MUJSP

MCMASTER UNDERGRADUATE JOURNAL OF **SOCIAL PSYCHOLOGY**

About Us
The McMaster Undergraduate Journal of Social Psychology is a student-run organization that was founded in 2019 by Namya Tandon, a fourth-year undergraduate student in the Honours Social Psychology program at the time. Dr. Sarah Clancy serves as the faculty supervisor for the journal. She supervises the capstone research projects that Social Psychology students complete during their final year of the program. The MUJSP aims to recognize the academic excellence of final year Social Psychology students by providing them with the opportunity to have their own work published in a journal.

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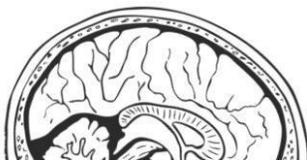## Acknowledgments

Table of Contents

Editorial Team

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Editor-in-Chief
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Raisa Jadavji
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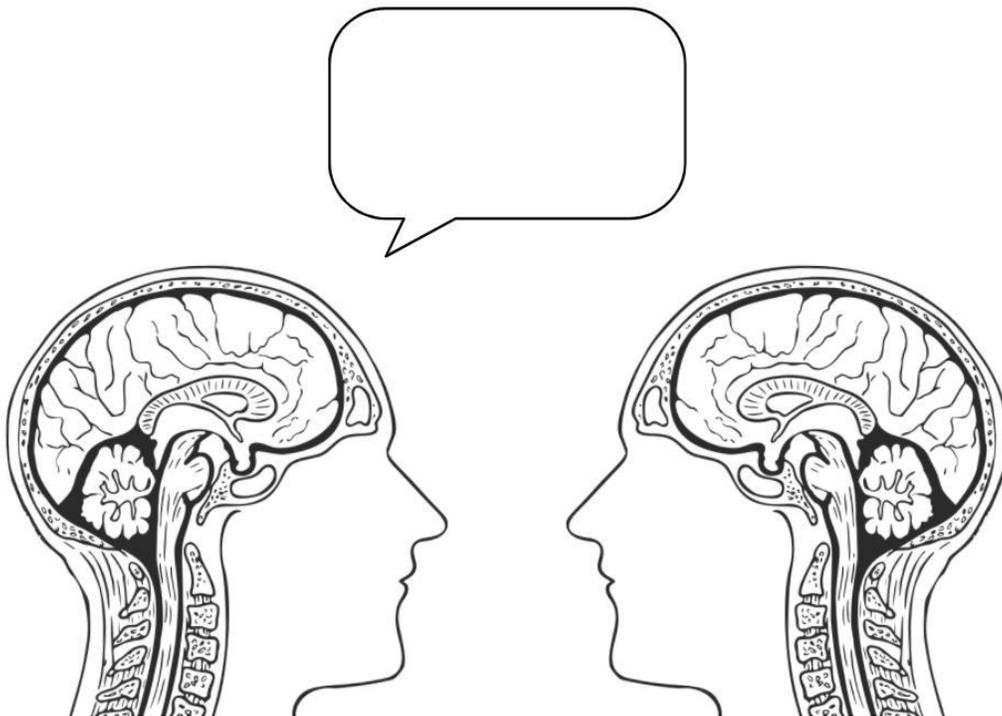
A Sign of the Pandemic Times? Completing a Virtual Group Thesis During COVID-19

A warm welcome and happy reading of the second issue of the McMaster Undergraduate Journal of Social Psychology! Since last year, the editorial team of the McMaster Undergraduate Journal of Social Psychology has grown and changed. Namya Tandon remains at the helm as editor-in-chief, as does Jordan Graber as graphic designer. After a fantastic year as assistant editor, Ranuli DeSilva has transitioned out of her position, with Raisa Jadavji and Angelo Marmolejo serving as co-assistant editors. Last, Christina Doan has joined the team as the layout editor. The entire team sends best wishes and thanks to Ranuli and extends a warm welcome to all new editorial members of the McMaster Undergraduate Journal of Social Psychology.

I have been teaching the capstone course since the 2014-2015 academic year and the hard work, dedication, and engagement of the students remains a constant feature each year. The enrollment of the capstone course continues to grow each year, with the 2020-2021 academic year consisting of 88 students with 17 unique research projects. As a result, there were six thesis papers this year that met the minimum standard of excellence of a grade of 85% or higher on the final thesis paper submitted for the capstone course, as per the publication criteria. As you will discover when reading these six articles, our undergraduate students are emerging young scholars interested in exploring timely, socially relevant, and important topics impacting their fellow peers. The six studies included for publication in this issue include the following (ordered alphabetically by study title): **Communication and the Maintenance of Relationships During The COVID-19 Pandemic** by Alyssa Nerland, Baila Lovejoy, Christina Doan, Jordan Graber, and Kirsten Hutt; **Exploring Perceptions of Positive and Negative Impacts of Students' Well-Being on Their Physical Health** by Mikayla Voets, Emily Bergsma, Kayla Zanon, Jacob Thomas, and Keeley McGrath; **Quantitative Study of Upper Year Undergraduate Students at McMaster University: Assessing the Intersection of Remote Learning, Social Experiences and Living Environments** by Isabella Batista, Victoria De Freitas, Jet'aime Fray-Samuel, Ashmeen Hayer, Theia Jamal-Sunderji, and Ashley O'Brien; **The Effects of Online Learning During the COVID-19 Pandemic on Undergraduate Students' Well-Being at McMaster University** by Kenya Cassidy, Cassandra De Lorenzis, Janelle Enns, Kenda Offinga, Haley Owens, and Emily Sorasit; **The Influence of Social Media on Undergraduate Students' Perceptions of Reality: Through the Theoretical Perspective of Groupthink** by Titi Huynh, Kristen Kostuch, Mya Martorano, Olivia McMurray, and Victoria Scimeca; and, **Undergraduate Students Experiences and Perceptions of Subjective Well-Being during a Global Pandemic in an Online World** by Catherine French, Kobika Kirubhakaran, Mehr Mahmood, Kelsey Reinink, and Bailey Stegenga.

It is hard to believe a year has passed since the very first publication of the McMaster Undergraduate Journal of Social Psychology! Words like lockdown, quarantine, social distancing, masking, and online, remote, or virtual learning have been a constant and all-

too-familiar part of our discourse and lived experiences, exemplifying the changing global world living with and through this global health crisis since early 2020. The pandemic changed the format of the capstone course, with the 2020-2021 academic year being the first in history to have the group thesis projects completely entirely online. While this certainly brought on unique challenges and hurdles, the students' adaptation to change was admirable and impressive. This was a new experience for everyone as we held class lectures, group meetings, and office hours virtually on Zoom, with groups connecting in similar ways to develop, design, collect data, analyze the findings, and prepare both a poster and final thesis paper showcasing their research. While only a portion of the thesis papers completed during the 2020-2021 academic year are included in this issue of the McMaster Undergraduate Journal of Social Psychology, the work completed by the entire class under unprecedented and unusual circumstances was commendable and should be recognized. If you would like to know more about the other projects completed during the 2020-2021 academic year, please see this link for more information on the virtual poster showcase: https://socialpsychology.mcmaster.ca/news/social_psych_capstone

The research studies in this second issue of the McMaster Undergraduate Journal of Social Psychology reflect the current lived reality of university students as they negotiate their way through a new world with pandemic restrictions leading to impacts on health and well-being, changing learning environments, engagement with and use of social media, and adapted modes of communication for living, learning, relationships, and connectedness with others. As with many studies conducted in the course and in the social sciences more generally, the sample sizes in these published studies are not generalizable. However, the findings in each study emphasize the importance of incorporating students' perceptions and experiences to developmental changes with online learning, classroom experiences, and impacts that pandemic living and learning has on the role and usage of social media in everyday lives, relationships, and the health, well-being, and wellness of the McMaster University student population.

Batista et al., (2021) and Cassidy et al., (2021) conducted research on the different experiences of remote learning during the pandemic among undergraduate students. Batista et al., (2021) found that remote learning negatively impacted many participants which was mediated, both positively and negatively, by one's living environment. The transition to moving back home, managing multiple home and school-related responsibilities, and learning online impacted not only one's academic experience(s), but also challenged their ability to sustain connections and relationships with others. In their study, Cassidy et al., (2021) determined the online learning environment negatively impacted students' well-being in numerous ways, including cognitively (increased stress, online learning fatigue, decreased motivation levels); physically (greater aches, pains, and strains due to increased computer and device usage); interpersonally (via decreased connectedness and contact with peers), and finally, academically (perceived decrease in quality of learning, lack of motivation, and decreased educational satisfaction). While some experiences were positive, both Batista et al., (2021) and Cassidy et al., (2021)

concluded the pandemic and online learning environment ultimately changed the learning landscape, with potential yet unstudied long-term impacts on students. These two studies emphasize the need for McMaster University to further develop and enhance online learning, teaching technologies and delivery methods, offer alternatives to cheating and plagiarism software, and increase opportunities for engagement among classmates and peers.

Nerland et al.,'s (2021) study identified that while undergraduate students were adaptive in their modes of communication to sustain and maintain relationships during the pandemic, many still experienced online fatigue and social disconnectedness. Their study highlights the need for further outreach programs, both on and off campus, as well as social support programs and services in both online and offline (in safe, public-health guided ways) capacities, to increase connectedness with others. In a world that has become so reliant on online modes of communication to safely connect during times of lockdown and isolation, Huynh et al., (2021) examined the negative impacts of social media usage and the link to behaviours, leading to a group-think mentality. This study highlights the need for greater awareness about online presence, engagement with social media, a critical understanding of the impact of others on decision-making and behaviours/actions, and the need for balance between on and off-line communication with others. While Huynh et al.,'s (2021) study did not specifically look at the role of communication during the pandemic, their study findings allude to the potential implications of greater reliance on informational and communication technologies as a form of connectedness, and the potential consequences of such usage on actions, behaviours, and relationships.

Last, both French et al., (2021) and Voets et al., (2021) explored impacts on students' well-being. Voets et al., (2021) found that as mental wellness decreased, students experienced greater incidences of physical health related symptoms, such as pains, headaches, tension, and muscle strains. Further, stress had the greatest impact on the relationship between physical and mental well-being among the university students, according to Voets et al., (2021). While coping mechanisms helped mitigate some physical and mental wellness related experiences, the authors found more can be done at the institutional level to support undergraduate students. French et al., (2021), on the other hand, examined the subjective well-being of undergraduate students, studying the definitional reality of 'living a good life' during a pandemic. While some participants noted benefits of participating in online activities and communities, offline and/or in-person forms of communication were strongly preferred, leading to greater subjective well-being and wellness. Moreover, strong bonds and social supports with family, friends, and the community were also found by French et al., (2021) to be advantageous to students' overall subjective well-being and perception of 'living a good life.' Both studies, therefore, underscore the need for accessible, inclusive, and readily available supports, activities (including leisure activities) and coping mechanisms offered on campus to reduce student stress, thereby improving students' health, well-being, life satisfaction, and outlook.

I hope you enjoy reading the important, interesting, and socially relevant social psychological research studies of the six respective groups featured in the second issue of the McMaster Undergraduate Journal of Social Psychology. The entire editorial board should be commended for their hard work and dedication on the publication of the second issue of the McMaster Undergraduate Journal of Social Psychology. I continue to be honoured to work, as Faculty Advisor, alongside intelligent, motivated, dedicated, and inspiring students: Namya, Angelo, Christina, Jordan, and Raisa, who serve as editorial board members, along with the six groups who were eligible for publication this year. Congratulations to all involved in the publication of the second issue of the McMaster Undergraduate Journal of Social Psychology - your hard work, dedication, and inspiring work is recognized, respected, and appreciated! Until next year's issue, stay safe, take care, and be well!

Sincerely,
Dr. Sarah Clancy, PhD
Faculty Advisor, McMaster Undergraduate Journal of Social Psychology
Assistant Professor
Honours Social Psychology Program
Department of Health, Aging and Society
McMaster University

Letter from the Editor

Dear MUJSP Readers,

It is my pleasure to welcome you to this year's issue of the McMaster Undergraduate Journal of Social Psychology. Now in its second year of publication, the MUJSP continues to recognize the academic achievements of final-year undergraduate students in the Honours Social Psychology Program, providing them with a forum to showcase their capstone research projects.

This year, a total of 6 research studies met the rigorous standards for publication. Within this issue, you will discover a variety of relevant research topics, ranging from how online learning during the COVID-19 pandemic affects the well-being of undergraduate students to the influence of social media on undergraduate students' perceptions of reality. The featured authors of this year's issue were in an unprecedented position, where for the first time in the history of this course, they completed their capstone research projects virtually. This year's issue is a testament to their perseverance and tenacity.

Since last year, the MUJSP editorial team has almost doubled in size. I would like to extend my sincere gratitude to the newest members of our team, Angelo Marmolejo and Raisa Jadavji, co-assistant editors, and Christina Doan, the layout editor, who should be commended for their enthusiasm and work ethic. I would also like to recognize Jordan Graber, the graphic designer, who has once again artistically captured the very spirit of the issue's contents. All members of the editorial team should be commended for their efforts in launching this year's issue, despite the challenges posed by the COVID-19 pandemic. Similarly, I would like to express my deepest appreciation to Olga Perkovic, the Research and Advanced Studies Librarian, and Gabriela Mircea, the Digital Repository Librarian, for providing us with the platform to publish the MUJSP and celebrate the achievements of social psychology students at McMaster University. Last but not the least, I would like to acknowledge the continuing role played by Dr. Clancy, the faculty advisor of the MUJSP, in being incredibly encouraging of the MUJSP editorial team, as well as all her students, including the featured authors in this year's issue. I, as well as the whole team, are very fortunate to have benefited from her kindness and generosity.

I hope you enjoy reading this year's issue, in which you will find some of the most distinguished research projects within the McMaster social psychology community. On behalf of the editorial team, I thank you for your continued support.

Sincerely,

Namya Tandon
Editor-in-Chief

Communication and the Maintenance of Relationships During The COVID-19 Pandemic

Alyssa Nerland[1], Baila Lovejoy[1], Christina Doan[1*], Jordan Graber[1*], and Kirsten Hutt[1]

Abstract

Communication is foundational to relationship maintenance. Humans have long relied on the body as a source of communicative interaction, and now must adhere to new ways of being due to the COVID-19 pandemic. This research focuses on the impacts on communication put in place by new pandemic-related restrictions, in addition to adaptive measures utilized by participants within peer and romantic relationships. 75 McMaster students completed an online, anonymous survey outlining communicative processes before and after the pandemic, newfound methods of communication, and any associated influences on the individual. The research finds that the COVID-19 pandemic has negatively impacted styles of communication, and despite finding new ways to remain connected, participants still experienced significant levels of social disconnectedness. This research may be used to further the understanding of how negative circumstances, such as the COVID-19 pandemic, may impact relationship quality and inform any future intervention strategies that could mitigate these effects.

Introduction

The topic that we have chosen to address concerns the ways in which the COVID-19 pandemic has impacted communication in both peer and romantic relationships. This topic is of interest to us because of our unique experiences throughout this time, and the curiosity surrounding how others' relationships have been affected by the changing circumstances. Alongside ever-changing restrictions comes new expectations of individuals concerning their proximity to those around them. We are interested in learning how people understand and navigate these new expectations, how their routines have adapted, or perhaps deteriorated, and most importantly, how these new safety guidelines have changed how people communicate and the effects this has on relationship quality. We argue that studying individuals during major world events is important to the understanding of human interactions as changing circumstances show the process of unique socialization in its purest form. We conducted our study using the research question: How has the COVID-19 pandemic impacted communication, and as a result, peer and romantic relationships?

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[1] Undergraduate Student, Honours Social Psychology Program, Faculty of Social Sciences, McMaster University, Hamilton, Ontario, Canada.
[*] While we both serve on the editorial board for the journal, there are no conflicts of interest in publication as all grading and final selection of papers eligible for publication were conducted at arms-length, with Dr. Clancy evaluating all final thesis papers and independently contacting the groups who were eligible for publication.

This paper will begin with a comprehensive review of literature that will give context to our research endeavours, as well as explain why the study of this topic is so relevant and important. Second, we will identify theoretical frameworks utilized in the examination of data. This will include both prominent theorists and their corresponding theories that will connect to the research in question. Third, we provide an in-depth review of our methodology, explaining each step of the research process to obtain our final set of data. Following this, the ethical risks of the study and the possible challenges we are anticipating will be outlined and explained further. Sixth, we will present the major findings from our collected data. Seventh, we provide a discussion of the limitations that the study faces, and the insights that we predict will be provided by the outcomes of this study. Lastly, we provide a summary and conclusion, along with the completed ethics protocol.

Literature Review

The subject of communication and its resulting impacts on relationships is complex. Prior research that focuses specifically on the interactions of communication, relationships and the COVID-19 pandemic are few in number. This is comprehensible, considering we intend to study an issue which has so recently unfolded. The work that does exist varies in context, geography, and field of study. Below is a thematic breakdown of literature that we will use to inform our research endeavours, focusing on the following concepts: relationships, communication, adaptation, and digital communication and its implications.

Relationships

One of the central ideas to this research is the concept of relationships. Throughout the literature, researchers understand that social relationships develop in many contexts and situations and in many different ways. Licoppe (2004, p. 9) defines a relationship as something that "stretches over a period of time that exceeds individual interactions". Licoppe (2004) further states how interactionist and constructivist models address relationships in terms of the sequence of organized interactions. These exchanges re-establish and reinforce social connection between individuals (Licoppe, 2004). These operationalizations of relationships can inform how our team understands the changes in relationship maintenance, by determining how and why relationships are maintained, and how alterations to that system impact individual and social levels of communication.

Some research has been conducted on the connections between the COVID-19 pandemic and relationships. Much of this research addresses the contextual circumstances that influence how romantic relationships are maintained. Pietromonaco and Overall (2020) applied a framework of relationship science to the current pandemic to determine how romantic relationships might be influenced. By utilizing theoretical frameworks, they analyzed past stressors and their impact on the adaptive behaviours of couples (Pietromonaco & Overall, 2020). They additionally examined how this challenged their relationships on deeper levels throughout the pandemic (Pietromonaco & Overall, 2020). Healthy relationships involved the recognition of needs and constructive problem solving (Pietromonaco & Overall, 2020). They found that external stressors, such as work or economic hardship, had the ability to undermine these healthy relationship processes (Pietromonaco & Overall, 2020). Furthermore, Watson et al. (2021) outline that our general contentment with relationships is dependent on mundane social interactions more

than is comprehended. The physical distancing outlines of COVID-19 provide a barrier to this level of connection felt in relationships as individuals are experiencing less mundane interactions than previous years.

Luetke et al. (2020) study on the impacts of the COVID-19 pandemic on romantic, intimate, and sexual partnerships similarly looks into the conflicts induced by COVID-related restrictions. Their findings revealed that 34% of participants experienced increased conflict and decreased intimate behaviours with their romantic partners due to COVID-19 and its resulting influences (Luetke et al., 2020). Many factors, including the decrease of social interaction, limited access to mental health care services, and separation from loved ones predict poor mental health outcomes, which in turn predict strained relationships (Luetke et al., 2020). These findings suggest that the added stressors put in place by the COVID-19 pandemic predict negative adaptations by individuals, which may negatively impact behaviours towards romantic relationships.

Some of the research conducted on relationships outlines the protective qualities of social interactions and support during stressful events. Bolger and Eckenrode (1991) developed a study which tested the ability of social integration to buffer the stress experienced during academic examinations. Social integration in this case refers to the average number of people a subject interacts with in specific familial, peer, voluntary or religious domains (Bolger & Eckenrode, 1991). They found that many subtle processes occur that impact how individuals perceive and seek social support. These are influenced by personality and social circumstances. Most importantly to our research, additional findings suggest a strong correlation between social integration and the reduction of stress during the time of a high stress event (Bolger & Eckenrode, 1991). While this research has implications for how negative stressful events can be buffered by the processes of social relationships, there are a few limitations. The study focuses specifically on one stressful event, while our research will more generally focus on broader life events or social circumstances. Similarly, their research has limitations in explaining in totality the relationship between such events and individual and social health behaviours.

Another important factor that impacts relationship maintenance is social interaction. Unfortunately, one of the main preventative measures towards the COVID-19 pandemic happens to be the reduction of social interaction. Social distancing and isolation measures have been a widely adopted tool in the fight against the spread of COVID-19. The reduction of disease transmission is the primary aim of social distancing and isolation strategies. These measures have the ability to slow the spread of the quickly travelling disease, but similarly place restrictions on how individuals go about establishing and maintaining their personal and romantic relationships. This may result in adverse social, psychological, and economic consequences, as noted by Block et al. (2020) in their study on social network-based distancing strategies. Similarly, the changing social atmospheres have led to a redefinition of social interaction that will inform how individuals interact with those around them.

Communication

Literature focused on communication demonstrates that due to its dynamic properties, it is a difficult concept to encompass in one definition. Solomon and Vangelisti (2010) address the functions of communication in the initiation, development, and maintenance

of personal relationships. Through sharing messages and generating shared meanings, individuals utilize communication in order to define associations and select appropriate behaviours (Solomon & Vangelisti, 2010).

The current pandemic has forced new methods and frequencies of communication for many. Adami et al. (2020) developed a manifesto with aims of presenting the changes in communication due to the COVID-19 pandemic, in addition to interventions which may inform future research. These researchers first address the importance of considering communication practices throughout and after the pandemic. Research on the immediate mental and biological health-related challenges faced by the general public have been given priority. While these efforts are essential, Adami et al. (2020) establish the importance of the social and communicative changes that will undoubtedly impact society for the foreseeable future. The complex system of communication has long relied on the human body for social interaction, and the restrictions based on the spreading pandemic has reshaped how we define these interactions (Adami et al., 2020). New social norms have forced us to learn new ways of living, new ways of mediating in-person interaction, new avenues for social connection (mainly technological) as well as new processes of making meaning during interaction (Adami et al., 2020). These changing parameters surrounding communication among individuals require a consistent renegotiation.

Adami et al. (2020) urge the recognition of the many faces of this issue and the reach it has, demographically, geographically and socially. Similarly, they recognize the interdisciplinary scope and complexity of the issue of communication with others during a global crisis. Their work can inform how we think about our study. It will be essential to our study for us to understand the intersectionalities and complexities of this topic. In order to contribute to this body of knowledge, we must recognize that there will be no clear solution, but an abundance of difference that might allow us to advocate on a broader level.

Adaptation

Many implications within related research investigate the adaptive processes of individuals when experiencing negative events. This is an important aspect to consider, as it will be an essential task to determine how to address the impacts of COVID-19 on communication and in turn, peer and romantic relationships. Licoppe (2004) suggested that relationships are dependent on communicative devices. If we understand that interpersonal relationships rely on communication, we must similarly understand how the current state of the world has partially blocked the ability to do so in face-to-face contexts. To combat this, individuals either do or do not find ways to combat these challenges by finding other ways of maintaining their peer and romantic relationships.

Technologically based social interaction is one frequently noted method to maintain relationships in lieu of COVID-19 related restrictions. Due to the multiplicity of spaces in which relationships can exist, it has become increasingly common to develop and maintain relationships without ever interacting in a face-to-face context (Licoppe, 2004). Licoppe (2004) further outlines how multiple management strategies, including spread-out, long or frequent, short discussions over the phone can assist individuals in feeling a connection with more permanence. Other strategies included short and frequent texts as gestures that reinforce social connections (Licoppe, 2004). Researching communication between university aged students in the 2020-2021 year increases the importance of

literature on technologically based communication. Turner (2015) notes that Generation Z, the generation that a majority of current day university students are in, are motivated strongly by technology. This cohort of individuals have continuously found comfort in online communication, preferring it over face-to-face interaction before COVID-19 (Turner, 2015). This style of communication is different from those of previous generations as Generation Z has grown and developed in a technology boom that largely determines much of their lives (Turner, 2015). When studying communication in a physically distanced social environment, such as that of COVID-19, this dependence on virtual communication is important to the understanding of preferred communication methods.

Multiple studies similarly address the utilization of social media as a method of increasing positive social behaviour without the ability to have face to face interactions. Moore and March (2020) utilized an online survey in order to collect data on perceived levels of loneliness during early periods of social isolation imposed by the Australian government. Through question scales, researchers measured perceived loneliness, levels of connection and utilization of healthy coping behaviours. The results suggested that medium to high levels of loneliness were experienced by participants, who also demonstrated lower usage of healthy coping mechanisms (Moore & March, 2020). Alternatively, their study revealed that connecting with others via phone, messaging or other social media platforms positively related to healthy coping behaviours (Moore & March, 2020). Media connectedness with others further predicted that individuals would proactively maintain individual mental health (Moore & March, 2020).

Another common consideration within reviewed research is the idea that each relationship will vary in regard to the adaptation methods used. As cited previously, Pietromonaco and Overall (2020) address the many contextual factors which may increase the negative influences on couples' relationship satisfaction. Past experiences and life circumstances predict the ability of individuals to navigate the uncertainty of the COVID-19 pandemic (Pietromonaco & Overall, 2020). They conclude, in addition to the implementation of policies that would remove socioeconomic and healthcare related barriers, couples may benefit from learning positive adaptive relationship processes, including learning how to communicate with and support their partners (Pietromonaco & Overall, 2020). This research does, however, address the social circumstances of older adults. As we are studying the undergraduate student body, we may need to consider the alternate potential intersectionalities being experienced by younger populations.

Digital Communication and Its Implications

As the pandemic has shifted interaction away from in-person communication, understanding the implications of social media and digital communication methods is imperative to our knowledge of relationship processes. Thorisdottir et al. (2019) describe two types of social media use: active and passive. Active social media use is defined as "chatting, sharing photos, or status updates with a specific audience or posting other personal content that others can then comment or give likes" (Thorisdottir et al., 2019, p. 536). Passive social media use is defined as "browsing, scrolling, reposting links, or looking at content from others" (Thorisdottir et al., 2019, p. 536). However, the consequences of social media use may differ depending on the type. Escobar-Viera et al. (2018) explain that those who use social media more passively are more likely to

experience feelings associated with depression and anxiety. It is crucial to examine digital communication habits, including social media use, during the pandemic due to the change in available methods for communication and the psychological impacts of isolation. Due to environmental factors and situational differences, romantic relationships will be affected differently than peer relationships by the mass amount of digital communication brought on by the pandemic (Thorisdottir et al., 2019). Thorisdottir et al. (2019) explain that active social media use does not have the same negative outcomes on romantic relationships as it does on peer relationships. It is imperative that we examine both how the effects of digital communication will be altered due to the pandemic, as well as how they differ between romantic and peer relationships.

Increased social media use is also associated with social distress that has the ability to impair relationships when experiencing an environment such as COVID-19. Hetz et al. (2015) describe the concept of Fear of Missing Out (FOMO): individuals concerned about being excluded from social experiences that their peers are enjoying. FOMO generates feelings of disconnection that encourage the increased use of social media to mitigate the negative effects; increased exposure to social media, however, exacerbates the number of experiences one is exposed to and creates a cycle of FOMO (Hetz et al., 2015).

Summary

This literature review addressed a number of topics relevant to the purpose of our research. It first conceptualized relationships and the processes that assist in their development and maintenance. Next, we covered the definition of communication, in addition to multiple variables that influence how and why individuals connect with each other in the ways they do. Further, adaptive methods were outlined in relation to the COVID-19 pandemic. These included new ways of interacting with peers and partners based on pandemic-related restrictions. Finally, we discussed digital communication, passive and active social media use, FOMO and the resulting effects on relationship processes.

Concluding Remarks

Research on the COVID-19 pandemic, while emerging, remains sparse. Much of the research discussed in this review varies in its relationship with our purposes. There are demographic, field of study and thematic limitations in the peer reviewed research on relationships and the COVID-19 pandemic. Each of these limitations reinforces the importance of our research. Our study will look more specifically at the impacts of recent months and events on personal relationships of undergraduate students. We wish to take a broader look at the new ways of conceptualizing relationship maintenance among university students, how communication has been impacted and similarly how it has been redefined in order to increase positive relationship growth. Through this, we have the potential to further develop an understanding of the social circumstances of young people during a global crisis. Studying complex topics such as relationships and communication is a feat, in that these concepts are addressed in alternate styles based on several individual cognitive and social factors, in addition to contextual variables. It is important to address these differing styles of communication and adaptation to adversity because it can provide a deeper comprehension of the ways in which social issues may be addressed on a level that can assist as many populations as possible.

Theory

Symbolic Interactionism (SI)

The perspective that we are interested in using is Symbolic Interactionism (SI). The term was originally coined by George Herbert Mead, but Blumer is recognized to be the father of SI as he formally defined and developed three premises (Blumer, 1986). In his work, *Symbolic Interaction: Perspective and Method* (1986), Blumer (1986, p. 27) explains SI to be "the study of how people negotiate the meaning of social life during their interactions with others." The viewpoint is at micro level and heavily emphasizes meaning making processes as individuals have the agency to explore their socially structured societies (Blumer, 1986, p. 2). In addition, Blumer (1986, p. 2) defines the three premises of SI: meanings arising out of social interaction, "human beings [acting] towards things on the basis of the meanings those things have for them" and meanings going through an interpretative process in order for human beings to determine whether they want to accept or reject them.

Our group chose SI to be a prominent theory for our research as we have an understanding that every individual has different social interactions and experiences, having high potential to influence an individual's mindset and beliefs. As a theory, SI postulates that individuals are the social agents to discover and learn about their social institutions, implying high amounts of diversity from social interactions despite being in the same society (Blumer, 1986). Through the completion of this research project, we hope to gain insight into the lived experience of McMaster University undergraduate students as they navigate different meanings regarding social interactions and connections through the COVID-19 pandemic.

Definition of the Situation (DOTS)

Definition of the Situation (DOTS) was developed by American sociologist, William Isaac Thomas. The concept focuses on individuals analyzing the social conduct of a situation. Thomas (1931) explains the purpose of DOTS as the following:

Preliminary to any self-determined act of behaviour there is always a stage of examination and deliberation which we may call *the definition of the situation*. And actually not only concrete acts are dependent on the definition of the situation, but gradually a whole life-policy and the personality of the individual himself follow from a series of such definitions. (p. 254)

The evaluation includes: the roles of every individual (including one's own role), the mental state of each individual, the accepted behaviour norms that are set by society and by the environment of the situation, a shared sense of goals and appropriate action, and the meanings behind each of these aspects (Thomas, 1931). The result of individuals learning of the DOTS will give them the understanding of what is expected of them and of other members, the goals of the situation, and what social behaviours are deemed appropriate.

Our group decided to use this theoretical framework as we found it was important for us to understand what actions people may take based on the situation they are in, when communicating with others. We recognize that there is a possible decrease with in-person conversations and potential increase in virtual conversations in order to "flatten the curve" of COVID-19. We can apply Thomas' (1931) DOTS concept of "situations" to the assortment of communication methods (i.e., texting, direct-messaging, audio/video-

calling). From here, this framework can help us acquire information and compare the differences in self-presentation based on the social setting the individual is in.

Frame Analysis (FA)

Frame Analysis (FA) was developed by Erving Goffman. Goffman (1974, p. 21) describes frames as "the principles of organization which govern events — at least social ones — and our subjective involvement in them", leading to the definition of frame analysis to be "[a] 'schemata of interpretation' [that] helps people to 'locate, perceive, identify, and label' everyday events." Goffman (1974) explains how a frame analysis begins with "a transparent view of reality" (Ritzer, 2003, p. 54), that is known as a primary framework; the framework can be natural (based on physical events), or social (based on human interactions). From here, the primary framework can be transformed into either keying, "meanings [being] transformed into something patterned on but independent of the initial frame" (Ritzer, 2003, p. 54), or fabrications, "a false belief about what it is that is going on" (Goffman, 1974, p. 83). Both have the ability to influence our interpretations and meanings, as they can alter our sense of reality.

Our group decided to include Goffman's (1974) FA in our work as it helps us understand the interpretations and meanings that individuals have developed out of their social interactions. Now that there are rules about physical distancing during the COVID-19 pandemic, there has been an increase in social interactions being done virtually. Compared to in-person interactions, this can be challenging to interpret the meanings of certain messages, as there is no concrete display of emotions. With this framework, we can gain insight into the interpretations that individuals have within their conversations, how some interactions are thought to be more significant, and why certain communication styles have produced more meanings than others.

Perspective-Taking Model (PTM)

Robert L. Selman (1973) created the Perspective-Taking Model (PTM), which is also recognized as the role-taking ability. Delamater, Myers and Collett (2019, p. 281) describe PTM as the communication between individuals that use symbols and meanings in order to convey a shared context. Selman (1973) describes three stages of social perspective taking. The first stage is called "Egocentric Role-Taking" (Selman, 1973). According to Selman (1973), between the ages of four to six, a child has difficulty with the distinction of perspectives, especially between their own and of others. Selman (1973) identifies "Social-Informational Role-Taking" as the next stage, where six to eight-year olds understand that others may possibly have contrasting views from them despite being in the same social setting, which can lead to different information that was not a part of their view. The final stage, set for ages eight to ten, is the "Self-Reflective Role-Taking" (Selman, 1973). With the acceptance of the previous stage, the child is now able to understand the concept of them being able to interpret their thoughts and feelings through the lens of another person's eyes and that others have the ability to do the same for them as well (Selman, 1973).

Our group felt that the PTM would be another excellent framework for our research project as it would give us a deeper understanding of the various perspectives that we may encounter during data analysis. Although our survey questions are set to be answered in the perspective of the individual taking the survey, there are some questions

that require the individual to be empathetic and consider the views of the significant other(s) in their life. For example, our survey includes questions that discuss the challenges that have emerged in the individual's communications with their interpersonal relationships; individuals can select multiple options that best apply to them as well as type in their answer for other options that are not displayed. Not only do these questions encourage the individual to reflect on the struggles that they have been having, but also the potential struggles that their significant other(s) may be experiencing. Having this theory as background context will help our group recognize the reasoning behind certain choices that the individuals made in the survey.

Interpersonal Spacing

Delamater et al. (2019, p. 284) define interpersonal spacing as the "positioning of [one's] body at varying distances and angles from others." Some examples of interpersonal spacing may be sitting close or far from someone, using barriers to avoid close proximity, turning away, looking straight forward versus looking to the side, and intimate closeness. Despite interpersonal spacing being a type of nonverbal communication based on physical closeness and body language, it has the potential of conveying certain messages. For instance, if one's significant other sees their partner sitting on the couch and chooses to sit beside them, it can be identified that they are happy to be with their partner, but if they choose to sit on the opposite side of the couch while turning their back, they can identify them being angry at their partner.

Our group decided to include the theoretical framework of interpersonal spacing as we are interested in seeing how the communication between individuals will vary as interpersonal spacing varies. Returning to the concept of physical distancing and the set regulations of minimal contact with others, the use of interpersonal spacing has exponentially decreased, causing the possible difficulty of understanding specific impressions from others. Our research group would like to study how the lack of interpersonal spacing has affected communication in peer and romantic relationships, as well as the alternatives that participants have been utilizing to express emotions (in a non-verbal manner).

Summary and Concluding Remarks

The frameworks that our group chose for our research project are Symbolic Interactionism by George Herbert Mead, Definition of the Situation by William Isaac Thomas, Frame Analysis by Erving Goffman, the Perspective-Taking Model by Robert L. Selman, and Interpersonal Spacing by John Delamater, Daniel Myers, and Jessica Collett. We believe that Symbolic Interactionism will aid us in learning the numerous, diverse perspectives that individuals may develop as they experience the COVID-19 pandemic. As well, Thomas' Definition of the Situation gives us the understanding of how certain behaviours have the power to change the dialogue based on which communication method is being used. Frame Analysis will aid our examination of the varied interpretations that individuals develop during their interactions. With the Perspective-Taking Model, it will benefit our research as it will help us understand individuals' perspectives within social interaction. Our last framework, interpersonal spacing, will emphasize how communication between individuals may differ without the influence of physical proximity and body language.

Methodology
Problem Statement and Research Questions
   The COVID-19 pandemic has affected individuals globally in a variety of ways. Living through a global pandemic presents many challenges to the relationships we find ourselves involved in. This includes family, friends, and romantic partners. By drastically reducing our ability to interact with those outside of our current household, it creates problems with communication and can lead to relationship problems or, in the most extreme cases, relationship termination. Communication processes are now more frequently conducted via electronic means (i.e., texting and video chat), where it is harder to convey emotion, intention, and tone. Miscommunication can lead to frustration within relationships and may lead to further issues. Due to the challenging circumstances caused by the COVID-19 pandemic, it may be increasingly difficult for individuals to communicate with their peers and romantic partners. Lack of in-person contact and communication makes it significantly harder for most individuals to maintain their close relationships. Through this research, we hope to discover the ways undergraduate students have attempted to counteract the effects that the current pandemic has placed on communication across relationships.
   Our research intends to discover how the process of communication and maintaining strong peer and romantic relationships has been affected by the COVID-19 pandemic. We chose to conduct research on this topic for several reasons. The primary reason is the lack of research surrounding the pandemic, giving us the ability to discover how the pandemic has affected different relationships while we are experiencing it. Each group member has experienced changing relationships in unique ways, and we were and remain interested to hear other individuals' stories. We have chosen to explore peer and romantic relationships because it will give us an understanding of how the different areas of our relationships have changed and how we have come to adapt to the changes in each area.

Ethical Considerations
   The research was approved by the McMaster Research Ethics Board (MREB #: 0327). This research project posed no greater risk than that of everyday life, with the following ethical concerns being acknowledged and controlled to the best of our ability. There were no physical risks that the participants faced, but there were possible social and psychological risks that we acknowledged and planned for in this research. Socially, we acknowledged the risks of privacy and confidentiality for participants. Although this was an entirely anonymous survey, we acknowledged that participants may not have had access to a private space or device in which to complete the survey. We acknowledged that this could cause concerns about their privacy in these spaces, and participants may have experienced stressors or social consequences from the presence of others. The psychological risks that may have occurred during this research include the discussion of relationships and subsequent problems within them. Participants may have experienced unpleasant feelings if reminded of negative memories or thoughts about their relationships while answering the survey material. This was unique and dependent on the individual's experience with relationships and the effects of COVID-19. As these thoughts have a higher potential to occur in day-to-day life, we concluded that feeling negative

thoughts about a recent negative interaction (within the COVID-19 timespan) was within the realm of minimal risk.

We prepared the following procedure to manage these risks. To address the social risks involved in this research, we explained to participants through the recruitment and/or study instructions that they have the ability to take this survey at any time, and in any space that they feel the most comfortable. In these explanations, it was ensured that all information collected was confidential in nature, and there was no way for us to trace these responses back to them. Finally, participants were informed that they were free to withdraw from the survey at any point if they felt uncomfortable proceeding, and that they were welcome to not submit their responses at all if they felt discomfort or stress around doing so. To combat the potential psychological risks, a letter of information was created to provide each participant with the knowledge of these risks, to ensure confidentiality and to give participants the ability to make an informed decision on whether or not to participate in the survey. Additionally, each question in the survey contained a "Prefer not to Answer" option that allowed participants to move past questions that may elicit negative emotions. Similar to the social risk management, participants were informed of their freedom to stop and exit the survey at any time without repercussions. To help combat any emotions that were brought up for participants, contact information and links to resources available at the Student Wellness Centre were provided in both the Letter of Information and at the final page of the survey to support students if they were experiencing distress.

In making the study ethical, we felt it was important to acknowledge potential conflicts of interest, how those were managed to remain impartial, and not apply pressure to participants to answer survey questions in a certain manner. Each member of this research team is a fourth-year student at McMaster University, and therefore all had student-to-student conflict of interests with potential participants. Each member also has unique roles in various groups on campus that created conflict of interest. These roles are as follows:

At the time of our research, Jordan Graber worked with the executive team of the Social Psychology Society, as well as MSU's Maccess as a Volunteer Peer Supporter. She was also a Blu Cru representative and the Graphic Designer for the McMaster Undergraduate Journal of Social Psychology. Baila Lovejoy was a member of the Social Psychology Society executive team. She was also the coordinator of MSU Spark and was a member of the Mac Dance Recreational Team. Additionally, she worked as a Dance Marathon Subcommittee member as a part of McMaster Smiling Over Sickness. Alyssa Nerland worked as a Teaching Assistant and was another member of the Social Psychology Society's executive team. She was also a Blu Cru Representative. Christina Doan was the Public Relations Coordinator of the Music Society, the fourth-year representative of the Social Psychology Society, a member of the David Gerry Flute Ensemble, and a Teaching Assistant. Kirsten Hutt was a part of the Women's Rugby team at McMaster.

We planned to manage these conflicts in multiple ways. First, recruitment only took place on third party platforms, referring to clubs and societies on campus, meaning that no member of this research team recruited participants through personal social media or personal interactions. This ensured that no participant would be addressed directly by the members of this team. Kirsten acted as the recruitment director as she had the least number of affiliations on clubs and had no affiliations with any of the chosen third-party

platforms to recruit through. Participants were also fully aware of who all the researchers were in this study, so they were able to make an informed decision on their desire to participate. By having a completely anonymous survey, participants could be confident that their participation would not be known by the researchers should they have a relationship with any of us, which aided in preventing any biases from occurring.

Research Methodology

For our research study, we utilized a quantitative methodological approach to study how communication and relationships have been impacted by the COVID-19 pandemic. Upon approval, this approach took form in an online anonymous survey, hosted on the McMaster Research Ethics Board (MREB) approved site, LimeSurvey. We worked with convenience sampling, through the use of third-party recruitment. We chose this method of research because it allows minimal in-person contact, flexibility during the design process and due to its interpretive and financial convenience.

Minimal contact was beneficial to our study due to COVID-19 safety concerns and restrictions. Individuals had the ability to complete this survey in any place and at any time of their choosing, without any requirement for in-person contact. This similarly left little room for influence due to researcher bias. In addition, this type of data collection allowed us to utilize a range of question forms. One that we were very interested in using was the Likert Scale, which allowed us to easily collect and compile a large variety of information from participants. Likert Scales are also user friendly and made the survey experience more positive for student respondents. This survey method provided us, as researchers, with flexibility in developing our questions, in addition to analyzing and comparing results. The online survey also allowed us to reach a large sample size, while using limited resources.

Steps of Research Process

This section of the proposal will outline the steps that were taken to establish, plan and begin the process of our research. We began by first brainstorming our topic of study. We wanted to find a subject that was neither too broad nor too specific in scope in order to ensure there would be fewer difficulties in the collection of data, and the applicability of findings. During this process, we were particularly interested in multiple topics concerning the current social climate. This included varying subjects related to and influenced by the COVID-19 pandemic. Due to our personal experiences with recent events, we ultimately decided to centralize on this topic for our project. We felt that this was a unique opportunity to learn from an event of global proportions that has been experienced both individually and collectively. We discussed the importance of gathering this first-hand information as it unfolded, in order to inform policy and interventions aimed at supporting individuals through similar events in the future.

In the next part of our brainstorming process, our branched ideas included the pandemic's impact on academia and social relations. As students of the Honours Social Psychology Program, we recognized the importance of relationships and the influences of negative contextual stressors. The concept we initially finalized concerned how romantic relationships were impacted by the COVID-19 pandemic. However, this concept developed as we consulted Dr. Clancy, collected background research, considered ethics, and discussed our unique experiences with COVID-19. Our next drafted question

considered the influences of the pandemic on family, peer and romantic relationships. When developing survey questions and consulting research, we still found this topic to be too broad in scope. We found that it would be best for our research to find a specific area of interest that has connections to how people maintain social ties with those around them. Ultimately, we closed in on the question: How has the COVID-19 pandemic impacted communication, and as a result, peer and romantic relationships?

Along with the finalization of our research question, we operationally defined the terms we would be working with. We defined the COVID-19 pandemic as the time period beginning on March 13, 2020 and going until the present day. We defined peer relationships as long-term social connections with others that you are not biologically related to and have no romantic affiliation with, otherwise known as the colloquial term of friendship. We defined romantic relationships as connections between individuals with a mutual understanding of a romantic interest. We also understood that online fatigue could potentially be a common theme throughout our research study. According to Dhir et al. (2018), social media fatigue is best defined as "a situation whereby social media users suffer from mental exhaustion after experiencing various technological, informative and communicative overloads through their participation and interactions on the different online social media platforms" (p.1). To broaden the definition to all digital communication methods, rather than specifically social media use, we adapted this definition to "a situation whereby individuals suffer from mental exhaustion after experiencing various, technological, informative and communicative overloads through their participation and interactions through the different digital communication methods, such as texting, video calling, audio calling etc." in order to best fit the needs of our research.

Our next step in designing this research project was examining and managing ethical considerations and possible risks. We have designed this research to be minimal risk. As per feedback from Dr. Clancy, we first changed our initial topic from being strictly about romantic relationships to including peer relationships. As a group, we discussed and managed the social and psychological risks that are outlined and described in the outline of steps in the research process. With all these ethical considerations in mind, we next filled out the McMaster Research Ethics Board (MREB) form, as per direction from Dr. Clancy.

In the process of confirming our research topic and questions, we met weekly with Dr. Clancy to discuss any progress we had made in that week and welcomed any feedback she could offer. In the following week, we would use our group's personal meeting time to discuss the feedback Dr. Clancy had offered, leading us to adapt our topic and research questions as needed. Throughout each change, including focusing more closely on communication within relationships, we kept open lines of communication amongst the group to ensure we were all in agreement with every decision. Additionally, we gained Dr. Clancy's approval on all revisions before moving forward with the development of our research project, as well as received general suggestions that helped us in working more effectively and efficiently. Finally, we confirmed that our research question would address how communication has been affected in peer and romantic relationships during the COVID-19 pandemic through email correspondence with Dr. Clancy.

Once we had our research area of inquiry, we developed a general research question that the pandemic has impacted communication, but that individuals may feel the impacts differently based on their unique experiences. Additionally, we believed that

communication within peer relationships has been impacted; however, we believed that the impacts would be felt more drastically within romantic relationships, in comparison to peer relationships. Next, we anticipated that individuals would have developed adaptations to their communication styles in order to be more suitable to the COVID-19 pandemic. For example, individuals may have used video-calling more frequently and in-person communication less frequently than they did before the commencement of the COVID-19 pandemic. Finally, we predicted that due to individual, personal, and contextual factors, each person would report an alternate experience of the effects this pandemic has placed on their communication, and their relationships.

The next step was choosing theoretical frameworks. During our weekly video-call meetings, we looked through a variety of social psychology textbooks and communicated with Dr. Clancy in order to determine which frameworks would be best to use when analyzing our collected data. Over time, we settled for five social psychological theories: George Herbert Mead and Herbert Blumer's Symbolic Interactionism, W. I. Thomas' Definition of the Situation, Erving Goffman's Frame Analysis, Robert L. Selman's Perspective-Taking Model, and John D. Delamater, Daniel J. Myers, and Jessica L. Collett's Interpersonal Spacing. To begin, we chose Symbolic Interactionism to be one of our theoretical works as we wanted to analyze the different experiences that individuals have endured during the COVID-19 pandemic. Next, we utilized The Definition of the Situation as we felt that Thomas' idea of the "situation" could be applied to our research as the virtual platforms that individuals are using. Our choice of Frame Analysis was inspired by how individuals view certain conversations to be more salient than others and how these salient conversations may come from certain communication methods. Moreover, the Perspective-Taking Model helped gain insight on the individualistic perspectives that have developed due to differing experiences of communication during the COVID-19 pandemic. Our last framework, Interpersonal Spacing, helped us learn about how individuals non-verbally express emotions without the assistance of physical proximity and body language.

Next, we brainstormed potential research questions for participants. These questions were informed by the literature reviewed and theories chosen. We based our questions on specific themes. These included the methods and changes in communication, as well as the emotions revolving around them. We ultimately decided on utilizing two sets of identical questions. One set was geared towards peer relationships, while the other focused on romantic relationships. Each question was thought of and approved by each member of our group.

After successfully developing our survey questions, we drafted the letter of information and the recruitment scripts that were used for acquiring participants through third-party sources. We followed the template given through the thesis class (SOCPSY 4ZZ6) to ensure the letters were done to completion and to the best of our ability. The recruitment script included: the researchers names and emails, the purpose of our study, the topic of interest, the procedure used for data collection (online survey), a statement regarding the length of the survey and three sample questions. All these components provided the third-party individuals with the ability to make an informed decision on whether or not they would like to promote our study to their followers. The letter of information given to consenting participants included the same details, with the addition of participant centered information. This included an oath of confidentiality, information on where to find help

should distress occur, and information on where to view the findings of this study after completion. This allowed the participants to have all the knowledge possible on this study before agreeing to continue. These documents were completed by Kirsten Hutt, as she was the individual in the team that was not affiliated with any of the third parties that we contacted.

Gaining ethics approval was the next step of our research process. We received feedback from Dr. Clancy, accordingly revised our research process and adapted to those changes to create an effective research design. After completing revisions and receiving final ethics approval, we reached out to various clubs and organizations across campus (listed in the next section) to recruit participants. 75 participants completed our online anonymous survey, detailed below.

When creating our online anonymous survey, we used the MREB approved survey website, LimeSurvey. In response to the advice from Dr. Clancy, we limited our number of questions to under 30 to reduce question fatigue. This survey took participants no longer than 15 minutes to complete and was possible to complete anywhere at any time so long as they had access to an Internet connection. Participants were also able to withdraw from the survey prior to submission and could choose not to answer any question at any time. We chose a combination of single multiple-choice questions, as well as Likert scale questions. Using a diversity of question types allowed us to gain a better understanding of how communication has been affected within our sample population.

Following ethics approval, and the development of our required documents, an email was sent to our list of third parties for external recruitment. This email included a letter of information and recruitment script. The list of third parties that we reached out to is as follows:

McMaster Sociology Society	McMaster Engineering Society	McMaster Public Health Association
Labour Studies Student Association	Communications and Multi-Media Society	McMaster BioPsych Society
Psychology Neuroscience and Behaviour Society	McMaster Social Work Student Collective	McMaster Smiling Over Sickness
MacKin Society	McMaster Social Science Society	Mac Dance Recreational Team
McMaster Linguistics Society	McMaster Anthropology Society	Mentorship at Mac
McMaster Social Psychology Society	MSU Maroons	

We reached out to a large number of student program societies and clubs, as we recognized that not everyone would consent to post our study on their platforms. This way, we had a greater chance of receiving a larger sample population. Once the emails were sent to our list of McMaster affiliated groups, each had the opportunity to decide

whether or not they would share a recruitment email and our research poster with their members, as well as on their social media platforms. These documents were sent out along with a link to the survey. Of the groups reached out to, the McMaster Social Science Society, Mac Dance Recreational Team, MacKin Society, McMaster Linguistics Society, and McMaster Social Psychology Society were the clubs that responded to our recruitment email.

Students who came into contact with our project through these third parties had access to a link that directed them to our survey. Before commencement, they were provided with a letter of information as previously described. The extensive explanation through these first pages provided students with all of the information needed to make an informed decision about participating in the survey. If they chose to move forward to the questionnaire, they first needed to agree to the terms outlined prior, by selecting the option that begins the survey. This confirmed their consent to participate in our research.

Next, students spent time completing the survey questions. This took approximately 10-15 minutes, as noted before commencement of the survey. As discussed earlier, students also had the ability to skip any questions which they did not feel comfortable answering. Similarly, they had the option to exit the survey at any given moment, without repercussions. If the student completed all questions of the survey and selected the "submit survey" button, their data was collected. Following their completion, participants were directed to a screen which thanked them for their participation, as well as provided them with resources to the Student Wellness Centre. This was available in the case that students require assistance following the content addressed within our research study. Finally, additional information about the upcoming poster session was provided on the final screen.

Our next steps involved data analysis, which will be addressed more thoroughly in the final section of the methodology.

Potential Challenges in Data Collection and Analysis

Due to the unique nature of the current pandemic, we detected several challenges that could impact data collection or data analysis. One of these challenges was the ability to recruit participants. Since our recruitment was conducted exclusively online via email, there was a chance that a smaller portion of the undergraduate student body was exposed to our survey. This would result in a small sample size at the end of the research, making the data hard to generalize for the student population. On top of these concerns, we also faced the potential challenge that participants would withdraw from the survey prior to completion, resulting in the loss of data. With the potential for a small sample size, participants not completing or submitting the survey at the end could mean missing out on large portions of data that would otherwise be crucial to the formation of trends and patterns.

As this was our first independent research endeavour, we saw potential challenges with correctly addressing the steps of data collection and analysis. Additionally, our group was unable to meet in-person to analyze data, which created further communication issues. We chose to conduct most of our work via Facebook messenger or Zoom meetings. We recognized that this process would be a learning experience for all, and to address these problems we ensured to seek assistance when needed.

Data Collection Timeline and Data Analysis

Our timeline for data collection, analysis and project completion proceeded as follows:

Project phase/assigned work	Tentative date of completion
Submit research project proposal and ethics protocol	October 20, 2020
Meeting with Dr. Clancy to discuss research proposal and ethics protocol	October 29, 2020
One to two-page overview of research due	November 19, 2020
Deadline for revisions of research project proposal and ethics protocol	November 20, 2020
Tentative recruitment start date (email faculty societies and other clubs)	November 23, 2020
Tentative date of survey opening	November 23, 2020
Survey closes	February 12, 2021
Start data analysis	February 14, 2021
Finish data analysis	February 26, 2021
Start to assemble poster content	February 27, 2021
Deadline to assemble poster content	March 9, 2021
Conduct poster revisions	March 10, 2021
Deadline for final poster edits	March 15, 2021
Prepare virtual poster presentation	March 10 - 17, 2021
Virtual poster presentation	March 18, 2021
Soft deadline for read through for final thesis paper	March 27, 2021
Deadline for final thesis paper	April 1, 2021
Deletion of all research data	April 2021 (following submission of grade)

As discussed previously, our survey closed on Friday, February 12th, 2021, after recruiting 75 participants. We met the following Sunday to commence the data analysis process. In this time, we went over participant responses within LimeSurvey, plans for

analysis, and consulted multiple sources explaining the alternate resources available for analyzing our findings, including PSPP.

Our research team utilized the PSPP system to analyze the information for patterns, trends, and overall themes. We had initially planned to use SPSS to conduct the analysis of our LimeSurvey data upon collection. However, we ultimately chose to use PSPP, a free platform available online. This program was simpler to access, as SPSS is a program typically used through McMaster computers. Due to the pandemic, we were unable to reach campus to access these technologies. Kirsten Hutt and Christina Doan downloaded the program to their laptops, and were selected to import the data into PSPP.

We downloaded one syntax file and one Comma Separated Value (CSV) file from LimeSurvey. These were then uploaded to PSPP. From here, we developed data charts. We encountered issues with making cross-tabulations, inputting and formatting the data into the charts, and multiple stylistic aspects. Due to this, our team transferred our work to Excel in order to format our data into clean, comprehensible graphs and charts. This process involved the use of password protected files in order to maintain confidentiality. Excel allowed us to maximize our efforts by providing the opportunity to collectively format our data on the same file. Through this, we were able to view each other's progress and provide assistance where needed.

To begin data analysis, we ran simple frequency graphs for each of the questions asked. Next, we ran descriptive statistics. This allowed us to have an overview of responses and better understand the basics of our data and findings. Trends and themes began to emerge, which led us to focus more specifically on a few areas. By running cross-tabulations between data sets, we were able to discern whether or not certain variables were connected. When we found variables that we felt were connected, we developed graphs that represented those correlations, and consulted our literature and theories in order to explain the associations.

Our first task was to compile significant findings for the thesis poster presentation. We conducted more in-depth examinations of multiple questions that we found to be most reflective of our research as a whole. The significant insights provided became the basis for our Poster Presentation, which occurred on Thursday, March 18th, 2021. After that, we continued cross-tabulating our data. The findings of these analyses are documented and discussed throughout the remainder of this report.

Summary

This section detailed the methodological process of our research. We first reiterated the purpose of our research and the questions being addressed. Next came an overview of multiple ethical considerations, followed by an outline of research methodologies. The following section provides an overview of the initial steps of the research process, up to data analysis. We then addressed any potential complications perceived by the members of our team. Finally, we provided the timeline of our research, in addition to the steps we took in data analysis. Each step came with its own challenges and was met with compromise and persistence.

Results

Demographics

Our survey included demographic questions asking for age, ethnicity, gender, and year of study at McMaster University. The sample size is 75 participants for peer relationships (n= 75) and 57 participants for romantic relationships (n=57).

Age

The age of our participants ranged from 18 to 29 (Figure 1). The largest age category represented in our study is 21 years (32%), followed by 20 years (24%) and 22 years (12%).

Figure 1

Frequency – Participants' Age

What is your age?	Frequency
18	6
19	7
20	18
21	24
22	9
23	3
24	2
25	1
26	1
29	1

Ethnicity

Participants reported a variety of ethnic identities, with Caucasian being the majority (49.3%), followed by Asian (16%), Biracial (9.3%), Middle Eastern (8%), European (5.3%), and Indigenous (1.3%) (Figure 2). 2.6% of participants reported Canadian as their ethnicity and thus created a separate category due to the ambiguity of this response.

Figure 2

Frequency – Participant's Self-Identified Ethnicity

Ethnicity	Frequency
Caucasian	37

Canadian	2
European	4
Indigenous	1
Asian	12
Biracial	7
Middle Eastern	6
No Response	6

Gender

In terms of gender, the majority of participants in our study were female (93%), followed by male (7%) (Figure 3). There were no other self-identifying gender identities represented in our study. This question was presented in an open-ended fashion to our participants, but we only received responses of those who identify within the gender-binary.

Figure 3
Frequency – Participant's Self-Identified Gender Identity

Gender	**Frequency**
Female	70
Male	5

Year of Study

Finally, our study asked participants what year of undergraduate study they were currently enrolled in. The majority of participants in our study were currently enrolled in fourth year (38.7%), followed by third year (26.7%), first year (10.7%), and with the lowest representation of participants, second year and other (each 8% respectively) (Figure 4). 4% of participants chose "Prefer Not to Answer' in regard to their current year of study.

Figure 4
Frequency – Participants' Current Year of Undergraduate Study

Year of Undergraduate	**Frequency**
First Year	8
Second Year	6

Third Year	20
Fourth Year	29
Other	6
Prefer Not to Answer	3

Communication and Social Support
Peer Relationships

The first question in our survey asked participants if they felt their peer relationships had been altered due to changes caused by the COVID-19 pandemic. 92% of participants felt that they had been altered, 1.3% felt that they had not been altered, and 6.7% of participants did not respond. Additionally, we asked to what extent participants agreed with the statement "I feel I have strong communication with my peers" prior to the pandemic, as well as following the commencement of the pandemic. 17.3% of participants moderately agreed with the above statement prior to the pandemic and moderately disagreed during the pandemic. 16% of participants strongly agreed that they had strong communication prior to COVID-19, but only moderately agreed during the pandemic. 13.3% of participants remained consistent, reporting that they moderately agreed with the statement that they had strong communication before and during the pandemic.

On the subject of strong communication and the frequency at which participants spent time with their peers in-person during the COVID-19 pandemic, 21.3% of people never spent time with their peers in-person and felt they had weak communication. 14.7% of participants felt neutral towards the strength of their communication with their peers and spent time with them in-person approximately once a month. 12% of participants felt as though they had exceptional communication and had in-person interactions with their peers once a month.

When comparing connectivity levels with peers, 46.7% of participants felt they had strong connections to their peers before the commencement of the COVID-19 pandemic. Of those that strongly agreed beforehand, 8.6% still strongly agreed, 22.9% moderately agreed, 40% felt neutrally, 22.9% moderately disagreed, and 5.7% strongly disagreed that they had strong communication during the COVID-19 pandemic. When measuring feelings of support by peers before and during the pandemic, 32% of participants did not change in their perceived experience of the support they received. 14.7% of participants moderately agreed before, but became neutral during the pandemic. 6.7% of participants strongly agreed before, but moderately disagreed after.

When assessing participants' agreeance that they feel supported by peers and that they can provide support to their peers, 10.7% of participants moderately disagreed for both, 10.7% of participants were neutral for both, 24% of participants moderately agreed for both, and 4% of participants strongly agreed for both. When testing the interaction of online fatigue and the ability to provide support for peers, 42.7% of participants either moderately or strongly agreed that they could provide social support to peers and faced online fatigue. 20% of participants responded that they felt neutral towards their ability to provide social support, but still encountered online fatigue. 16% of participants did not

feel as though they were able to provide social support; however, they still endured online fatigue (Figure 5).

Figure 5
Reported levels of support given and received by participants in regard to their peers

		Rate how strongly you agree with the following statement as they apply to your PEER relationships following the commencement of the COVID-19 pandemic: I feel that I am able to provide social support to my peers.				
		Strongly Disagree	Moderately Disagree	Neutral	Moderately Agree	Strongly Agree
Rate how strongly you agree with the following statement as they apply to your PEER relationships following the commencement of the COVID-19 pandemic: I feel supported by my peers.	Strongly Disagree	0	0	0	2	0
	Moderately Disagree	2	8	0	2	0
	Neutral	0	4	8	4	1
	Moderately Agree	0	0	6	18	2
	Strongly Agree	0	1	1	7	3

Romantic Relationships

To begin the romantic section of our study, we asked the remaining participants if they felt that their romantic relationships had been altered due to changes caused by COVID-19. 49.3% of the participants felt that their romantic relationships had been altered due to changes caused by the pandemic. 16% of participants selected 'No', and 14% of the participants did not respond. Prior to the commencement of COVID-19, 43.4% of participants reported some level of agreement with the statement: "I feel I have strong communication with my partner". Following the commencement, only 26.3% agreed with this statement. This decrease provides the basis of understanding that reported communication changes are changed for the worse.

As it proved to be an important factor in peer relationships, in-person interaction and communication challenges in romantic relationships were similarly cross-examined. Prior to the pandemic, 57.9% of participants saw their partner frequently (2-5 times weekly or daily) and reported agreeing to some level that they had strong communication in their relationship. Following the commencement, several people continued reporting spending in-person time with their partner on a frequent basis and communication had not been affected; 8.7% of participants, however, reported rarely seeing their partner in-person (never or once monthly) and reported negative effects on communication.

In regard to the link between communication and feelings of connectedness, 53.1% of participants that reported communication changes noted a strong connection with a partner before the pandemic, versus 31.3% having a strong connection after (Figure 6). Those that reported no changes in communication had a 9.1% difference between the prior and after commencement conditions (63.6% prior to the pandemic and 54.5% after

the commencement). This comparison shows a moderate correlation between communication quality and feelings of connectedness.

Figure 6
Feelings of connection to romantic partners as reported by those who indicated changes in communication
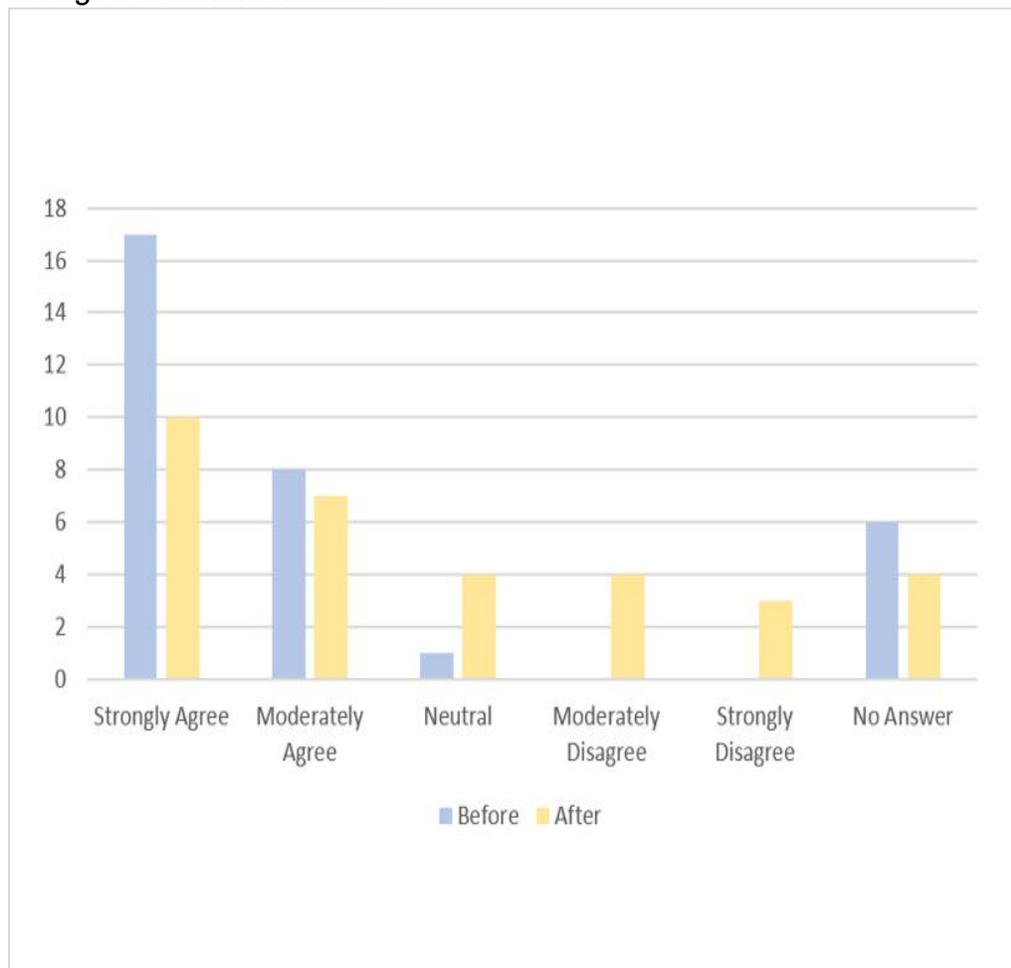
Of the participants that reported experiencing changes in social support, 52.6% strongly agreed they had strong connections prior to the commencement of COVID-19. In this variable, no participants reported having a weak connection to their partner. After the commencement, the 'strongly agree' category decreased to 21% of participants, revealing a correlation between changes in social support and connection to romantic partners (Figure 7). The 31.6% difference between time frames is shown in the shift towards disagreeing with the statement "I feel connected to my partner" when social support had changed. Of the participants that reported experiencing changes in social support, 68.4% agreed they had strong communication prior to the pandemic and 42% agreed with that statement after. In contrast, of those that reported no changes in social support, 74.2% agreed they had strong communication before COVID-19, and 65% agreed after. This shows a correlation between people feeling supported by their partner and the quality of communication they report having.

Figure 7
Feelings of connectedness to romantic partners as impacted by changes in social support before and after COVID-19
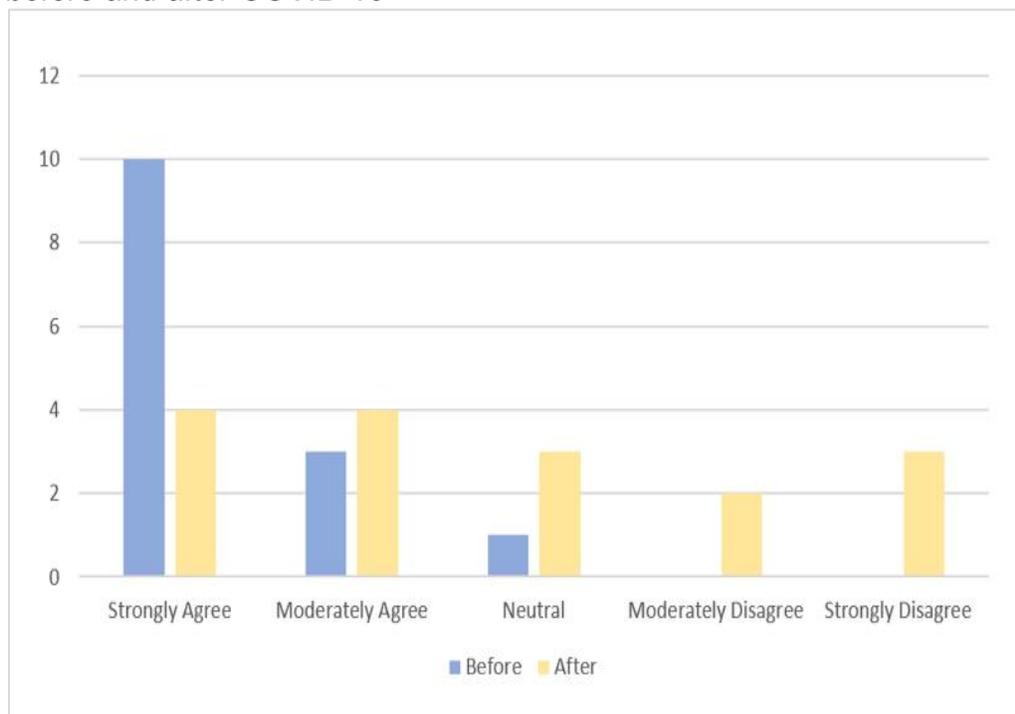
Adaptation to Physical Distancing
Peer Relationships

In our survey, we asked to what extent participants agreed with the statement "I frequently spend quality (in-person) time with my peers", both before and during the COVID-19 pandemic. 44% of our participants shifted from either moderately or strongly agreeing before the pandemic to strongly disagreeing during the pandemic. Additionally, we cross-examined to what extent individuals agreed with the same statement during the pandemic, and their experiences of social disconnectedness. 64% of our participants felt that they did not frequently spend quality in-person time with their peers but reported feelings of social disconnectedness. However, only 6.7% of participants reported that they frequently spent in-person quality time with peers and experienced social disconnectedness. In our survey, we also asked about whether participants scheduled time for social interaction with their peers; 57.3% of our participants did schedule time for social interactions. Of that group, 83.7% reported feelings of social disconnectedness.

Next, we asked participants about the frequency at which they video called their peers before and during the COVID-19 pandemic. Before the pandemic, 29.3% of participants never video called their peers; during the pandemic, 12% of participants never video called their peers (Figure 8). When cross-examining feelings of connectedness with peers, and the frequency at which participants video-called their peers during the pandemic, we found that of the 28 participants who did not feel connected to their peers, 71.4% video called less than once weekly. 28.6% of participants video called at least once weekly (Figure 9).

Figure 8
Frequency – Video calling before and during the pandemic for peers

		Approximately how often did you use the following method of communication with your PEERS following the commencement of the COVID-19 pandemic: Video Calling (e.g., FaceTime, Skype, Zoom, etc.)							Total
		Missing	Never	Once Monthly	Twice Monthly	Once Weekly	2-5 Times Weekly	Daily	
Approximately how often did you use the following method of communication with your PEERS prior to the commencement of the COVID-19 pandemic: Video Calling (e.g., FaceTime, Skype, Zoom, etc.)	Missing	3	0	0	0	0	0	0	3
	Never	0	7	6	3	3	1	2	22
	Once Monthly	0	2	5	5	2	5	1	20
	Twice Monthly	0	0	3	3	0	1	0	7
	Once Weekly	0	0	1	2	1	4	1	9
	2-5 Times Weekly	1	0	0	0	2	9	1	13
	Daily	0	0	0	0	0	0	1	1
Total		4	9	15	13	8	20	6	75

Figure 9
Frequency of video calling with peers and degree to which participants feel connected to peers
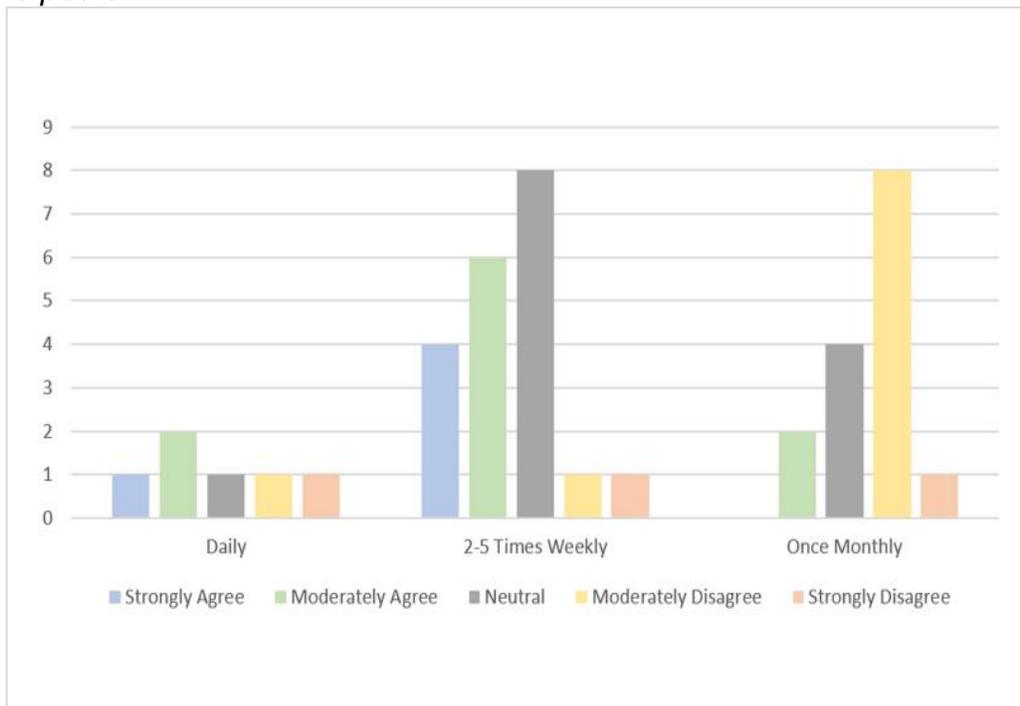
Romantic Relationships

Participants that reported experiencing changes in communication reported texting their romantic partners more often than video and audio calling. 38.6% of participants reported texting their romantic partners daily, 15.8% of participants reported video calling daily, and 14% reported audio calling their partners daily.

In order to examine methods used by participants to mitigate the impacts of the pandemic, our study asked participants if they scheduled time for social interaction with their romantic partners. 39.1% of participants who reported feeling social disconnectedness also reported scheduling time for social interaction with their partner. In comparison, 60.9% of participants who reported feelings of social disconnectedness reported they did not schedule time for social interaction with their romantic partner. This indicates that scheduling time for social interaction does have a significant effect on romantic relationship connections.

Services and resources were not commonly used among participants. 0% of participants utilized on-campus services to mitigate the effects of the pandemic. 3.5% of participants who indicated they experienced challenges in communication reported they utilized online services. Due to this small percentage of respondents, we are unable to declare that on-campus and online services are effective in the reduction of challenges in communication caused by the pandemic.

Our study asked participants how often they saw their romantic partners prior to and following the commencement of COVID-19. Prior to the pandemic, 19.3% of participants who saw their partner daily reported no feelings of social disconnectedness. 10.5% of people who never saw their partner prior to the commencement of the pandemic reported feelings of social disconnectedness. This implies a correlation between in-person interaction and feelings of social disconnectedness. Following the commencement of the pandemic, 10.5% of participants who saw their romantic partner daily felt no social disconnectedness, compared to 15.8% who did see their partner daily but reported feelings of disconnectedness. 19.3% of participants who saw their partner 2-5 times weekly reported no feelings of social disconnectedness, whereas 14% of participants who saw their partner at the same frequency experienced feelings of social disconnectedness. Those that saw their partner 2-5 times weekly were almost equally as likely to experience social disconnectedness as not to.

Communication Styles and the Associated Consequences
Peer Relationships

Using our survey responses, we cross-examined feelings of connectedness with peers and those who increased social media use to combat social isolation. We discovered 68% of our participants increased their use of social media during the pandemic. Of this population, 37.2% did not feel connected to their peers, 29.4% felt neutrally, and 33.3% felt connected to their peers. Returning to our entire sample, 12% of participants did not feel connected to their peers and did not use more social media (Figure 10).

When evaluating direct messaging use before the pandemic, 89.3% of participants claimed to direct message peers at least once weekly, while 6.7% did so less than once messaging less than once weekly. Additionally, we examined the habits of audio calling with peers before and during the COVID-19 pandemic. 13.3% of our participants never engaged with audio calling before and during the pandemic; only 1.3% of our participants

Figure 10

Impact of increased social media use on feelings of connectedness to peers
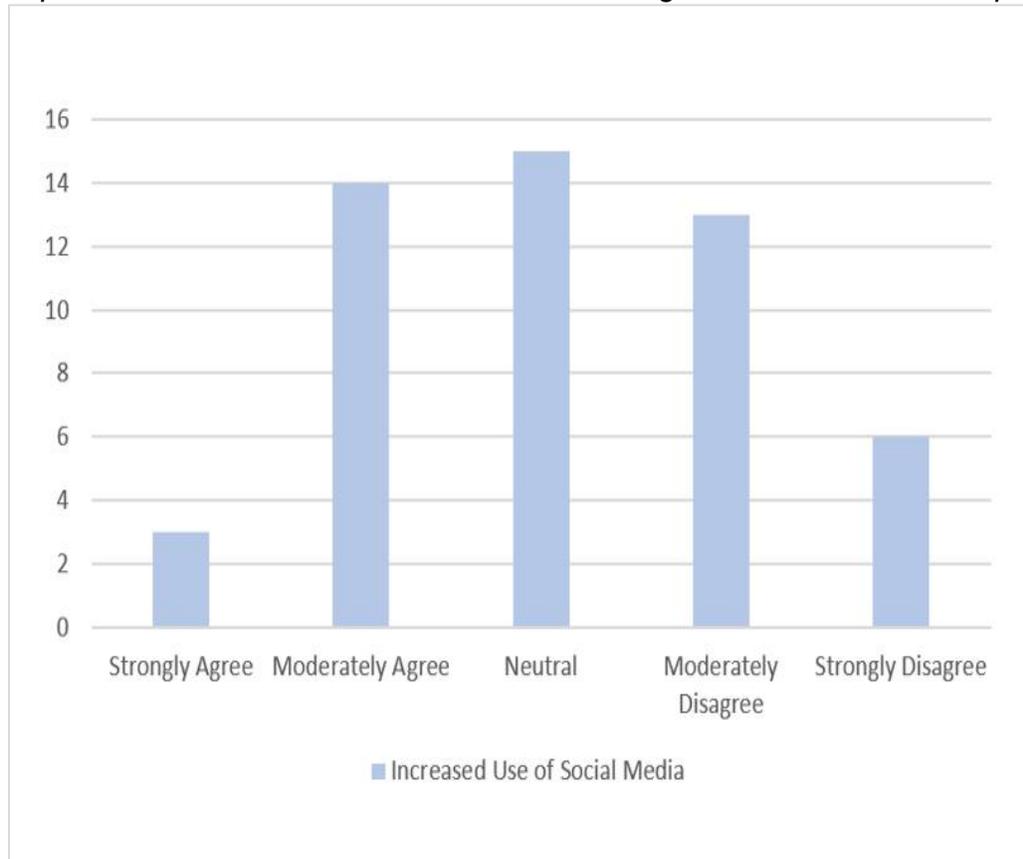
engaged with audio calling daily before and during the pandemic. In terms of an increased use of audio calling, 8% of our participants claimed that they went from using audio calling once per month to two times per month. In terms of a decreased use of audio calling, 6.7% participants claimed that they went from using audio calling once per week to two times monthly, while 5.3% participants claimed that they went from using audio calling once per month to never.

We examined the relationship between experiencing online fatigue and the frequency participants used direct messaging during the COVID-19 pandemic. Out of our sample, 34.7% of our participants used direct messaging daily and did feel signs of online fatigue. Of those who faced online fatigue and used some direct messaging, 84.7% engaged with direct messaging once weekly or more, while 15.3% did so less than once weekly. Furthermore, we analyzed the statistics of online fatigue and use of audio calling during the pandemic. 52% of participants felt online fatigue, despite using it no more than twice monthly. 13.3% of participants faced online fatigue while using audio calling 2-5 times weekly. In terms of daily use of audio calling, 50% of users felt online fatigue, while the other 50% did not (Figure 11). Likewise, we evaluated experiences of online fatigue with video calling during the pandemic. We found that 24% of our participants faced online fatigue and video called their peers 2-5 times weekly. Finally, across all categories, at least 73.3% of participants faced online fatigue (Figure 12).

Figure 11
Frequency of online fatigue experienced during each communication method – peers
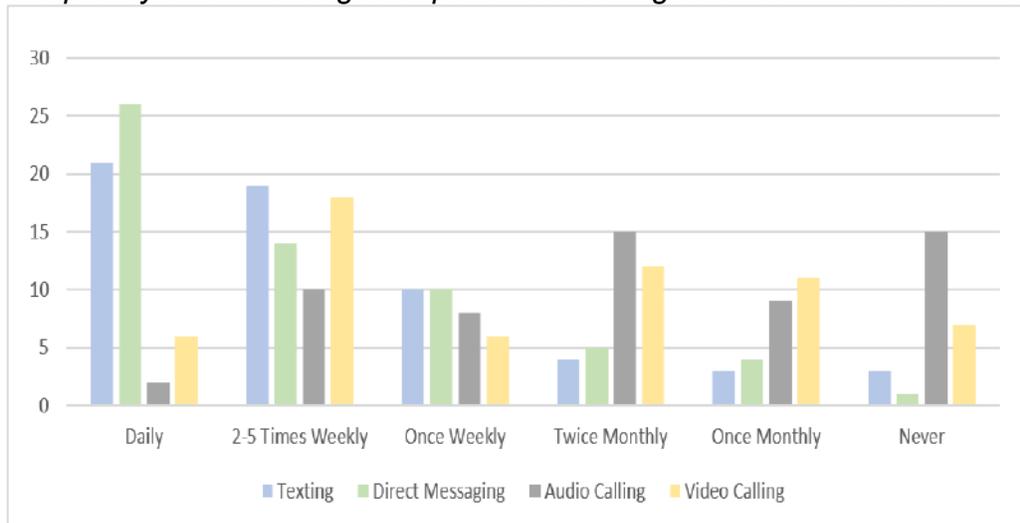
Figure 12
Experiences of online fatigue and frequency of video calling with peers
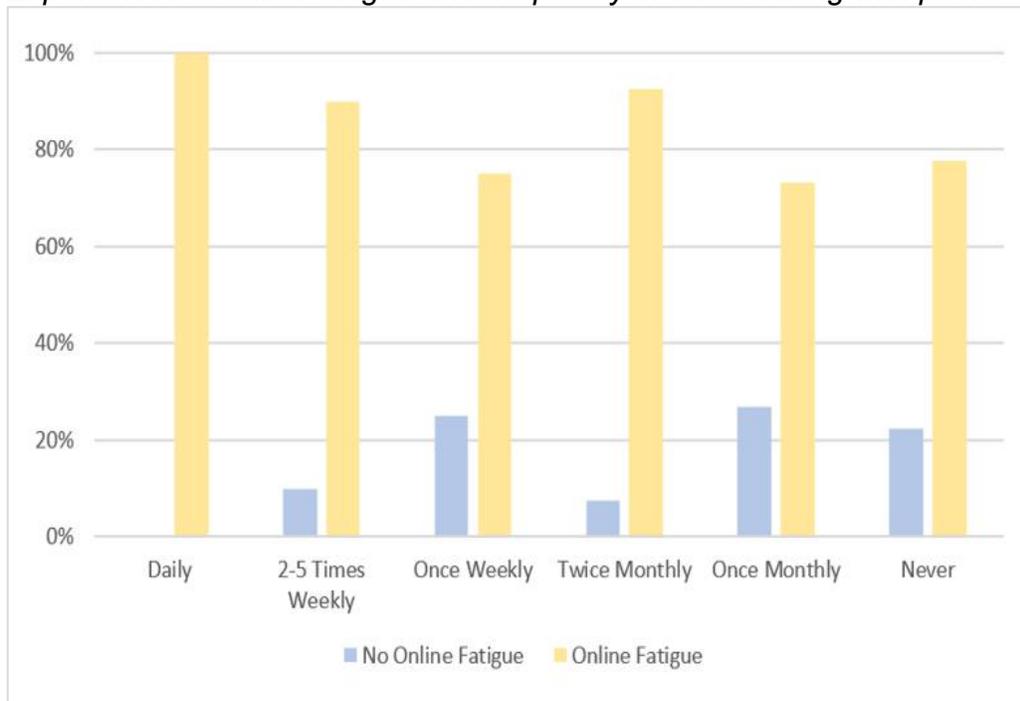
Romantic Relationships

   With regard to digital communication, our study asked participants the methods in which they communicated with their romantic partners. Participants who reported they frequently used video calling also reported higher levels of online fatigue. 50% of people who reported experiencing online fatigue also reported video calling with their partners daily. Comparatively, 29.2% of participants who reported not experiencing online fatigue

reported video calling with their romantic partner daily. 37.5% who reported never video calling with their romantic partner reported not experiencing online fatigue. 12.5% of participants who never video called with their romantic partner also reported experiencing online fatigue (Figure 13). These results indicate a relationship between video calling and the creation and maintenance of online fatigue.

Audio calling did not create the same results as video calling did in relation to online fatigue. 37.5% of participants who indicated they experienced online fatigue also reported audio calling with their romantic partner daily (Figure 13). 12.5% of participants who reported never calling their romantic partner also reported experiencing online fatigue. For those not experiencing online fatigue, 25% of participants audio called with their romantic partner daily. This relationship indicates that audio calling does not create the same feelings of online fatigue as video calling.

Finally, our study sought to examine if increased use of social media had any mitigating effects on feelings of social disconnectedness. In order to determine whether a relationship was present, the variables of social disconnectedness and greater use of social media were evaluated together. For those participants who indicated feelings of social disconnectedness, 60.9% of participants did not increase their social media use in order to communicate with their romantic partner. In comparison, 39.1% of participants who indicated the same feelings reported increased social media use. The relationship of increased social media use and communication may not hold the same effectiveness in romantic relationships, as these relationships are predominantly more intimate than peer relationships and may require different methods of communication for maintenance.

Figure 13
Level of online fatigue experienced from video calling and audio calling – romantic partners
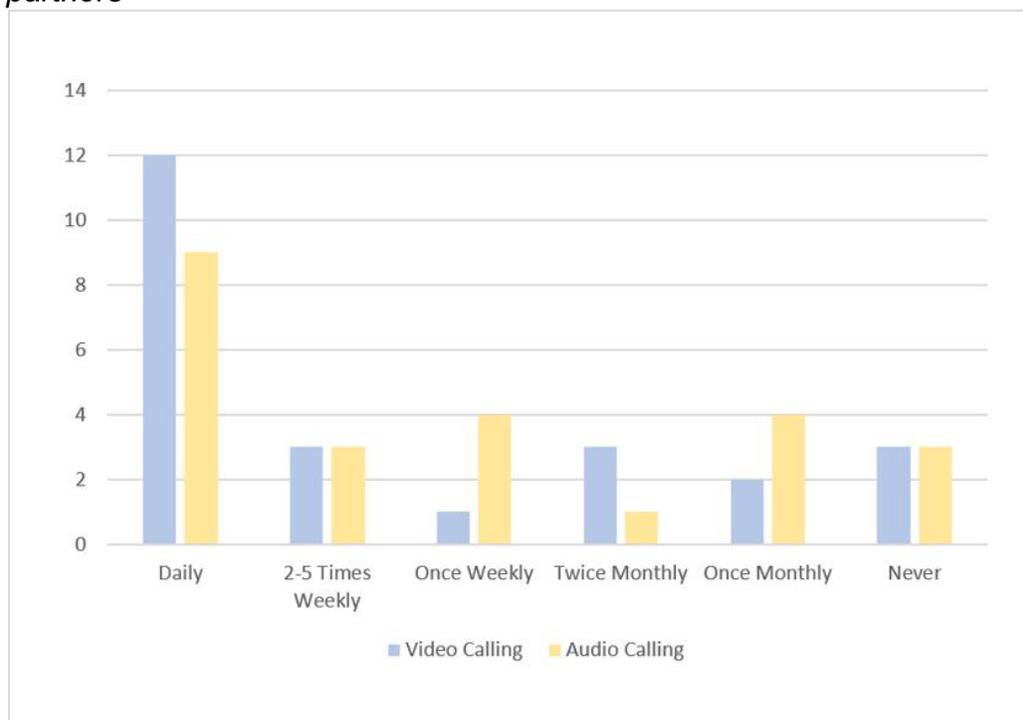
Discussion

Demographics

For the purposes of our study, we questioned participants about a variety of demographic variables including age, ethnicity, gender, and year of study. This information was gathered in order to potentially illustrate patterns between relationships, communicative behaviours, and participant demographics. We conducted cross-tabulations between our general research questions and the demographics, which ultimately did not reveal any significant overlaps. Due to the small size of our sample, this fact was unsurprising. Perhaps with more intensive and diverse research, correlations between these variables might arise.

The ethnic identities of respondents within this study varied. As discussed previously, the majority identified as Caucasian, followed by Asian, Biracial, Middle Eastern, European, and Indigenous. A small number of participants also identified their ethnic background as Canadian. The disproportionate ethnic makeup develops further issues with generalizing findings. It is unrealistic to accept our findings as truths for all students who may have different understandings of relationships, communicative practices and the COVID-19 pandemic itself based on their backgrounds. The high number of Caucasian participants seems to be consistent throughout the literature, as this demographic does tend to be overrepresented in much of Western research. Regardless, this drastic overrepresentation must be acknowledged, as differences based on ethnicity cannot be entirely accepted or ruled out without a broader representation of ethnic backgrounds.

A majority of participants involved in our study indicated that they are currently enrolled in their fourth year of undergraduate study, with third year being the next largest group. This high representation of fourth year students may be due to the overlapping participation of the required fourth year undergraduate thesis. We assume that due to this course overlap, our peers are more likely to support their fellow classmates in conducting research. As this project is well known by students across various disciplines, we hypothesize that fourth years may be more likely to support their peers because they understand the importance of the project. The higher proportion of upper-level student participants could also be attributed in part to the presumed increased familiarity with the undergraduate experience and involvement in student clubs. As students become more comfortable in their university life and understand the various different areas of participation more, they may be more comfortable participating in research. For the purposes of recruiting participants, our study was shared via student run clubs on Facebook and Email; although these groups were inclusive to all years of study, upper-level undergraduate students may be more inclined to view the posts as interesting. The frequency of participants' ages aligns with the frequency of year of study as 20-21 years of age is the typical age of a third or fourth-year university student.

The responses regarding gender identity highlighted that all participants identified within the gender binary, with the majority of participants identified as female. We have identified a few theories as to why the gender difference appears this way. The first is that social science is a female dominated field (Zafar, 2013). Despite the fact that this survey was shared outside of the social science community, we feel it safe to assume that social science students will be more likely to participate in social science research. The gender norms associated with being a woman in Western society align well with the values of social science and thus we see the over-representation of women in this field (Zafar,

2013). The second explanation to make sense of the abundance of female participants is that this survey is geared towards discussions of communication and relationships; these topics align with the values of the female gender identity and, more importantly, oppose the values of the male gender identity (Zafar, 2013). Women may feel more comfortable discussing the topics covered in this survey as they have been socialized to share their emotions and be open about the difficulties they are having in interpersonal relationships.

Communication and Social Support
Peer Relationships
When responding to questions regarding their peer relationships, participants noted changes in their communicative practices and levels of social support. We believe the disparity in communicative strength partially has to do with different levels of in-person interaction due to safety restrictions put in place to limit the spread of COVID-19. We theorize that those who continue to see their peers in-person, despite it being much less frequent than prior to the pandemic, had stronger communication due to the efforts put into scheduling gatherings. Further, the in-person aspect itself may contribute to perceived strength of communication. Because of the rarity of in-person interactions, there was more pressure on individuals to communicate more clearly and accurately, leading to stronger communication overall.

Our research demonstrated that a majority of participants who frequently saw their peers in-person before the commencement of the pandemic, saw those peers on a less frequent basis following implementation of restrictive measures. Without face-to-face interaction, individuals had to find other means of connecting with their friends. Adami et al. (2020) addressed similar changes in communication standards caused by COVID-19. Humans have long relied on the body for means of interaction, which is no longer a reliable or consistent method of communication. According to the Interpersonal Spacing Theory, this lack of in-person interaction reduces the ability to read body language and non-verbal cues. When comparing levels of strong communication before and during the COVID-19 pandemic, all participants either maintained the same level of communication, or felt they had weaker communication during the pandemic. This decline in strength of communication can be correlated, in part, with the decline of in-person interaction. We theorize that this decline influences the ability to read body language and non-verbal cues, as these significant factors are being taken away from interactions, making it more difficult for participants to interpret the social context (Delamater et al., 2019). In-person interaction has been a critical aspect of communication in the past; now that proximity to one another is limited, individuals must redefine how to connect with peers.

Furthermore, individuals' understanding and experience of communication and social support varies. Bringing in Frame Analysis (FA), we are able to witness the new norms and expectations and how they vary within certain social media platforms; we heavily acknowledge the setting as a detrimental factor within a social interaction. Different methods of communication exist as frames, and each social media platform has a set foundation that influences the flow of interactions on said platform. We understand how the environment can affect the quality and direction of the interaction; for example, when talking on a video chat, one is able to receive responses immediately, in comparison to direct messaging platforms where response times are based on the agency of others. The Perspective-Taking Model (PTM) accounts for these differences, explaining that each

person has their own interpretations of symbols and meanings that are exchanged throughout their interactions (Delamater et al., 2019). With newer, more frequently used spaces for interaction (i.e., online, social media) come new norms and interpretations. Pietromonaco and Overall (2020) suggest previous experiences and relationship processes predict how individuals will adapt to the stressors put in place by the pandemic. This demonstrates the variability of each participant's ability to cope with the changes in communication. Each person interprets meanings and situations differently based on what they have experienced in the past. It is important to recognize that some of these responses are informed by the unique lives of each participant, and that every one of them will respond individually to the effects on their personal relationships. Ultimately, the COVID-19 pandemic has forced new methods of communication, which in turn has influenced how we accept and relay information.

When evaluating participants' perceived feelings of support as well as their ability to provide support in relation to their peers, 49.4% of participants felt they were given the same level of support they were able to provide. We predict that this reciprocated level of support can be explained through the PTM; individuals gradually understand the benefits of receiving support from their peers, which leads to them giving equal levels of support in return. Additionally, we believe this is a form of egoistic helping, which can be defined as "a form of helping behaviour in which the goal of the helper is to increase [their] positive feelings or to receive some other benefit" ("APA Dictionary of Psychology", 2021). Therefore, if individuals are giving strong support to their peers, they may be doing so as they expect it to be reciprocated.

While the benefit to giving support is the potential of receiving it in return, the consequence to giving support is facing online fatigue. When evaluating experiences of providing support to peers, participants faced online fatigue regardless of the level of support they were able to provide. Applying Symbolic Interactionism (SI) to these findings, we understand that we are facing online fatigue as a whole; however, there are individualistic experiences as to how participants are providing support to their peers. To illustrate, if friend one posted on Facebook saying they are feeling sad, friend two might provide support by commenting on the post saying "I hope you get well soon!", but friend three might provide support by Facetiming friend one to check-in and discuss how they are feeling. These two levels of support are drastically different, and these two individuals may perceive their ability to provide support differently. However, they may both face online fatigue due to the digital interaction. Therefore, we theorize that no matter the level of support one is giving, they are at risk of facing online fatigue.

Romantic Relationships

As addressed by Licoppe (2004), communicative practices are essential in the maintenance of relationships. The norms surrounding communication have been drastically impacted by restrictive measures that are being utilized to limit the spread of the COVID-19 virus. As the current global circumstances are unlike anything we have seen, individuals are met with a dilemma surrounding how to negotiate this type of situation. Definitions of how ourselves and others should be participating in daily life are not yet justified. As a result, citizens are met with daily challenges surrounding how they must communicate with those around them, including their romantic partners. Participants in romantic partnerships reported a number of changes in communicative processes

caused by the COVID-19 pandemic, in relation to in-person interactions, feelings of connectedness and perceived social support.

In-person interaction, or lack thereof, proved to be an important predictor of relationship quality. Regardless of whether it was prior to or following the commencement of the COVID-19 pandemic, romantic partners who saw each other on a frequent basis reported strong levels of communication. Participants who did not see their partners frequently reported they did not experience strong communication. This significant decrease in perceived strong communication confirms our notion that the COVID-19 pandemic has had negative effects on communication within romantic relationships.

The restrictions put in place by the government to limit in-person interaction has created an effect on the perceived strength of communication within relationships. Block et al. (2020) stated that physical distancing measures could have adverse effects on the social psychological processes of individuals. This, in combination with our findings, suggests there is a link between in-person interaction and the perceived strength of communication within romantic relationships. Those who continued to see their romantic partners on a frequent basis, may not have experienced the same impacts due to public health restrictions as those who were not able to utilize in-person interaction to communicate. The act of seeing a romantic partner face-to-face requires the interpretation of their non-verbal communication, which may be more beneficial to connection than the methods of communication that are being utilized to communicate presently. By removing this involvement, individuals may internalize a feeling of disconnect with their partner, which in turn decreases strength of communication. As stated above, when discussing the changes observed in peer relationships, we theorize that the decline in perceived strength of communication in romantic relationships can be attributed in part to the current restriction of in-person interaction.

The changes in communication methods have subsequently had an effect on perceived social support in romantic relationships. Due to restricted in-person contact, individuals have taken up a variety of communication methods (i.e., video calling, audio calling, in-person, direct messaging). SI tells us that individuals shape meanings around what information is given to them. While communicating with a partner via text, for example, there is increased opportunity for miscommunication due to ambiguity of messaging. If one partner perceives their side of the conversation as unsupportive, then they may further believe they do not have a strong connection with their partner. If one partner is feeling brought down by an external stressor, conveys this information to their partner, and receives a simple and unemotional response, they may interpret this as an unsupportive partner. As Pietromonaco and Overall (2020) state, a high stress event, like the current pandemic, challenges relationships on a deeper level. Added stressors may impact individuals negatively, which may alter behaviours in communication and perceived social support (Pietromonaco & Overall, 2020). In order to maintain a healthy relationship, partners need to recognize each other's needs and provide suitable social support in response to those added stressors. A larger proportion of respondents indicated that their communication strength was higher than their perceived connection to their romantic partner. Therefore, we are able to draw a link between the feelings of perceived social support and feelings of connection between romantic partners.

Drawing on SI, our results illustrate that as we move farther from utilizing in-person interaction on a daily basis, it becomes more difficult to negotiate meanings during online

social interactions. It becomes challenging to understand what can be deemed supportive when there is essentially no in-person interaction to provide physical social support (i.e. a hug or kiss). According to SI, we make meanings through social interaction, and given that communicating via online means exclusively is a novel experience, we may not have yet created meanings surrounding online social support with those we are close to. As we move through the pandemic, we have the ability to determine what is supportive for us and our partners. However, without the instant communication via in-person interaction, individuals may learn these ways through trial and error, which could result in perceived lower connectedness and strength of communication.

We may also utilize DOTS (Thomas, 1931) to examine perceived social support and communication. Prior to behaving, individuals analyze their role, mental state, and accepted behaviour norms of the situation in order to conduct themselves properly (Thomas, 1931). However, in novel situations, such as navigating how to communicate during COVID-19, there is no blueprint for individuals to create their behaviours from. Finding the definition of the situation provides individuals an understanding of what is expected of them, which we can connect with the perceived changes of communication felt in romantic relationships. When individuals are placed in an ambiguous situation, it is typical to look to others to gather information about what behaviours are appropriate. Without the knowledge of social norms and expected behaviours, it becomes difficult to determine how we should react during interactions. This lack of definition of the situation also demonstrates that we are unaware of how others should react during interactions. The cyclical relationship leads to formation of new norms and expected behaviours, however, due to the isolating nature of COVID-19, they may be individualistic or vary from relationship to relationship.

Due to the nature of the current pandemic, the safety measures put forth by the government to limit the spread of the virus advise individuals to limit their in-person interactions. These restrictions have caused a drastic change in the methods individuals use to communicate. We have long relied on in-person communication and interaction to convey information, ideas, and emotions (Adami et al., 2020). As aforementioned, there has to be a process of re-defining social norms in communication and interaction. Through the process of renegotiating various relationships, individuals have created new norms for interacting via different platforms (i.e., video calling, social media, texting). Bolger and Eckenrode (1991) stated that there is a strong correlation between social integration and reduction of stress during high stress events. Social integration is referenced here as the average number of people an individual interacts with in specific domains (Bolger & Eckenrode, 1991). If an individual, following the commencement of the pandemic, interacts with a higher-than-average number of people than prior to, the perceived strength of support may be higher than their cohorts. This is not an exclusive predictor of strength of communication or support, as quality is more important than quantity in terms of social support for most individuals. Our study sought to understand what methods individuals took to combat changes brought on by COVID-19. Social interaction is a main component to predicting relationship maintenance; if there is no social interaction, then we can assume that relationships will not be healthily maintained.

Adaptation to Physical Distancing
Peer Relationships

When examining the disparities between the frequency at which participants saw their peers in-person before and following the commencement of the pandemic, there is an overwhelming decrease. As mentioned above, this is highly influenced by the restrictions set in place during the pandemic to limit the spread of COVID-19. Due to the abrupt change in the nature of interpersonal relationships, there are tangible and intrapersonal consequences on individuals. In regard to their peer relationships specifically, we found that the frequency at which individuals spent time with their peers during the pandemic is correlated to feelings of social disconnectedness. The majority of participants reported infrequently spending time in-person with their peers and felt socially disconnected. We theorize this missing sense of connection is due to the lack of in-person interaction; now with online platforms, levels of intimacy are not as high while physical proximity can no longer be considered, leading to an overall decay in levels of social connectedness. The current literature emphasizes the importance of mundane everyday interactions and how they contribute to our levels of social connectedness (Watson et al., 2021). Prior to the commencement of the pandemic, these everyday interactions were largely taken for granted and their impact went unnoticed; however, due to their rarity now, their impact is much more noticeable. This leads to lower levels of social disconnectedness for those who spend time with their peers in-person more frequently. Furthermore, we can connect this finding to PTM. Because the world has changed (via pandemic), our perspectives of social media platforms and how we now interact with people (i.e. no in-person contact) has to change too.

When cross-examining experiences of social disconnectedness and scheduling time for social interaction as a communication strategy, the majority of participants did schedule time for interaction; however, a majority of those students still felt socially disconnected. This initially was a surprise, as we had understood that scheduling time to meet in-person would increase connection levels due to prior findings. When applying the PTM, we now understand that the normalcy of meeting with individuals during the pandemic is impaired because of the safety restrictions put in place, limiting the level of connection individuals feel. During the pandemic, one may have to choose different activities that vary in the levels of connection they bring; this is in comparison to before the pandemic when they did not have to hesitate in choosing a more public/social location or activity. For example, prior to the pandemic, peers may choose to go to shopping centres, concerts, sports games or restaurants; however, during the pandemic, many of these are not feasible so one may feel less connected with alternative, restricted activities chosen.

When analyzing frequencies at which participants video called their peers before and during the COVID-19 pandemic, data demonstrated a slight increase that was not as drastic as we initially predicted. We initially hypothesized that because in-person interactions were less frequent during the pandemic, video chatting would be a primary method of communication. However, because our findings were not as momentous, we understood that direct messaging platforms were the communication methods most used. We feel as though this might explain how individuals in our modern society appreciate the mediocrity of minimal communication with their peers, over making a conscious effort for quality conversations. We believe this results in an unhealthy level of satisfaction as it affects levels of social connectedness. This is due to the lack of depth that comes with the continuation of surface level interactions that take place on social media.

When testing the relationship between feeling connected and the frequency at which participants video called their peers, there was a correlation between the two. Of the participants who did not feel connected to their peers, the majority video called less than once weekly. We can relate this to SI through the understanding of quality; meanings that we now associate with video calling have changed compared to prior to the pandemic, as we assume that individuals did not appreciate it in the same way before. Even though this alternative is not as satisfactory as in-person interaction, we understand that it is our new norm for communicating with peers. This results in video chatting being associated with more positive emotions; individuals are still feeling connected while attempting to maintain a high quality within their interpersonal relationships as best as they can. For example, before the pandemic, individuals would not feel adequate contentment when video calling their peers as they would receive that satisfaction when they were together in-person, but now because the physical distancing restrictions have affected their in-person plans, they resort to video calling more frequently. Not only do they maintain high qualities within their peer relationships, but they also view video calling in a new light.

Romantic Relationships

Physical distancing due to COVID-19 varied in its impact on romantic relationships. With a generous portion of our sample continuing to see their romantic partners frequently, in comparison to the decrease that appeared in peer relationships, the effects on connectedness appeared differently. Participants were equally as likely to experience disconnectedness from their partner regardless of in-person interaction occurring daily. This suggests that other factors had to be contributing to the relationships that remain feeling socially disconnected from one another. SI's interpretation of social interaction as a meaning making and negotiating process could help explain the difficulty in connection to partners (Blumer, 1986). During COVID-19, there are several different experiences that individuals have on a daily basis; the extreme changes in daily living, as experienced on an individual level, may impact our abilities to negotiate meanings. Social interaction and meaning negotiation commonly took place in-person prior to physical distancing procedures, leaving the current circumstances for meaning making vague and difficult to mutually understand. With this difficulty, couples may find conflict in their newfound differences in understanding, leading to greater disconnectedness to each other.

A second possible explanation for greater disconnectedness with frequent contact lands in the effects of external stressors. The findings of this study lead us to believe that the various confounding factors of COVID-19, that colloquially generate large amounts of stress, are impacting romantic relationships increasingly. As addressed by Luetke et al. (2020), a number of factors including decreased social interaction and separation from loved ones have been linked to poor outcomes that negatively influence relationship processes. We argue that romantic partners likely have a different type of bond than in peer relationships; romantic partners tend to share in life's distress, especially when cohabitating or exclusively spending time with that individual (Pietromonaco & Overall, 2020). According to Pietromonaco & Overall (2020), the pandemic is likely impacting how couple's function together in their daily lives. As with SI, individual experiences differ greatly, however in romantic partnerships, the stressors tend to impact both members. Personal stressors that have been brought on unexpectedly by COVID-19 (i.e., job loss, stress from work entering the home with home offices, etc.) transfer into romantic

relationships (Pietromonaco & Overall, 2020). As learned in studying peer relationships, there is a lack of interaction with peers while most people continue to see their partners frequently; this is evidence that romantic partners are the primary contact of participants. Not having contact with friends regularly may result in these stressors building up, and there is a lack of release or separation from the partner caused by lack of time with peers.

The next variable studied is the impact of scheduling time for one's partner. Results show that a significantly smaller percentage of participants schedule time for their partner than those that do not, and of those that do, it has little impact on the level of connection they feel in the relationship. We theorize that this is because communicating with romantic partners on a daily basis is more natural and a part of routine more so than communicating with peers. As mentioned earlier, participants experience higher levels of social disconnectedness when they do not schedule time for peers; this contrast may highlight the previously discussed 'bond' that is present in romantic relationships and not in peer relationships.

Of the factors that impacted social connectedness, the ability to provide and perceive social support from partners is more evident than scheduling time. Those that experienced more social disconnectedness reported struggling with providing and perceiving social support from their partner; this can connect to stress being transferable between partners and is indicative of COVID-19 related stress impacting how romantic partners perceive one another (Pietromonaco & Overall, 2020). PTM indicates that individuals understand the support that is given to them and reciprocate in equal amounts (Selman, 1973). When perception of one's partner is impacted by external stressors, the perception of support is likely to also be impacted. The inability to successfully perceive social support means that participants may be less likely to reciprocate support to their partners, as indicated by PTM, resulting in greater levels of social disconnectedness.

Of the methods of communication in the survey, a majority of participants report texting their partner daily, followed by video calling and then audio calling. This differs from the analysis of peer relationships as participants reported never audio calling their peers on a daily basis. We theorize that this is caused simply by the cohort that participants are in; a majority of our participants, being 20-21 years of age, are in Generation Z. According to Turner (2015), Generation Z is a largely technology motivated generation. Individuals that have grown up with technology, the way Generation Z has, report enjoying virtual communication more; a majority of participants in the study by Turner (2015) reported preferring to talk to peers virtually over in-person. This helps explain the phenomenon of peers not using audio call as a method of communication during the pandemic. Many may be uncomfortable with this medium depending on the level of which their relationships have reached. This can then help us understand why it is much more common in romantic relationships; the bond that we theorize is important to romantic relationships may allow for Generation Z to find enough comfort in their partners for audio calling to be an appropriate method of communication. For the other forms, we theorize that they are not as popular as in peer relationships because of the percentage of participants that reported having frequent in-person contact with their partners. Video calls may be used to mimic in-person interactions, however when there is no separation of partners, mimicking such interaction is not necessary.

Communication Styles and the Associated Consequences

Peer Relationships

When analyzing the relationship between connection with peers and greater social media use as a communication strategy, we found that of the participants that used social media more, there was a similar sized group between those who did feel connected, those who felt neutral, and those who felt disconnected. This finding relates to SI, in that the effects of using social media immensely depend on the person and how they create meanings through their interactions on social media. Despite the high levels of social media use during the pandemic, all participants are experiencing levels of connectedness differently in their peer relationships, leaving no noticeable trend or correlation. Therefore, it can be concluded that the effect of social media use on connectivity relies on other situational and personal factors. In terms of individuals feeling connected through their greater use of social media, we recognize this finding as they are receiving updates on their peers through social media news-feeds, leading to individuals showing support and appreciation for others (i.e., "liking" a post, "reacting" to a "story"); although minimal and potentially surface level, these small interactions may still bring feelings of connectedness. Diving into the neutral statistic, we can identify this with the PTM as we believe that most individuals accept the surface level of communication with their peers that they receive through social media apps. In regard to feelings of disconnectedness specifically, social media focuses more on highlighting oneself, compared to connecting with peers (such as the function of texting or calling).

When comparing the routine of direct messaging peers before and during the pandemic, we found there was not much change between the two. This is sensical as direct messaging platforms are often part of undergraduate students' daily lives, even before the pandemic. As a society, the idea that constantly being in communication with others (despite not physically being with them) has been ingrained in our daily routines. This often results in high levels of direct messaging; the pandemic has exacerbated these habits as direct messaging is one of the only methods of communication we still have access to. We can connect this result to FA by comparing the use of direct messaging platforms, in-person time, and [audio/video] calling. Before the pandemic, direct messaging was used a moderate amount, in-person time was frequent, and the rate of calling was exceptionally low. When looking at the data regarding the time during the pandemic, direct messaging has maintained its moderate frequency, in-person time has unquestionably decayed, while video calling specifically has increased. Returning to the mediocrity concept, individuals have accepted the lackluster quality of using social media to contact their peers. Therefore, along with our previously mentioned data on the relationship between feelings of connectedness and frequency of video calling, there is an understanding that further connectedness can be reached through video calling instead of those platforms.

When testing habits of audio calling before and during the pandemic, we found there was a general decrease in the frequency at which participants audio called their peers. We infer that participants were not audio calling their peers much before the pandemic as they were able to spend time in-person, despite there still being a small group of individuals who were audio calling their peers. When addressing this through the DOTS, we theorize that individuals are audio calling their peers even less during the pandemic because they are now engaging with other digital methods of communication that bring a stronger sense of connectivity, such as video calling. Focusing on the PTM, we are not

able to spend as much time in-person, so we now have to look for other ways to visually connect with peers, something that is not brought upon by audio calling.

When evaluating online fatigue and direct messaging during the pandemic, there is a positive linear progression; the more one uses direct messaging platforms, the more likely one is to experience online fatigue. We hypothesize this is due to the wide assortment of direct messaging platforms there are to maintain one's presence (i.e., Snapchat, Facebook Messenger, etc.); it can become overwhelming when using multiple platforms as one has to juggle various priorities instead of focusing one's energy on a singular platform. Furthermore, it might be assumed that individuals are using direct messaging to combat a sense of fear of missing out, otherwise known as FOMO (Hetz et al., 2015). Therefore, individuals may check social media and numerous direct messaging platforms more frequently as they do not want to feel like they are disconnected from their peers, resulting in greater online fatigue. Additionally, checking these platforms more often leads to the potential of passive social media use; if one is already on the app, their natural urge to scroll takes over due to the convenience. Passive social media use has been linked to feelings of depression and anxiety (Escobar-Viera et al., 2018). Further, the extensive utilization of social media is similarly linked to feelings that negatively impact psychological well-being, and produce greater levels of social media fatigue (Dhir et al., 2018). As researchers, we analyze this relationship as a continuous cycle where individuals attempt to maintain their presence on direct messaging platforms, continue engagement to combat FOMO, and then use social media in a passive manner, resulting in further online fatigue. This increase in fatigue may make it difficult to keep up with direct messaging, continuing the cycle.

Despite some participants still experiencing online fatigue while audio calling, the rates of fatigue were relatively lower than the other analyzed communication methods. Specifically, if audio calling peers daily, participants were equally as likely to face online fatigue as they were not to. Returning to both DOTS and PTM, we acknowledge how the lack of in-person interaction creates a certain minimum level of online fatigue, but may not be exacerbated by audio calling; we must also recognize how individuals may experience online fatigue from other platforms. In other words, their online fatigue may not necessarily be caused by audio calling. Moreover, experiences of online fatigue are not as intense with audio calling as they are with other methods of communication (i.e., video calling or direct messaging), due to the lack of visual focus one is required to have on screens. For example, one is able to be on a phone call with a friend while physically multitasking. However, if on a video call, one is most likely to visually pay attention to the other person, resulting in higher levels of online fatigue.

When assessing online fatigue with video calling in the pandemic, we found that across all frequency categories, at the very minimum, approximately three quarters of participants developed a sense of online fatigue. Connecting this finding to SI, we acknowledge the various meanings that individuals can associate with video calling their peers. One person might obtain a sense of connection, but still experience online fatigue because of the unavoidable digital nature of the interaction. Another person may view video calling as a reminder of the limits to in-person interaction that exist and become fatigued through missing the lifestyle before the pandemic; however, they might continue to engage with video calling as it is their only method of communication. Despite the individual meanings related with video calling, an inevitable sense of online fatigue may

be experienced. Likewise, DOTS and FA can be practiced in this finding as we analyze the new norms the pandemic has curated. From here, we can identify two perspectives; (1) the gradual increase in online fatigue as one continues to use video calling more, and (2) the immediate understanding that video calling will cause online fatigue, prompting the fatigue consequence preemptively. Although the effects highly depend on one's view of online fatigue and video calling, they will still exist and bestow upon oneself.

Romantic Relationships

Unlike in peer relationships, social media did not have a strong impact on romantic relationships; level of connectedness to one's partner did not differ with increased social media use from COVID-19. As discussed previously, there is a strong difference between passive and active social media use, and the impacts it can have on feelings of connection and inclusion. We theorize that participants are more likely to use social media passively for peer relationships, and actively for romantic; passively browsing social media sites will provide much more exposure to peers than to other couples that could lead to social comparison and feelings of FOMO. Active social media use promotes feelings of inclusion and reduced loneliness (Thorisdottir et al., 2019). When interacting actively with partners, there may not be the same negative outcomes that social media can have on one's well-being. In this way, the differences in social media use between peer and romantic relationships may help mitigate feelings of disconnectedness, or at least avoid furthering the separation between partners.

The influence of SI is also significant in this analysis. Each person is going to have their individual experiences with social media, and there may be vast differences in how increased social media impacts our population. It can be theorized that variations in connectedness could also be caused by confounding factors such as external stressors from COVID-19, as we have discussed the impact this has on romantic relationships. It is important to consider individual and contextual factors that may predict how and why individuals react to altered realities (Pietromonaco & Overall, 2020). These may potentially influence one's perception or acceptance of online communication methods and similarly predict their likelihood of utilizing them as a combative method for communication throughout the pandemic.

Other forms of communication in romantic relationships create online fatigue, similar to the effects in peer relationships. Video calling, a commonly used form of communication in romantic relationships, shows higher levels of online fatigue in comparison to audio calling. Unlike in peer relationships, however, audio calling is slightly more common amongst romantic partners. As mentioned by Licoppe (2004), audio calls help alleviate online fatigue by providing a break from looking at screens. We theorize that because audio calling is more prevalent in romantic relationships, this may act as a mitigator for some relationship stressors caused by COVID-19; with peers experiencing higher levels of social disconnectedness from increased social media use, the prevalence of audio calling may be the factor that generates more connection between romantic partners and helps alleviate those feelings.

Conclusion

Summary

Our research aims to address how the COVID-19 pandemic has influenced the ways individuals communicate with their peers and romantic partners. We found literature to preface our research, outlining the following concepts: relationships, communication, adaptation, and digital communication and their consequences. Using the following theories: Symbolic Interactionism, Definition of the Situation, Perspective-Taking Model, Interpersonal Spacing, and Frame Analysis, we looked at the changes in proximity, interpretations of meaning and feelings of connectedness, and how these may explain the experiences of individuals in relation to the changing communicative processes. With an online anonymous survey, we gathered participants from the McMaster student body to report on their perceptions of communication, feelings towards relationships, and adaptive methods of interaction prior to and throughout the course of the pandemic. We address multiple limitations that may inform future research, with hopes that more extensive examination will be conducted in this topic area. We ultimately found that though individuals have attempted to combat the in-person communication barriers put in place by the COVID-19 pandemic, the use of alternative methods does not entirely mitigate feelings of social disconnectedness or lack of social support, and often leads to feelings of online fatigue.

Limitations

There are multiple limitations to this study worth mentioning, in regard to our participants, research process, and literature. The first limitation is the lack of previous research on the concept of communication in relation to the COVID-19 pandemic. When we formed this research especially, there were few extensive studies on the connection between COVID-19 and relationship processes, simply because not much time had passed since the commencement of the pandemic. Due to this, it was difficult to begin our study utilizing previous knowledge and theoretical frameworks, as the pieces that did exist varied in terms of geography, field of study, and specificity. This limitation does however reinforce the importance of our work, as communicative processes will continue to be altered as the pandemic progresses and should be addressed throughout these developments.

Our next limitation relates to the number of participants gathered (n=75). Due to the small stature of the sample size, our findings cannot be widely generalized among the student body or the general population. The reported gender identifications reveal that a majority of our participants classified themselves as female (93%). The remaining few participants identified as male (7%). Further, our population sample is disproportionately represented by Caucasian participants (49.3%). Finally, all of our participants identified between the ages of 18 and 29. We found few significant differences across gender, ethnicity or age within our results. It is difficult to determine whether the lack of difference is due to the small sample size and lack of true representation, or other extraneous variables. While our results have implications for how and why communicative practices have been influenced and navigated throughout the course of the COVID-19 pandemic, it is not appropriate to assume that these are true among the entirety of the McMaster student body or general public. Further research is required in order to develop insights that more accurately represent wider student and public populations.

To expand on the previous limitation, we received a smaller number of responses within the romantic section, with a total of 57 respondents. This smaller sample size

makes it more difficult to generalize findings across all experiences of romantic partners during this time. Further, our study collected individual responses, which means that it is likely that in most cases we only gained insight from one side of a romantic relationship. As there is much variability in romantic partnerships, this study alone cannot encompass the many factors that contribute to relationship processes, stress and maintenance. In terms of future research, it would be beneficial to perform concentrated research on romantic relationships, communication, and interactions, and collect responses from both sides of the relationship for comparative analysis.

Another limitation to our research is the lack of qualitative insight. Our team utilized quantitative and statistical analysis in the process of our research, which proved beneficial as an informative agent. Although the survey provided opportunities for qualitative responses, this was optional and use by participants was minimal. Our work focused on communication, which is a concept that is diversely defined. Each individual has alternate preferences and viewpoints that impact how and why they communicate with their peers and romantic partners. Our quantitative data provided us with a general overview of our participants' experiences. However, it does not allow us to look deeper into the causes of these phenomena. It is important to recognize that every individual and every relationship is unique. The use of qualitative responses or interviews could further assist in understanding this variability.

Time is an added limitation of our research. This includes both time constraints with respect to the project and the timing of our study within the COVID-19 pandemic. As a student research study, this project was limited to a specific timeline. This was unavoidable, but with a greater allotment of time, we may have been able to place more focus on demographic understanding of data analysis. We similarly could have gathered more participants, which may have provided further insight into relationship and communication processes throughout this time. In addition, these past months were a mere fraction of the COVID-19 pandemic. If we were able to conduct this research over a longer period of time, we may have potentially generated results that were representative throughout the progression of COVID-19, rather than at one point in time. When we formed this research, we were only six months into the pandemic. In the short time since we developed this study, and even since we collected data, there have been a number of global developments (i.e., additional lockdowns, vaccination rollouts) that may have had additional effects on peer and romantic relationships. Future research may consider following the trajectory of a relationship throughout the COVID-19 pandemic to gain insight into how the ongoing stressors influence communication, levels of social support and connectedness.

Finally, COVID-19 had its own unique and significant impacts on the study that could have limited the final data analysis. Most of these limitations, ironically, had to do with the lack of in-person interaction between the members of our team and increased difficulty of technological platforms. Not being able to meet in-person created limitations in the pace and quality of data analysis, as working as a team was exponentially more challenging. PSPP is one aspect that was increasingly more difficult because of online work. This is a platform that none of our group members had any prior experience with, so it took us time to get comfortable with data analysis. Having to do this over Zoom was frustrating, as Zoom did not allow for screens to be shared while working on the software resulting in one person having to control and dictate what they were seeing on their screen. This

created barriers in our team's ability to efficiently and collectively analyze the data. Furthermore, COVID-19 resulted in the lack of in-class time with our instructor and supervisor, Dr. Sarah Clancy. Although we were provided with the needed information and she was available via email, Zoom, occasional synchronous classes, group meetings, and office hours, the lack of weekly in-person class created limitations in our efficiency and the capstone experience in general. Each of these limitations, while unfortunate, were essentially unavoidable. We also acknowledge that this particular study would not have been possible without COVID-19's impact on the world, and the knowledge gained from this study remains important for future experiences with pandemics.

Ultimately, there were multiple limitations throughout the process of this research. We recognize that these may have influenced our findings, however, do not believe that they prove detrimental to the overall impacts of this study. None of these factors will impact the well-being of our participants, and each may be addressed by future research with ease.

Significant Insights

This study revealed a number of insights that may prove informative to future research. One of our main findings was that individuals did in fact experience changes in their communicative processes due to the COVID-19 pandemic. With restrictions in place, individuals were forced to utilize alternate methods of connecting with one another. While some participants were able to mitigate levels of social disconnectedness and maintain healthy communication, it was variable among the rest. Strength in communication was often reported alongside the use of in-person interaction, suggesting that while online communication is a feasible alternative, it does not always meet the same standards as face-to-face interaction. The amount of in-person interaction was a significant predictor of levels of social connectedness and strength of communication in both peers and partners. Alternatively, those who reported greater levels of social disconnectedness and weak perceptions of social support saw their peers and partners on a less frequent basis. To counter the inability to see others in-person, participants reported instead using methods such as phone calling, video calling, and social media. Frequent use of these alternatives often leads to online fatigue, and respondents continued to report feelings of social disconnectedness, and difficulties providing and receiving social support.

As discussed previously, our research demonstrated that while individuals utilized different communicative agents in order to remain connected to their peers, they still reported a significant degree of social disconnectedness. While we initially hypothesized that individuals might experience reduced efficiency in communication, and as a result, weaker levels of connectedness, we suggested that the use of alternate platforms for interacting might mediate this result. However, miscommunication was not reported as heavily as we would have expected and was not significantly connected to respondents' high levels of social disconnectedness. Further, we found that while social media, phone calling, video calling, direct messaging and other forms of communication were used at some level of frequency, it was not effective in reducing social disconnectedness. We suggest that it is the lack of in-person interaction that ultimately causes this effect within individuals in peer and romantic relationships. This is an important finding, as it must be understood that regardless of the type of alternative communication, individuals may still experience adverse social or psychological effects due to the lack of in-person contact.

Further research should focus on what specific methods of communication are most proficient in reducing these feelings of social disconnectedness.

Overall, regardless of the type of relationship (peer or romantic), or type of platforms utilized, most participants experienced some level of online fatigue due to the increased usage of online communication techniques. This is plausible during COVID-19 as a majority of communication practices have been moved to the virtual atmosphere. We further suggest that this heightened level of online fatigue may be in part a result of the greater use of social media on a passive level, although further research is required to address this relationship specifically.

An additional insight worth mentioning in relation to romantic partnerships involves the build-up of stressors being placed on those relationships. Respondents in the romantic portion of our research often reported seeing their partners in-person much more frequently than did peers. This may be due to the fact that romantic partners became primary points of contact for one another. Despite this frequency, many participants still reported feelings of social disconnectedness. We suggest this is due to lack of peer contact, which is still an important factor in social well-being. Something that may be worth further research is the direct impact that concentrated interaction may have on individuals within romantic relationships. As they are less frequently seeing peers, and more frequently seeing their romantic partners, there may be greater stress placed on that relationship. Combining previous relationship difficulties with current pandemic stressors may have a variety of impacts on individual and relationship processes.

On a broader level, the relationship between COVID-19 and additional stressors is a field that requires further attention. Accumulation of relationship, socioeconomic and other daily stressors in addition to COVID-19 related restrictions may have its own array of unique impacts on individuals in peer and romantic relationships. Further research may allow for the development of targeted interventions to mitigate such effects.

One final insight has relation to the use of external supports. When asked about the use of online or on-campus services throughout the course of the pandemic, the majority of participants reported using none. No participants used campus services and only 3.5% of participants sought out assistance online. This could suggest that either participants are unaware of the many services available to them at this time, or they do not feel comfortable utilizing them. Once again, it is difficult to generalize these statistics due to the small sample size. However, it does raise questions about who has or continues to use online help services, and the perceived efficiency or effectiveness of these programs. Future research should address what types of online services would be of interest to students and how they can be enhanced to better serve the McMaster community.

Concluding Thoughts

Communication and social interactions are imperative to the development and maintenance of relationships. Our research team wanted this work to inform and remind the McMaster student body of the importance of this fact. By providing insight into the changing communicative processes caused by the current global circumstances, students may be more aware of the changes in their relationships and work to more effectively combat them. Further research must be done in order to determine proficient intervention strategies. However, we believe that greater awareness about one's relationship, communication strategies, and resulting emotions or feelings may

encourage individuals to recognize how and where they can work to improve. We hope that this work may inform additional research in this topic area, conducted with larger sample sizes and across educational institutions, or even within the general public to increase generalizability. This study shows us that in times such as this, our relationships remain essential to our well-being. The COVID-19 pandemic has placed many stressors on individuals' peer and romantic relationships. The changes in communication resulted in a number of adverse effects including social disconnectedness and online fatigue. Future research should aim to focus more specifically on the mechanisms that cause these changes. It will be important to address these issues as the COVID-19 pandemic progresses into the foreseeable future.

Acknowledgements

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Exploring Perceptions of Positive and Negative Impacts of Students' Well-Being on Their Physical Health

Mikayla Voets[1], Emily Bergsma[1], Kayla Zanon[1], Jacob Thomas[1], Keeley McGrath[1]

Abstract

With thousands of students attending university every year, little research has been conducted to assess whether there are positive or negative impacts of students' well-being on their physical health. Using a qualitative online survey, we anonymously sampled McMaster University undergraduate students (n=45) which consisted of female (n=31) and male (n=12) participants. Our survey included questions such as: what is your satisfaction with your physical health and well-being, what activities do you associate with positive and negative well-being, what is your perceived level of stress throughout the school year, and how do you cope with stressful situations? Through a series of coding and identifying categorical variables, we analyzed our data by drawing on themes that related our research. This revealed relationships between students' well-being and physical health, allowing us to make positive and negative correlations between well-being and physical health and compare them in their relation to university, in order to reveal the effects they have on each other. We found that 73.3% of participants are "unsatisfied" with their well-being and 44.4% of participants are "unsatisfied" with their physical health. As well, 53.3% of students reveal that their level of stress increases during the school year, however most responses indicated positive word associations with the terms well-being and physical health, but negative word associations with the term university. Our research concluded that one's well-being has serious implications on physical health, demonstrating that declining well-being can directly impact the physical health of university students.

Introduction

Topic of Research

In today's world, mental health and well-being is discussed more than ever before. As society works hard at fighting away the stigma surrounding mental illness, new conversations are brought forward, thus leading to new understandings. With new findings, the beginnings of critical conversations, and the reduction in stigma surrounding mental well-being, we are able to see an enormous correlation between well-being and physical health. The idea that mental health and well-being can have relations to one's physical health can be dated back to the 5th century BCE. Greek medicine, at this time, believed in a physiological explanation for mental disorders through the humoral theory

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(Chakravarty, 2011). Specifically, the humoral theory considered the body as being "composed of four humours: blood, phlegm, yellow bile, and black bile" (Chakravarty, 2011, 269). Furthermore, mental disorders were seen as a cause of imbalance of black bile in the body (Chakravarty, 2011); taking this concept of body imbalance causing problems of well-being, we seek to further understand how in modern society the connection between well-being and physiology still exists. This study will provide a relationship between mental well-being and physical health, and the effects university has on these aspects in an individual's life. We also hope to provide insight to universities allowing them to understand the impacts the culture and institution can have on its students' well-being and physiology.

Purpose of Research

We sought to explore and understand this relationship between physical health and well-being, noting the importance of prior research in this subject, and where there can be further or additional knowledge found. When examining the well-being of university students, it is vital to consider each and every facet of mental well-being and physical health, and more importantly the onset of physical health problems as a result of well-being. Noted by Ghazal Read et al. (2016), there has been extensive research done on both mental health and physical health individually; however, there has been a paucity of research on the correlation between both mental and physical health. Through the literature we studied, it was practical to assume physical activity improves well-being; one underlying aim our research sought to provide was the opposing view - does one's well-being have implications of exercising (Hayes & Ross, 1986). Furthermore, we took this knowledge and applied it to university students and expanded by looking at the effects well-being (i.e., perceived stress, happiness, body image, etc.) can take on individuals' physical health. The study took a social psychological context by applying the influence of a larger institution, university and its social culture, and connected it to individual experiences of well-being and physical health to determine the impacts it may have on one's life.

Taking into consideration the theory of cognitive dissonance it is understood that if two or more concepts in the brain are inconsistent, individuals will seek to change the inconsistency to better align (become more consistent) (Festinger, 1962). If this concept is applied to the components of an individual's well-being and physical health, it can be anticipated that there is consistency between the two. Thus, when applying cognitive dissonance to well-being there may be evidence displaying physical health behaviour being impacted by whether someone has good versus poor well-being.

Research Questions

Throughout the course of our research, the primary focus has been to understand the connection between emotional and physical well-being. The research of this study was conducted solely online via LimeSurvey, and only included participants in their undergrad at McMaster University. We believe this allowed a look into the lived experiences and perceptions these students have on physical health and mental well-being in relation to university as a contributing factor.

In summation, there is literature that establishes connections between physical health and well-being and can be seen dating back to the classical Greek era. However, there

is still room for growth in knowledge of this subject matter which we have attempted to cover: (1) Does one's state of well-being have implications on aspects of physical health - i.e. exercising?; (2) In which ways does being a university student impact this relationship of well-being and physiology?; (3) Does the relationship between well-being and physical health appear different among different self-identified genders, and in which ways - physiology/well-being, or both? Ultimately, the aim of this study is to explore perceptions of positive and negative impacts of students' well-being on their physical health.

Overview

This following research study is divided into six significant sections. The first section provides a review of previous literature pertaining to our topic. The literature review works to solidify our research, as well as show how our research fills the gaps that current studies have failed to address. We will then outline the theoretical frameworks used in our research study including 'Cognitive Dissonance' and 'Attribution Theory. We utilize these theories to understand the adverse correlation between emotional and physical well-being, as well as provide an explanation connecting these theoretical assumptions to our research. Following this, we will discuss our methodology, including an outline of the research methodology, ethical considerations, the research process, and an analysis of the data. This section includes a step-by-step review of the research process from start to finish, as well as an in-depth consideration of ethical concerns from our research. It will also provide a detailed overview of the data analysis component. Next, we will share the results of our research. We will then discuss our findings, including a comprehensive analysis and interpretation of the results, as well as assert the broader significance of our research. Lastly, we will conclude with a summary of our overall findings. This will also provide insight into any possible limitations of our research study. Additionally, we will conclude with significant insights and contributions that our research grants to the McMaster community and undergraduate students alike.

Literature Review

The following section reviews previous literature that has been published on the correlation between physical exercise/health and mental well-being.

Review of Previous Literature

Soo Kim, Soo Park, Allegrante, Marks, Ok, Ok Cho, & Garber (2012) investigated the relationship between physical activity and general mental health in the United States. The purpose of their study was to determine an ideal number of hours an individual should engage in physical exercise per week to provide the greatest benefits to their mental health (Soo Kim et al., 2012). Their goal was to prove a dose-response relationship between physical activity and mental well-being, meaning they were trying to determine the proper dose of physical exercise in order to have a positive outcome on mental well-being. (Soo Kim et al., 2012). They examined over 7500 responses from a national U.S health survey that questioned adults on their general health and time spent on physical leisure per week. The authors discovered that between 2.5 to 7.5 hours of physical activity per week showed to be the most optimal range, proving their hypothesis of a dose response relationship (Soo Kim et al., 2012). Furthermore, the authors found that an

overexertion of exercise could result in a loss of the perceived mental health benefits associated with physical activity (Soo Kim et al., 2012).

The association between physical exercise and mental well-being was further researched by Graaf, Ten Have and Monshouwer (2011). The authors conducted a longitudinal study on the length of time individuals spent on physical exercise and how it is associated with mental disorders (Graaf et al., 2011). Using data from a mental health survey from the Netherlands, the authors found that those who are more active are, on average, of a higher socioeconomic status and are less likely to have a somatic illness (Graaf et al., 2011). Furthermore, the authors noted that an excess amount of physical exercise could prove to be just as negative towards one's mental health as zero physical exercise. They also noted that engaging in physical activity translated into a better course of mental illness and boosted recovery rates. Finally, they concluded that physical exercise is correlated with lower likelihood of mental disorders and better mental health (Ten Have et al., 2011).

Adams, Dye and Moore (2007) analyzed both vigorous and strength training, among female college students. They chose to study this as a result of the lack of research on the topic with a younger demographic of participants and also because mental illness is more prevalent in females. A seven-day frequency of either strength training or vigorous/moderate cardiovascular exercise was presented to groups of individuals and they answered questions on the duration of either activity (Adams et al., 2007). Participants were then asked questions regarding their mental well-being such as self-reported anxiety and overall perceived health (Adams et al., 2007). The authors discovered strength training to be more correlated with positive mental health than the vigorous cardiovascular training. The authors concluded that a relationship exists between physical exercise and mental health; however, more research is needed before physical activity is to be promoted as a type of treatment for mental illness (Adams et al., 2007).

Hayes and Ross (1986) examined two perspectives on the relationship between the physical and psychological aspects of oneself. The two main perspectives considered within this study were social evaluation and internal processes which allowed researchers to examine how external factors such as societal attitudes may impact one's psychological well-being, as well as how the relationship between psychological and physical health may impact well-being (Hayes & Ross, 1986). The purpose of this research was to determine whether variables such as being overweight, exercise, and general physical health were more heavily impacted by societal expectations or the internal processes that occur within an individual's body (Hayes & Ross, 1986). The researchers also wanted to determine the implications that these variables may place on an individual's overall well-being. Overall, this study found that exercising and having overall good physical health directly improved psychological well-being (Hayes et al., 1986). The authors also noted that being overweight did not have either a positive or negative implication on well-being, despite the negative stigma surrounding the topic that is maintained within society.

When analyzing the relationship between psychological well-being and physical health, it is important to consider variables such as age when conducting research. Ohrnberger, Fichera, & Sutton (2017) explored the effects that social capital and lifestyle choices such as cigarette smoking and physical activity placed on the relationship between physical

and mental health in an older age demographic. This study was conducted on a group of 10,693 individuals who were aged over 50 years old via a six-wave longitudinal study which ranged from 2002 to 2012 (Ohrnberger, Fichera, & Sutton, 2017). The most significant finding within this study was that both the participant's past mental health and past physical health had strong, indirect cross-effects on the participant's current mental and physical health (Ohrnberger et al., 2017). This was demonstrated in the finding that individuals who previously had better mental health were likely to decrease their cigarette consumption over time, presenting a positive outcome on their physical health in later life (Ohrnberger et al., 2017). It is expected that our research will similarly reflect this finding.

It is evident that there is a distinct relationship between physical and mental health. This relationship was further analyzed in the study conducted by Herbert, Meixner, Wiebking, & Gilg, (2020). This study was conducted among 185 university students in a laboratory study. The goal of this study was to determine how various rates of physical activity impacted mental health and well-being (Herbert, Meixner, Wiebking, & Gilg, 2020). Specifically, this study analyzed levels of both general perceived stress and perceived stress due to uncertainty of the future regarding finances, jobs, and social relationships. The main finding of this study determined that there is a strong relationship between physical activity and mental health among this group of university students (Herbert et al., 2020). In the group of participants that participated in a 6 week-long aerobic exercise program, there were significant reductions in perceived stress in all areas. This finding highlight's that the psychological well-being of students may be directly improved if they incorporate low to moderate physical activity in their daily schedules (Herbert et al., 2020). It is expected that participants within our research study that incorporate a form of physical activity into their daily lives will have a more positive perception of their psychological well-being.

Analysis of Previous Literature

There are many common themes throughout the articles chosen for this literature review. One of these themes is the study design with both Graaf et al. (2011) and Ohrnberger et al. (2017) using a longitudinal design for their research. Although both studies focused on rather different aspects of the relationship between physical activity and mental wellness, their findings echoed similar results. Both studies saw that the effects of either mental health or physical exercise lasted far into one's future, with past habits reflecting into their health years later. This demonstrates the benefits of a longitudinal study, and how this particular design allows for exploration into branches of research that are not possible with less time-consuming designs.

Several findings throughout multiple articles shared similar results. Particularly interesting was the finding that too much exercise can diminish the number of positive impacts seen on mental health. Soo Kim et al. (2012) and Graaf et al. (2011) both briefly touched upon this during their discussion. Additionally, Herbert et al. (2020) also claimed that through their study, they concluded that low to moderate physical activity is the best way to maintain positive mental well-being, rather than vigorous, high intensity physical activity. However, none of the other articles mentioned a possible upper limit to physical exercise. This is notable and begs the question of why no other researchers from our chosen articles discovered this. We may consider this finding when approaching our research.

Two of the articles directly research post-secondary students: university and college level (Adams et al., 2007 & Herbert et al., 2020). These studies are a great resource for the purpose of our research as this previous research was conducted on a similar demographic as ours will be conducted upon. The article published by Herbert et al. (2020) especially stood out to us because throughout their research, they took certain variables into account such as social relationships, jobs, and finances. We believe this is significantly important to the population we are choosing to study as these variables are so extremely present in the minds of university students. They could be struggling to afford their tuition and having difficulty picking a career path, all while trying to find a balance of having social life. Both research studies found evidence of a relationship between mental health and physical activity, as did all the articles in the literature review (Adams et al., 2007 & Herbert et al., 2020). However, we wonder if there may be a stronger link between the two variables in certain demographics, as none of the selected articles address this. For example, post-secondary students, compared to an opposing group, such as adults working full time jobs. This could be something that future studies surrounding this topic could consider in their research.

When considering the impact of an individual's psychological well-being on their health, topics such as societal attitudes and social comparison are commonly considered during research. Specifically, both Hayes et al. (1986) and Herbert et al. (2020) analyzed societal attitudes surrounding general perceptions of physical health and societal attitudes during their research studies. Although both studies considered these topics, it is important to consider how results may vary due to differences in social evaluations and attitudes depending on the demographic of participants chosen. For example, demographic variables such as socioeconomic status, gender, and the age of participants may produce differences in the responses that they submit. Although these studies provided an adequate analysis of these variables, they may place a larger impact on data collected than the previous studies may have reflected. Individuals who are a part of the McMaster community come from a variety of places and backgrounds, leading to greater diversity and variation within these demographic variables. For example, individuals that were raised in varying levels of socioeconomic status may not have the same opportunities as their peers to focus on their psychological well-being or physical health. Some of these opportunities may include access to counselling and therapy, extra-curricular activities, as well as gym memberships. These differences may be something that the research we conduct will more significantly reflect due to the large amount of diversity that is seen within the McMaster community.

Limitations of Previous Literature

Across all the articles analyzed, there were multiple limitations present within each study that was conducted. One of the most prominent limitations that may have impacted all these studies was that only a small number of mediators rather than a larger or more open range were considered. For example, many articles considered variables such as age, income, and religion while completing their studies and further involved these variables in their analysis of the results. Although some studies included additional variables such as gender, education level, and socioeconomic status in their demographic questions, very few included these variables in their discussion. We understand that this may not have been relevant to their studies, nonetheless they have the potential to be an

important mediator in the way of analysis. Another limitation that must be considered across all studies is that well-being is a subjective concept, and that each individual will rate their well-being differently depending on their interpretations of the concept.

It is important to consider the demographic being studied when conducting research. Specifically, it is important to consider how different age cohorts of people may answer or interpret survey questions differently. These differences may arise due to how their initial understanding of a topic was developed, depending on societal attitudes surrounding the topic during a critical point of the creation of their development. For example, the participants in the article were a very young demographic whereas in the research study, participants were found to be significantly older. This is an important limitation to consider when comparing these pieces of literature because definitions of psychological well-being have changed drastically over time and are much less contested compared to the times that older generations may have grown up in. Additionally, it is important to consider individual differences in physical health as well. A limitation that may arise surrounding this issue is that physical health varies per person, and both exercise and physical activity impact each individual differently. It is also important to consider that the participants surveyed may have varying levels of physical health due to things such as income, socioeconomic status, and age.

Lastly, it is difficult to compare the findings of these studies as each study utilized a different theoretical perspective to analyze their results. These theories may have changed how researchers interpreted the data that was collected, as well as what information they decided to include for their studies.

Theory

Within this study, social psychological theoretical concepts will be applied and examined when considering the potential positive or negative impacts on students' well-being, and the effect this may have on their physical health. The first theory being considered within this study is cognitive dissonance. Cognitive dissonance refers to a situational conflict in which there is an inconsistency between two or more cognitive elements (Festinger, 1962). For example, when an individual chooses to smoke, despite having the knowledge that smoking causes cancer. The act of smoking is considered the behaviour and the knowledge of causing cancer is the cognition.

When an individual experiences cognitive dissonance, it is often accompanied by a feeling of mental discomfort, which then motivates the individual to alternate their attitudes, beliefs, or behaviours to restore balance within their cognitions. In addition, Leon Festinger (1962) is the first theorist to have investigated cognitive dissonance and suggests that humans have an innate need to maintain harmony among conflicting attitudes and behaviours in order to avoid disharmony or 'dissonance'. This theory also states that cognitive dissonance usually occurs in two situational frameworks, one occurring after a decision has been made, which is referred to as post-decisional dissonance, and the other being when one acts in a way that is inconsistent with their own beliefs, known as counter-attitudinal behaviour (Festinger, 1962). Our intention to make decisions that benefit our personal needs and desires do not develop easily, thus it is necessary to reflect on the factors that influence these situation-based decisions, in order to understand the ways in which they affect us.

Consequently, when examining our research topic, one would consider how an individual's well-being can have an impact on their physical health, perhaps leading to cognitive dissonance. This theory helps us frame our research in the following way: when one has negative attitudes or thoughts it could potentially result in poor physical health, meaning that a poor state of well-being would be considered the cognition, and the lack of care in regard to physical health would be the behaviour. In terms of results, it may become evident that individuals with poor well-being may act in ways that decrease the quality of their mental and physical health, similar to individuals who have a good well-being and appear to intentionally act in ways that increase the quality of their physical health.

Another aspect of cognitive dissonance related to our research is whether a poor state of well-being causing discomfort may potentially motivate the individual to make positive changes in alternating their attitudes in order to improve their well-being and physical health. Utilizing the framework of cognitive dissonance within the research will also give us the opportunity to review different states of cognition that impact our physical health through the results of the survey. The most evident factor between cognitive dissonance and our research topic is Festinger's (1962) belief that humans have a distinct need to avoid dissonance among their cognitions. This research has the potential to reflect on the universal desire to be happy and how this factor affects us as humans when we do not meet the ideal standards of happiness (well-being), resulting in poor physical health (Festinger, 1962). In comparison, one's positive cognitions and their positive effects on an individual's physical health will be reviewed in comparison to cognitive dissonance.

Furthermore, this research will also consider attribution theory. Attribution theory refers to the process in which an observer uses to infer the causes of another individual's behaviour (Festinger, 1962). For example, one may attribute an individual feeling of being sad or upset to a loved one passing away. Frtiz Heider (1958) was the first theorist to propose a psychological theory of attribution and develop the terms of situational (external) and dispositional (internal) attributions as part of the theory's framework. Situational attributions explain behaviour by focusing on factors in the person's social environment (Heider, 1958), however dispositional attributions explain behaviour by looking within the person (Heider, 1958).

Nevertheless, Heider (1958) was not the only theorist to expand on attribution theory. F. W. Schneider (2012) explored attribution theory through the notion of attribution biases and errors. Schneider (2012) stated that people tend to overestimate others' behaviours and underestimate the influence of external factors on one's actions, referring to this concept as the fundamental attribution error (Heider, 1958). External factors may also be referred to as social influences which shape people's attitudes and behaviours based on the demands of their social group. Similarly, Harold Kelley (1967) expanded on Heider's (1958) attribution theory by introducing the covariation model. The covariation model seeks to explain how individuals arrive at these attributions and the factors that influence their inferences (Kelley, 1967). In doing so, Kelley (1967) identified three factors that influence attributions, consensus, consistency, and distinctiveness. Consensus takes into account whether or not others behave the same in a similar situation; whereas consistency looks at whether the individual themselves continuously behaves the same way in a particular situation; further, distinctiveness considers whether the individual behaves the same in similar situations (Kelley, 1967).

The notion that attributions are not fixed but vary situationally, allows for a greater perspective in assessing the dynamic of students' well-being and the contributing factors that affect their physical health, as our research may reveal. In addition, applying the concept of fundamental attribution error within attribution theory to our research is imperative to understanding how social influences affect individuals' behaviours and well-being. This research has the potential to find a correlation between negative social influences resulting in poor well-being and physical health. For example, if a student associates themselves with a group of peers who constantly feel stressed about school, this could result in poor well-being for the individual themselves. Therefore, it would be reasonable to attribute the social influence of stress to neglecting one's physical health. As a result, attribution theory will prove to be effective in that the data itself will contain a variation of students' statuses of well-being and will allow us as researchers to associate situational influences on particular states of physical health.

Methodology

Research Methodology

Through quantitative measures, we have conducted an anonymous survey via online. From our research, we found useful data that helps to gain knowledge of university students' lived experiences with well-being and physical health. Additionally, we sought to find correlations of positive and negative effects students' wellbeing have on their physical health through asking a series of questions around well-being and physical health. This quantitative anonymous online survey included both closed (Likert scale) and open-ended questions. It was important that the participants remained anonymous, so we utilized LimeSurvey, an anonymous online survey that was approved through ethics, and is specific to Canada (Clancy, 2020). Additionally, it should be noted that the research was approved by the McMaster Research Ethics Board (MREB#: 0327).

We were able to gain insightful data from a total of 45 participants, including female (n=31) and male (n=12) participants, within the undergraduate population at McMaster University located in Ontario, Canada. We made use of a non-probability sample, also known as a convenience sample. This method of sampling was practical as our research was on a smaller scale and the participants were obtained through particular groups within us, the researchers' knowledge (Robson, 2014). For our research specifically, we pursued McMaster University clubs and organizations for participants. Snowball sampling was also utilized as our participants from the non-probability sample group may have personally known of others who were interested in participating (Robson, 2014). Through these recruitment methods, we were able to gain enough participants to receive sufficient data.

Ethical Issues

As mentioned by Robson (2014), ethical concerns are always present when people are involved in a research study; Robson (2014: 74) however notes, "there is little point to research involving people if it doesn't have the potential to affect someone in some way." Although it was not the intent for people to be impacted negatively from their participation in our survey, it was important to consider possible breaches of ethics that could have arisen. As we asked personal questions revolving around well-being and physical health, there posed potential psychological risks. These risks may have been

subjective to the individuals participating, including feelings of embarrassment, weariness, or upset (as noted in our section of "Ethics Protocol"). In addition, there was the potential of social risks associated with fear of privacy or reputation being tarnished for those who participated. Although there were both social and psychological risks, we ensured that they posed no risks greater than those in everyday.

Considering the potential risks associated with having participated in our survey, we implemented procedures to ensure ethical research was conducted. First, it is important to note all participants were provided with a letter of information in order for them to make an informed decision and following this letter they had to give consent to proceed further (Clancy, 2020). With these steps in place, participants were given a chance to understand our research and what their participation entailed, as well, gave them the opportunity to change their mind. Additionally, at any point during the survey, up until they submitted the survey, participants had the opportunity to no longer participate - also noted in the letter of information. Furthermore, the information received was submitted anonymously, allowing them to secure their anonymity and privacy over the course of the research. All data collected was confidential in secure data storage software to further keep data private. Furthermore, we had also provided contact information for McMaster's Student Wellness Centre as a preventative measure and risk mitigation strategy. Although potential psychological and social risks may have been involved in our research, the overarching data collected has appeared as beneficial, and we hope through the actions we had put in place participants felt comfortable and safe.

Research Process

Through recruitment, we were able to find willing participants to take part in our survey. Our plan of recruitment involved posting within McMaster affiliated Facebook pages/groups and emailing McMaster student lead organizations. When emailing the different contacts, we provided our recruitment scripts and our letter of information. We obtained permission for posting by emailing or messaging administrators of Facebook groups given ethics approval; we provided an overview of what our research was, and how individuals could participate. Once approved by the administrator we would then either post our recruitment script or have the administrator post on our behalf. We began by approaching these communities through cohorts, only continuing to expand based on the number of participants had received; noting each particular group we had contacted. The associations we contacted include; McMaster Social Science Society (MSSS), Social Psychology Society, Anthropology Society, Economics Society, Geography and Earth Sciences Society, Health and Aging Society Association, Labour Studies Student Association, Political Sciences Student Association, PNB Society, SCaRs, Social Work Student Collective, Sociology Society, Life Sciences Society, Engineering Society, DeGroote School of Business Society, Humanities Society, McMaster Women's Flag Football Club, McMaster Dance Team, Class of 2021 - McMaster University - Official, Class of 2022 - McMaster University, Class of 2023 - McMaster University - Official Orientation, Class of 2024 - McMaster University - Official Group, McMaster Student Union, McMaster University - Current Students, McMaster Linguistics Society, Spotted at Mac. It was our goal through approaching different societies and graduating years that we would be able to get a diverse representation of McMaster's undergraduate population.

Keeley McGrath, Emily Bergsma, and Jacob Thomas were the individuals responsible for contacting previously noted groups. Emily Bergsma specifically was in charge of contacting the MSSS and Social Psychology society; as both Keeley McGrath and Jacob Thomas had past connections with said groups. Mikayla Voets was also noted as a conflict of interest as she had attachments to multiple groups including; MSSS, Social Psychology Society, McMaster Women's Football, and Class of 2024 students through means of a teaching assistant position, thus we concluded to exclude her in the recruitment reach out.

We also shared our poster of recruitment to reach a larger audience, in replacement of not displaying a recruitment poster throughout campus. The poster clearly stated that we were seeking willing participants for a research study and included the title of our study and a brief description, including the approximate time commitment to complete the survey (10-15 minutes), as well as providing Jacob Thomas' email address for contact, and lastly, a link to our survey.

Our survey consisted of 27 questions including both open-ended and closed-ended to optimize insight. Once granted permission through ethics approval, we conducted data collection through the LimeSurvey platform (an anonymous survey approved through MREB). This survey was conducted online and completed anonymously. The questions involved an assortment including; Likert scales, demographic, multiple and single choice, and open-ended. We were able to collect data from a total of 45 participants. We coded the received data in themes of physical health, academics, and well-being, then further coded using perceived positive and negative attributes to responses. Through this initial coding we were able to draw relevant connections between these themes in order to develop relationships and influences that they had to one another. We then were able to draw conclusions, and conduct graphs to help display the data received. Chosen results were then displayed as a poster presentation using bar and pie graphs, it also recorded the premise of our research, our demographic, methods used, significant insights, and a general conclusion. Finally, we have gone into further detail to outline our research and findings within this final thesis research paper.

Data Analysis

After we closed our survey on February 12, 2021, we began our data analysis. It is important to understand the concept of coding when discussing our analysis. Coding, as explained by Robson (2014), is the process of categorizing data into themes that hold significant meaning to the research. As previously mentioned, we planned to start with a simple categorization including: physical health, university, well-being, and gender. Due to the lack of representation in different genders (approx. 69% self-identified as female) we were not able to gain significant data to draw connections on gender differences. However, from the other categories we were able to expand, developing a total of 11 different thematic categories, specifically used to code the open-ended questions from the survey. We began with the coding themes of physical health, mental well-being, and university. From there we added codes of positive; positive physical health; positive mental well-being; positive, university; negative; negative physical health; negative mental well-being; and negative, university. Data was able to be categorized in either one or more of these codes, allowing us to derive connections to overarching ideas and findings. Specifically, it allowed us to draw relationships between well-being and physical

health, in which we could then apply the theme of university separately to see the influence it held.

Furthermore, through using coding we were able to give quantitative value through categorical variables. Categorical variables refer to numbers given to different categories (Robson, 2014). For our research specifically, some categories had been a result of our coding (i.e. through open-ended questions in survey), and others were given numerical value pre-emptively. For example, in questions such as "How satisfied are you with your physical health?", numerical value was given through use of a Likert scale. With this analysis we were able to account for frequency and make comparisons specific to things like university and stress. When recording and calculating this data we used software including PSPP and Microsoft Excel. This allowed us to easily convert data into graphs and better display our findings. Additionally, the PSPP data editor was used to complete cross tabulations of our data for the purpose of finding deeper connections between results.

We made use of a series of bar graphs and pie charts to show correlations found and make comparisons of different variables. Overall, we were able to make positive and negative correlations between mental well-being and physical health; and could then compare these correlations in relation to university to develop effects they have on one another.

Methodology Summary

Overall, through using quantitative measures we were able to gain insight into the connection between physical health and mental well-being specifically within university students through having conducted an online survey consisting of open and closed-ended questions. Participants were recruited through non-probability sampling, while also noting the potential use of snowball sampling. Although there were potential risks and conflicts of interest, we made sure to address these issues and made use of ethical mitigation tactics to avoid these issues. We used recruitment posters and scripts to provide clear and accurate information on our study to any of the potential participants. By providing all the necessary information we were able to assume implied consent and gave the opportunity for participants to skip any question they did not wish to answer. We made use of self-coding, Word Excel and PSPP to analyze our data, as well as created graphs and tables of our variables to aid our discussion and insights. Lastly, we drew connections between our variables to help support our overall conclusion of our study.

Results

Demographics

We asked participants of our survey to answer multiple demographic questions including: employment status, age, gender and year of undergraduate education. Our final total sample size was 45 McMaster university students (n=45).

Employment Status

The majority of our participants were part-time employees, with a total of 42.2% (n=19) selecting this category. Closely following this category was employed, with 37.8% (n=17) of the participants fitting into this category. These results are not uncommon, because being a full-time university student does not allow for a lot of extra time to have a job.

13.3% (n=6) of respondents reported that they were casually employed, and 6.7% (n=3) selected that they were working in full time employment. The following results are shown in Figure 1.

Figure 1
Frequency Table – Employment Status

What is your employment status?	Frequency
Unemployed	17
Casually employed	6
Part-time employed	19
Full-time employed	3
	n=45

Age
The overwhelming majority of the participants were 21 years of age, a total of 60%. Following this category, the second most selected answer was 20, with 24.4% of the respondents choosing this age group. Age 22 and age 19 were both selected only 4.4% of the time, and age 18 and age 24 were only selected 2.2% of the time. There was also one non-response to this question, leading to a total of 45 participants. These results could be interpreted to mean that the individuals who completed our survey were likely mostly third years and fourth years. This is exactly what was demonstrated in the last demographic question. The results of the age distribution are shown in Figure 2.

Figure 2
Frequency Table – Age

What is your age?	Frequency
18	1
19	2
20	11
21	27
22	2

23	1
	n=45

Gender

In order to remain inclusive, gender was programmed as an open-ended question. This allowed for participants to type in their own answer rather than having to select one. We witnessed a huge gap between male and female participants, with 68.8% of respondents being female, and only 26.7% of respondents being male. There was also one non-response to this question. These results can be seen in Figure 3.

Figure 3
Frequency Table – Gender

What gender do you identify as?	Frequency
Female	31
Male	12
N/A	1
	n=45

Year of Undergraduate

The final demographic question that was asked was on what year of undergraduate education the participants were in. As predicted by the responses to the demographic question of age, the majority of participants were in Fourth/Fifth year, precisely 57.8% responded this way. Third year was the second most selected answer, with 31.1% of our sample selecting this answer. Second year students only represented 4.4% of the sample, and there was only one first year student to complete the survey (2.2%). There were also 2 non-responses (4.4%), which is shown in Figure 4.

Figure 4
Frequency Table – Year of Undergraduate

What year of undergraduate are you in?	Frequency
Fourth/Fifth Year	26
Third Year	14
Second Year	2

First Year	1
N/A	2
	n= 45

Analysis of Variables
Ranking of Priorities

The first question on our survey asked individuals to rank their priorities from most important to least. The options they were given included: education, work, physical health, mental well-being, sleep, water intake, volunteering, social life and exercising. Our results showed that education was ranked as the top priority 46.7% of the time. Additionally, water intake and volunteering were ranked first 0% of the time. The results of Rank 1 can be seen in a pie graph in Figure 5. Running cross tabulations with the PSPP Data Editor showed that out of the 21 participants who selected education as their first priority, 76.2% of them selected 'unsatisfied' when asked about the perceived satisfaction of students' mental well-being. The other 23.8% selected 'very unsatisfied' when asked this question, meaning that none of individuals who selected education as a first priority believed that most university students were satisfied with their mental well-being. In addition to this, out of the 6 individuals who selected physical health as a first priority, 5 of them still selected 'unsatisfied' with perceived well-being, and only 1 selected 'satisfied'. Further, the results showed that volunteering was ranked last 60% of the time and that education, mental well-being, physical health, and water intake were never selected last as a priority. The results of Rank 9 can be seen in Figure 6.

Figure 5
Ranking of Priorities (First)
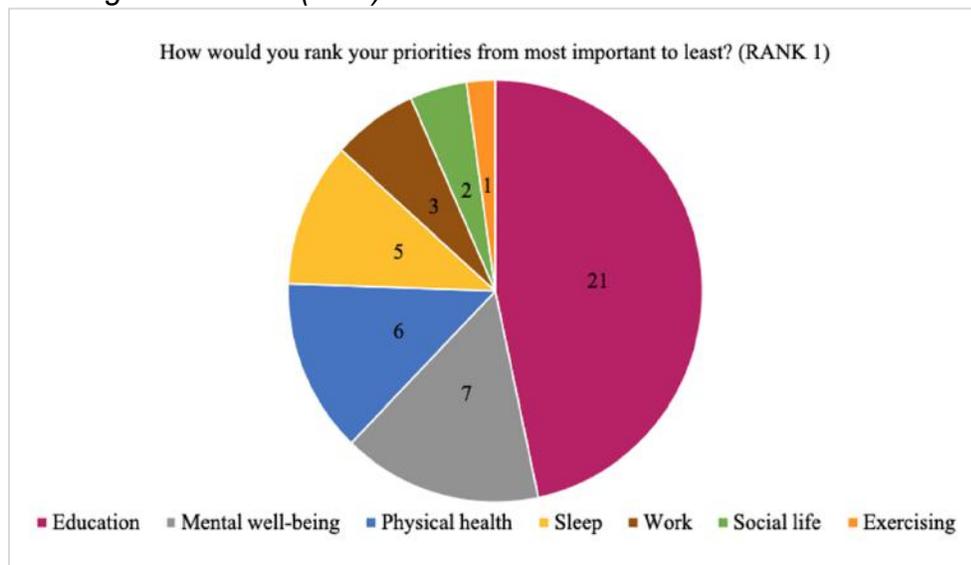
Note. 'Water intake' and 'volunteering' are missing from this graph because they were never ranked as first.

Figure 6
Ranking of Priorities (Last)

How would you rank your priorities from most important to least? (Rank 9)

- Volunteering
- Exercising
- Social life
- Sleep
- Work

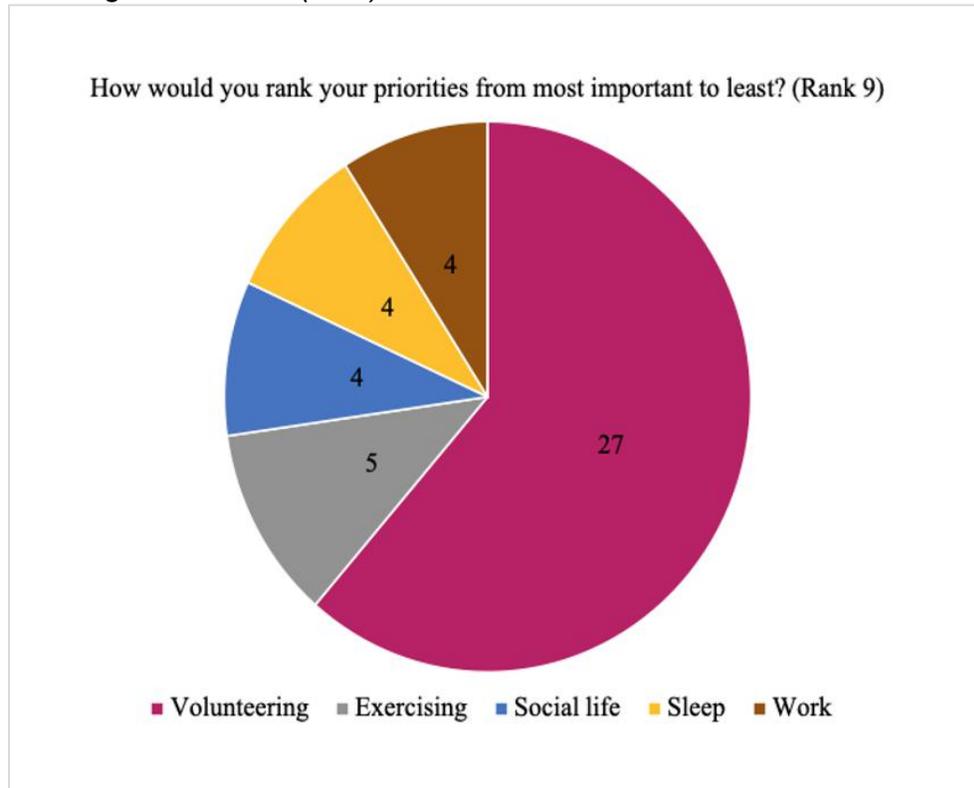*Note.* 'Education', 'mental well-being', 'physical health'& 'water intake' are missing from this graph because they were never ranked as last.

Satisfaction With Physical Health VS. Well-Being

Results from the questions asked on 'perceived satisfaction with mental well-being' and perceived satisfaction with physical well-being' showed significantly negative results. In particular, 73.3% of respondents chose 'unsatisfied' in regard to university aged students' satisfaction with mental well-being. Another 20% of respondents chose 'very unsatisfied', meaning that only 6.7% of the overall sample selected 'average' or 'satisfied'. When asked about university aged students perceived level of satisfaction of physical health, the results were not as negative, but we still witnessed more 'unsatisfied' answers than expected. Of the participants 44.4% selected 'unsatisfied' and an additional 4.4% selected 'very unsatisfied'. A total of 33.3% of respondents believe that most university aged students were 'average'(ly) satisfied with their physical health, and the remaining 17.9% selected 'satisfied'. A cross tabulation test showed that those who selected 'unsatisfied' for mental well-being (n=33) were almost just as likely to select 'unsatisfied' or 'average' when asked about physical health. Furthermore, 39.4% of those who selected 'unsatisfied' for mental well-being also selected 'unsatisfied' for physical health. Additionally, 36.4% of those who selected 'unsatisfied' for mental well-being selected 'average' for physical health, just a 3% difference between the two. However, only 21.2%% selected 'satisfied' for physical health if they selected 'unsatisfied' for mental well-being. These results clearly demonstrate a connection between physical health and mental well-being. A comparison of these results can be viewed in Figure 7.

Figure 7

Perceived Satisfaction of Physical Health vs. Well-Being in University Aged Students
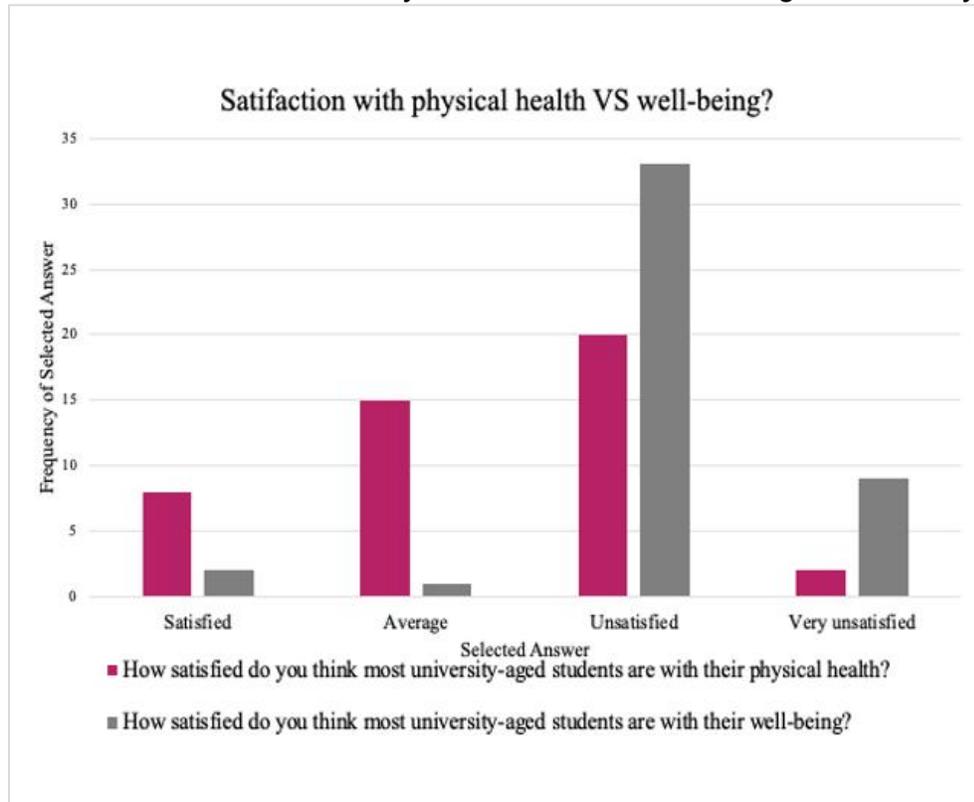
Influence on Working Out/Getting Physical Exercise

We asked our participants which reason they believe to have the greatest impact on working out/getting physical exercise and results show almost a split; 57.8% selected 'to enhance well-being and outlook' and 42.2% selected 'societal pressures or influence'. We would have liked to see more select the first option; however, these results show the reality of our world today. A connection can then be made about how the process of working out can influence one's mental well-being if they are doing it for society rather than for themselves.

Activity Association With Positive Well-Being VS. Declining Well-Being

Two of the questions on our survey were dedicated to asking individuals what activities they associate with others in states of positive mental well-being, and declining mental well-being. In states of positive well-being, 'motivated to exercise' was selected the most, with 43 out of 45 overall participants agreeing that this is an activity associated with positive mental well-being. These results, shown in Figure 8, clearly work to prove our hypothesis, as do the results of activity association with states of declining mental well-being, shown in Figure 9. The most selected answer was 'sleeping less', with 42 out of 45 participants making this connection. More importantly, 'headaches' and 'muscle tension' were selected by the large majority of participants, therefore showing a direct connection between physical health and mental well-being.

Figure 8

Activity Association with Positive Well-Being
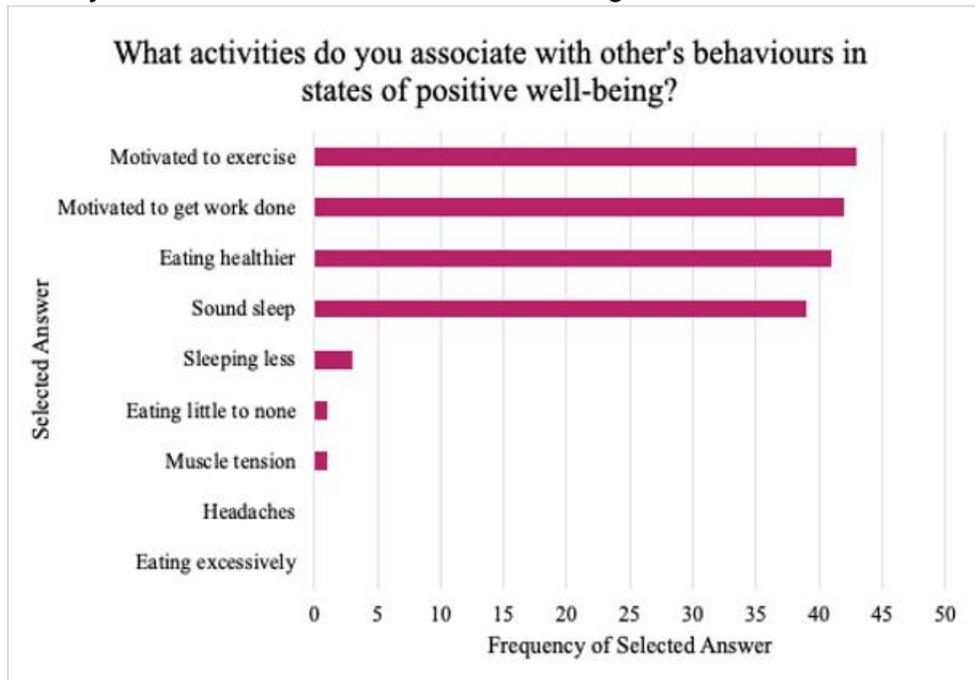
Figure 9

Activity Association with Declining Well-Being
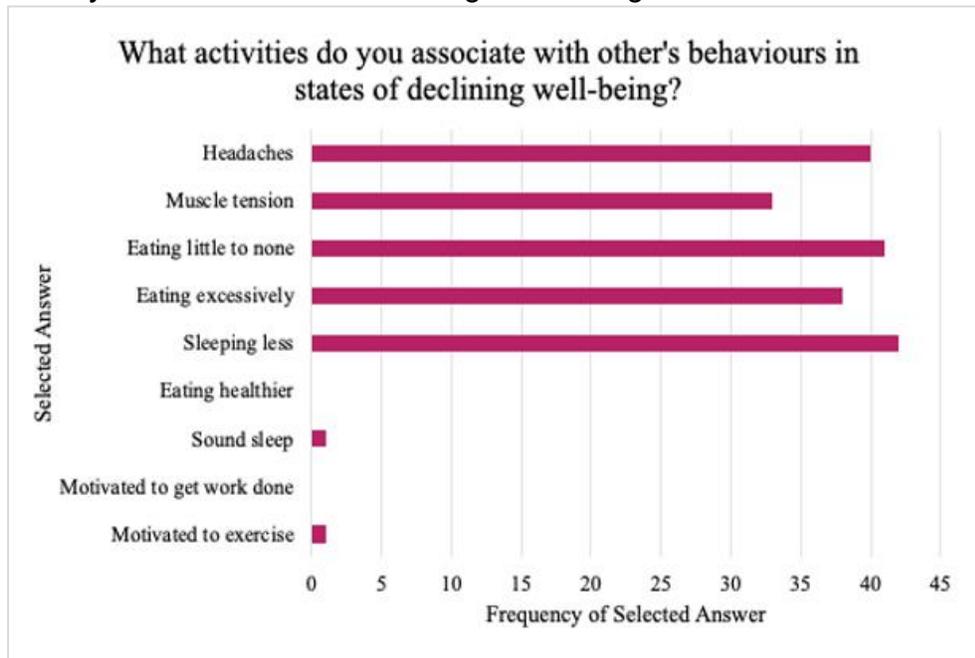
Amount of Exercise/Amount of Sleep

More general questions were asked on our participants' average amounts of exercise and sleep. Additionally, 26.7% of participants claimed to exercise daily, and 44.4%

claimed that they exercised once a week. We were pleased to see that university students had such high levels of exercise. In regard to sleep, 60% of our sample slept for an average of 7-9 hours per night and 37.8% slept for 4-6 hours. Only 1 individual selected 10+ hours of sleep per night. This is expected for university students.

Stress Levels and Coping Mechanisms

We asked multiple questions on stress levels, including perceived level of stress during the school year, and whether or not these levels are increasing, decreasing, or staying the same. 53.3% of our sample chose 'increasing' stress levels, and 42.2% selected 'staying the same'. Only 4.4% selected 'decreasing' in regard to stress levels. Running a cross tabulation test with these results and amounts of exercise showed that those who participated in less exercise ('a few times a month'), were more likely to select increasing levels of stress. However, those who participated in more exercise ('once a week' or 'everyday') were almost just as likely to select 'staying the same' as they were 'increasing' in regard to stress levels. During the school year, 42.2% of our participants said their stress levels were moderate, this meaning more than average, which was selected 26.7% of the time. Additionally, 24.4% of our sample selected 'very stressed' and only 6.7% selected 'rarely stressed' in regard to their perceived stress levels during the school year. These results can be seen in Figure 10. Coping mechanisms to stress were also examined, and we found that 'talking with someone' and 'sleeping' were selected the most, however they also were almost not selected just as many times as they were selected, which can be seen in Figure 11. Also, it is important to note that exercising was not selected more times than it was selected, meaning that most university students did not see physical exercise as a useful coping mechanism.

Figure 10
Stress Levels During School Year
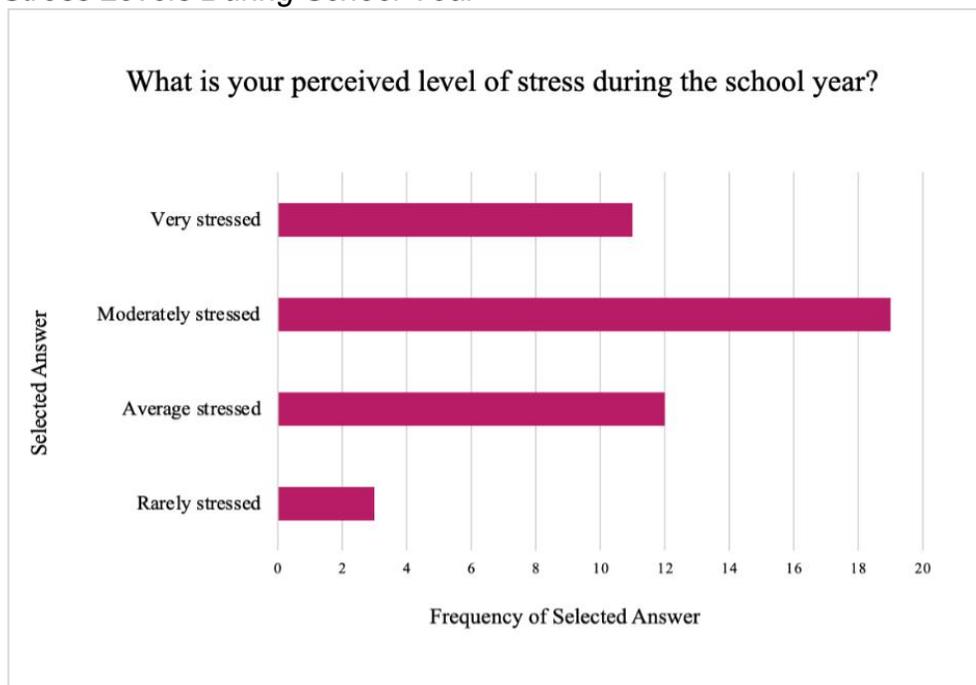
Figure 11
Coping Mechanisms to Stress
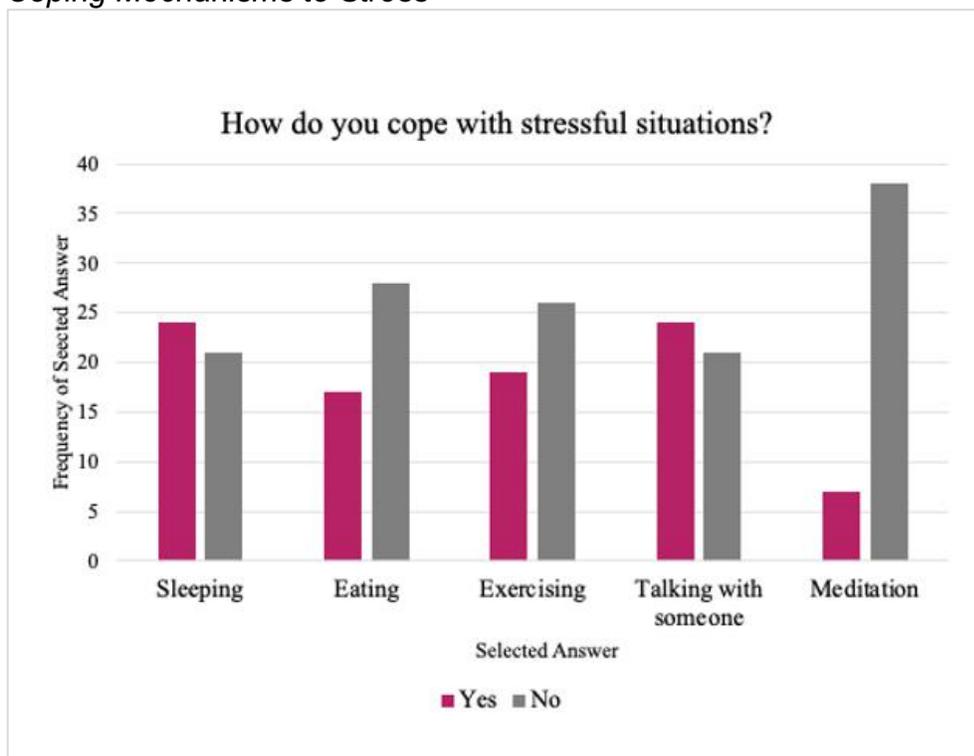
Influence on Well-Being

In order to analyze university students' overall sense of well-being, we asked them to choose from a list of options on what they considered to have the greatest impact. The list we provided consisted of the following terms, 'sense of identity', 'grades in school', 'sleep patterns', 'dietary patterns', 'family/friend relationships', 'romantic relationships', 'physical activity' and 'sport/club involvement'. 'Grades in school' seemed to have the biggest influence, as it was selected 88.9% of the time to have an impact on well-being. 'Family/friend relationships' was the next highest, being selected 77.8% of the time by our participants. Interestingly, 'physical activity' was selected to not have an impact 55.6% of the time. A cross tabulation test revealed that those who selected against physical activity having an influence on well-being, also were the same individuals who had previously selected 'few times throughout the year' (n=4) and 'not at all' (n=1) when asked about their amount of exercise. Due to the fact that the question about the amount of exercise was asked first, these individuals could have felt like they had to vote against physical exercise having an influence on their well-being because it would then mean that they themselves could have a more negative mental well-being because they are not exercising. Another interesting result of a cross tabulation test showed that those who selected against physical activity having an influence on well-being, also were most likely to have selected 'unsatisfied' when asked about their physical health. Of the individuals who selected 'yes' (n=20) when asked if physical had influence on well-being, none of them selected 'average' or 'satisfied' with their mental well-being, with 80% (n=16) of them selecting 'unsatisfied' and 20% (n=4) selecting 'very unsatisfied'.

Engagement with Meaningful Activities

We asked our participants to reflect on how often they participate in activities that are meaningful to them, the results show that the large majority of participants selected 'moderately' (57.8%), which is less often than the second highest selected answer, which was 'frequently' (28.9%). 'Very frequently', 'rarely' and 'no answer' each had 4.4% of the remaining participants. The results of this question can be viewed in Figure 12.

Figure 12
Frequency of Meaningful Activity Involvement
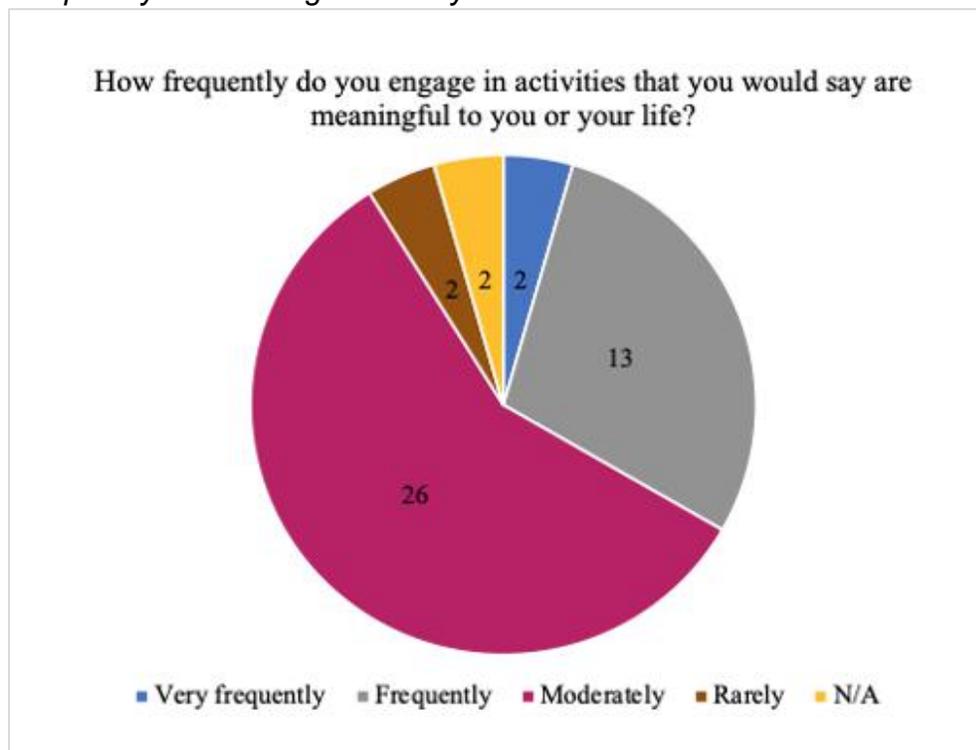
Involvement of Extracurricular Activities

Our sample showed almost a direct spilt when asked about their involvement with any extracurricular clubs/teams. 46.7% selected 'yes' and 48.9% selected 'no'. The remaining 4.4% were no-responses. Interestingly, in the previous question on what has influence on one's well-being, 'sports/club involvement' was selected against by 31 participants out of 45, and only 14 selected that they do believe it has an influence on well-being. In fact, 13 participants who selected against sports/club involvement on having an influence on well-being, selected 'yes' to being involved in extracurricular clubs/teams. This could possibly mean that they do not enjoy their time with these clubs/teams, or just that because they are a part of them, they have more knowledge about whether or not they have influence on their mental well-being.

Themes Discovered Through Word Association

Our survey asked participants three-word association questions: what words do you associate with the term mental well-being, with the term physical health, and the term university? These answers were then coded based on the notion of the word being

perceived as positive or negative, and/or related to physical health, mental well-being or university.

Words Associated with Mental Well-Being

When asked about what words the participants associate with the term mental well-being over half (57.8%) answered with phrases coded as physical health. This supports our hypothesis that there is a perceived connection between one's well-being and physical health. It is also important to note that 73.3% of participants tended to view mental well-being with a more positive outlook, as opposed to the 6.7% of participants who associated well-being with answers themed as negative. Furthermore, there were also an abundance of answers relating to mental well-being which can be supportive, as there is a clear understanding of what mental well-being is. There were also less significant responses that were recorded and can be viewed in Figure 13.

Figure 13

Frequency Chart – Themes for Words Associated with Mental Well-Being

Themes	Frequency
Positive *Ex. "Happiness", "Confidence", "Relaxed"*	33
Negative *Ex. "Depression", "Anxiety"*	3
Physical Health *Ex. "Energy", "Healthy living"*	26
Mental Well-Being *Ex. "Mental health", "State of mind", "How they are feeling"*	34
University *Ex. "Not university", "Good grades"*	2
Positive Physical Health *Ex. "Energy", "Healthy living"*	18

Negative Physical Health	0
Positive Mental Well-Being *Ex. "Happiness",* *"Motivated"*	26
Negative Mental Well-Being *Ex. "Depression",* *"Anxiety"*	1
Positive, University *Ex. "Good grades"*	1
Negative, University *Ex. "Not university"*	1
No Response	5

Note. Participants (n=45) may have provided multiple answers that could be represented multiple times.

Words Associated with Physical Health

As displayed in Figure 14, it is clear that the participants tended to mainly view the term physical health with themes of physical health (86.7%). Of these 86.7%, 92.3% observed positive physical health terms, such as "drinking enough water". An interesting connection between Figure 13 and Figure 14 is the use of the word's "energy" and "healthy", both in which were themed as physical health, and were answers associated with both mental well-being and physical health. This commonality between the terms well-being and physical health allows us to draw a stronger connection of this relationship due to their being a conjunction of similar associations. With only 20% of the responses being coded as being related to mental well-being, we can make the assumption that students perceive well-being having a greater impact on physical health, as opposed to physical health impacting well-being.

Figure 14
Frequency Chart – Themes for Words Associated with Physical Health

Themes	**Frequency**

Positive *Ex. "Active", "Happy", "Energy"*	38
Negative *Ex. "Thin ideal", "Sluggish", "Injury"*	5
Physical Health *Ex. "Exercise", "Sleep", "Nutrition"*	39
Mental Well-Being *Ex. "Motivation", "Stress reliever", "Appearance"*	9
University *Ex. "Not university"*	1
Positive Physical Health *Ex. "Fit", "Drinking enough water", "Healthy"*	36
Negative Physical Health *Ex. "Obesity", "Weak", "Sluggish"*	3
Positive Mental Well-Being *Ex. "Happy", "Stress reliever", "Motivation"*	3
Negative Mental Well-Being *Ex. "Thin ideal"*	1
Positive, University	0
Negative, University *Ex. "Not university"*	1

No Response	5

Note. Participants (n=45) may have provided multiple answers that could be represented multiple times.

Words Associated with University

Unlike the responses to words associated with the terms mental well-being and physical health, the words associated with university tended to have a negative connotation. As shown in Figure 15 answers themed negative was 53.3%, whereas Figure 13 was 6.7% and Figure 14 was 11.1%. These results help to emphasize the participants' perceptions of well-being and physical health being unsatisfied (73.3%) or very unsatisfied (20%) within university students. It brings in the negative impact university has towards well-being and physical health as we don't see the negative responses until the variable of university is included in a question. Furthermore, 55.6% of respondents' answers related to the theme of mental well-being when asked about university. Additionally, 52.5% of the total answers were associated with specifically themes of negative mental well-being. With the data displayed in Figure 15, along with Figure 13 and 14, we are able to perceive a causal chain in which university affects one's well-being, which ultimately affects one's physical health. In summation, university as a variable affects both well-being and physical health, aiding in our hypothesis.

Figure 15
Frequency Chart – Themes for Words Associated with University

Themes	**Frequency**
Positive *Ex. "Achievement", "Community", "Motivated"*	16
Negative *Ex. "Stress", "Overwhelming", "Rushed"*	24
Physical Health *Ex. "Tired", "Unhealthy"*	4
Mental Well-Being *Ex. "Friends", "Meaningful experience", "Rewarding"*	25

University Ex. "Difficult", "Grades", "Online"	36
Positive Physical Health	0
Negative Physical Health Ex. "Tired", "Unhealthy"	4
Positive Mental Well-Being Ex. "Meaningful experience", "Community", "Achievement"	11
Negative Mental Well-Being Ex. "Stress", "Depression", "Annoyance"	21
Positive, University Ex. "Adventurous", "Career", "Opportunity"	7
Negative, University Ex. "Expensive", "Scum", "Difficult"	8
No Response	5

Note. Participants (n=45) may have provided multiple answers that could be represented multiple times.

Discussion

Relationship Physical Health and Mental Well-Being

The relationship between physical health and mental well-being is one of a complicated nature. Throughout the course of our research, we have concluded that there is however, a strong relationship between mental well-being and physical health. More specifically, there is an apparent link between declining well-being with poor physical health. In our study, 88.9% of participants reported having headaches when operating in a state of deteriorating mental well-being. Additionally, 73.3% noted experiences of frequent

muscle tension and unsatisfactory mental well-being. These findings are suggestive of a distinct relationship between both negative physical health and mental well-being as participants perceived declining states of well-being with physiological responses. This supports our hypothesis in that the state of one's well-being can influence their physical health through means of headaches, muscle tension, unhealthy eating patterns, and lack of sleep. Additionally, we found that as conspicuous the relationship between declining well-being and negative physical health, there was also a clear connection of positive well-being with practical physical health. Soo Kim et al. (2012), note the effects physical health can have on well-being and the ideal relationship they can share. Expanding on this, we developed an understanding that motivation to participate in a healthier lifestyle (i.e. exercising, eating healthier, etc.) is more likely to occur while in a state of positive well-being. This claim is supported by 97% of participants selecting activities related to good physical health in association with positive well-being as compared to the 1% of healthy patterns associated with declining well-being.

Furthermore, the findings displayed in Figure 8 and Figure 9 are indicative of a pattern, showing that the connection between mental well-being and physical health is reciprocal. This notion is supported by the research study conducted by Adams et al. (2007). Their findings not only help to support the reciprocal nature of the relationship between mental well-being and physical health, but also show that exercise, such as strength training, is directly correlated with positive mental well-being. This works to prove that in the same way that a negative mental state will cause a poor physical state, an individual with superior physical health will equivalently display superior state of mental well-being. Additionally, positive well-being and good physical health tend to occur symbiotically. The article from Adams et al. (2007) assists in providing evidence to help back up claim that mental well-being has implications on physical health and vice versa.

Apart from positive well-being playing a factor in motivation to exercise, we asked participants whether enhancing well-being and outlook or societal pressures had the greatest impact to work out. Although 57.8% of participants chose enhanced well-being and outlook as the main factor to work out, it is important to note 42.2% still chose they exercised mainly due to societal pressures, making the gap between the options small. This differed from how we had accepted the results to look, as we assumed a greater majority would have chosen the option to increase well-being. This particular survey question aligned with the research of Hayes & Ross (1986), in which their focus was on similar variables; whether physical health was impacted more by societal expectations or internal processes. Hayes & Ross (1986) research can allow us to note however, that participants that responded their motivation to exercise was heavily due to expectations from society, would not have discredited our findings as the impact this variable has on well-being is non-existing. Thus, our hypothesis that there are perceived effects of well-being on physical health could still be supported from our collected data.

Beyond just an obvious correlation between mental well-being and physical health, our data helps argue that university students are perceived to be, on average, unsatisfied with both their physical health and their mental well-being. Our findings report that when asked about their perception of overall physical health for university-aged students, 44.4% of participants reported 'unsatisfied'. Even more alarming, when asked about their perception of overall mental well-being for university-aged students, 93.3% of participants reported that they believed the average university-aged student was either 'unsatisfied'

or 'very unsatisfied' with their mental well-being. Not only do these figures raise a concern for the overall well-being of individuals in their late teens and early twenties, they also further prove the correlation between mental well-being and physical health as we see the majority selected responses for both physical health and well-being falling under 'unsatisfied'.

Authors Hayes and Ross (1986) extrapolated results also indicative of a strong relationship between the two variables. Hayes and Ross (1986) determined through their research that regular exercise and maintenance of notable physical health had a direct improvement on the psychological well-being of their participants. As mentioned above, many of our respondents initially reported feeling displeased with their physical health. This accounted for almost half (48.8%) of the participants remarking they felt 'unsatisfied' or 'very unsatisfied'. Additionally, over 93% of respondents selected feeling 'unsatisfied' or 'very unsatisfied' in relation to mental well-being. These variables are very clearly linked, proving that a dissatisfaction among physical health and mental well-being is indicative of a direct relationship between the two. Although our findings differ regarding positive/negative correlations, the study by Hayes and Ross (1986) strengthens our hypothesis that a reciprocal connection exists between an individual's mental well-being and physical health.

It is important to note that the results our data displayed tended to account for perceived relationships between negative mental well-being and poor physical health; however, our findings still supported our original hypothesis that one's state of well-being does in fact have implications on aspects of physical health. There is evidence, specifically in motivation to participate in a physically healthy lifestyle, also supporting the connection that positive well-being can have with good physical health, although not as abundant. When adding the variable of university to the question does well-being impact physical health there is possible evidence in why these two factors were seen as low.

Perceived Influence of University

Alongside our main research question, we were also interested in the ways in which being a university student impacted the relationship between well-being and physical health. As displayed in Figure 5, it is made clear that education is typically ranked as the top priority in students' lives. However, of the 46.7% of participants choosing education as their top rank, 76.2% stated they perceived students' well-being as 'unsatisfied'. These results give insight that noting education as your top priority may contribute to the overall dissatisfaction with one's well-being. This insight allows us to wonder if those who positioned education as a priority in their lives have higher standards for their academic performance and thus, a greater deal of stress from school, contributing to a decline of well-being. Based on the literature currently available in this subject, we believe that it can prove effective to do research on the specific implications of academic stress on well-being to further insight in this topic area.

In contrast with much of the data gathered from our study, when university students were asked about their exercise and sleeping habits they appeared to be typical. As seen in Brain Basics (2006) adults require 7-9 hours of sleep every night, aligning with the majority of participants (60%) response of sleeping an average of 7-9 hours per night. Additionally, 71.1% of the university students that participated answered that they exercise once or more a week. With these results we gained insight that, although it

appears these students are living a healthy lifestyle, their perception of their peers differs. This contrast in results may be due to the fact that participants wished to portray a more ideal physical lifestyle, but when asked about how they perceive others answered more truthfully.

In Figure 10, perceived levels of stress during the school year displayed that 66.7% of participants experience moderate or high levels of stress contributing to negative states of well-being. The emphasis of stress in relation to university was strengthened through our question on words that one associates with the term university. Of the participants who responded to this question, over half associated university with the word 'stress'. It was interesting to see results of how these individuals cope with stressful situations, as we had predicted most would answer with exercise. However, less than half of the participants noted exercise as a coping mechanism, as opposed to 53.3% of participants choosing sleep or talking with someone as strategies to deal with stress. Sleeping, if outside of the recommended 7-9 hours is not noted as a healthy coping mechanism, and thus aids in perspective that well-being had a direct effect on physical health (Brain Basics, 2006). An unexpected factor, not previously included in our research was that of talking with others. This was noted as one of the top coping strategies in which participants chose. Discussions with others may assist in motivating them to work on their physical health and/or is likely have positive effects on mental well-being.

We were able to gain insight into how university factors into the effects of well-being and physical health. Although there was no strong evidence tying university alone to one's physical state, there was significant evidence supporting the impact university has to well-being. With the documentation of past literature and data we have gained in support of our hypothesis, we can however conclude that university, through affecting one's mental well-being, ultimately has effects on their physical health as well.

Word Associations

Word associations can help guide researchers in the analysis to interpret data and gain a deeper understanding of what the participants are feeling and how they engage with certain terms. Our research survey utilized three word-association questions; what words do you associate with the term well-being, with the term physical health, and the term university. These questions allowed us to make inferences and confirm our hypothesis that there is indeed a perceived connection between one's well-being and physical health.

When prompted to list words that the participant associated with mental well-being, 57.8% responded with phrases pertaining to physical health. This shows a strong connection between both mental and physical health, suggesting that each variable can directly affect the other. Additionally, over 70% of respondents replied with positive word associations for the term mental well-being. This brings about some contradiction to other questions asked in our survey, such as 93% of respondents reporting that they believed the average university-aged student was either 'unsatisfied' or 'very unsatisfied' with their mental well-being. This highlights the difference between perceived mental well-being in others and how mental well-being on its own is generally thought of. One explanation for this difference could be the use of attribution theory. This may have led to an overestimation in the perception of others behaviours, leading to the contradiction we see above.

When prompted to produce words associated with the term physical health, 84.4% of respondents replied with a positive associated word or phrase. Only 11.1% responded with a negative association, highlighting words such as "thin ideal", "sluggish", or "injury". This is suggestive of a contradiction to a previously asked question in our survey. As mentioned above, over 88% of participants reported having both headaches and poor mental well-being, and over 73% noted experiencing frequent muscle tension and unsatisfactory mental well-being. This may be explained through cognitive dissonance theory. There may be conflicting thoughts of what one wishes they felt towards mental well-being, physical health, and how they actually feel, causing mental discomfort which then leads to an alteration of one belief or the other (Festinger, 1962).

Furthermore, when prompted to list words that the participant associated with university, the majority of the answers appeared to have a negative undertone. With 52.5% of respondents associating negative terms with the word 'university', we saw use of language such as "overwhelming", "stress", and "rushed". This is indicative of a problem within the confines of the university institution, suggesting a much larger problem than we originally anticipated. This might be indicative of a correlation between all three variables; university, mental well-being, and physical health. It is possible that university causes feelings of stress and overwhelm, leading to a declining state of mental well-being and /or physical health. It is clear that these variables are interconnected, however it is necessary to conduct more research on this topic to conclude a hypothesis.

It is imperative to note that the words "motivation" or "motivated" were listed as a response to each word association question, signifying that respondents believe motivation is tied to physical health, well-being, and university. This finding not only demonstrates that motivation is a key factor of university success, but is also vital for the upkeep of physical health. Motivation however, stems from mental well-being, further verifying that adequate physical health comes as a result of superior mental well-being.

Additionally, the notion of "meaningful experience" was a frequent response when asked to associate words with university. This was not a variable we had previously considered statistically important prior to collecting our data. Through this research, we have determined that a meaningful university experience is something that many undergraduate students are craving and deem important for academic success and mental and physical well-being.

Role of Belonging

Through our research and analysis, it became evident that having a sense of belonging played a role in students' well-being, and through responses, it was noted that university provided some sense of community, aiding individuals' desires to belong. As noted by Gopalan & Brady (2020), having a sense of belonging is a fundamental human attribute, in which mental well-being can be improved by. Noting the existing reciprocal relationship between well-being and physical health, there is linked evidence that the role of belonging also positively affects physical health. When asking participants what influences their well-being 'family/friend relationships' was selected 77.8%, as opposed to the 55.6% of participants selecting that physical activity did not influence their well-being. This result may be attributed to the sense of belonging one feels when around friends and family. As there was a significant difference between the two factors, we deemed it necessary to further explore the relationship between belonging and well-being.

Specifically, there was an individual who used the phrase "meaningful experience" when asked for words associated with university. Meaningful experiences are situations in which you are participating in shared experiences, attributing to one's sense of belonging. To grow on the importance of meaningful experiences, we asked participants how often they engage in activities meaningful to them. Over half (57.8%) of the participants responded that they engaged moderately, and the next highest majority was those who engaged frequently (28.9%). Future research could expand on this idea, specifically looking at what type of activities are involved and how it directly contributes to well-being.

Universities can be noted as grounds to find community and belonging within the school itself, as was referenced in words associated with the term university. Furthermore, university provides extracurricular activities for individuals to get involved with such as sports and clubs. We were interested in noting the relationship membership has with well-being. However, our predictions of there being a strong relationship was not supported by the results. Of the 46.7% of participants who selected they were involved in extracurricular activities, 13 of them had selected that sports/club involvement has no influence on well-being. This may be attributed to a lack of shared perspectives between the individual and group, as it differs from past research in which having these groups provide a sense of belonging, ultimately promoting mental well-being (Gopalan & Brady, 2020).

Having individuals around oneself when looking at a different perspective, does have positive effects on well-being as seen in coping mechanisms. From our research there is evidence that one of the main ways students' deal with stress is through talking with others. By having this connection and relationship, they are provided a community in which they feel they belong to. So although there is a perception that extracurriculars play little to no role in well-being, having a community in which there is a level of comfort to open up and discuss with results in evidence that belonging does play a role in the well-being of students.

Although when looking at the factor of belongingness it is typically in reference to well-being, it is not to say that there is no connection between belonging and physical health. In a study done by Bailey & McLaren (2005), there is evidence that participating in physical activity was more likely to be done when participating in it with others. It would be interesting to take this information and apply it within a university context to gain deeper insight that the role belonging has, not only mental well-being, but also individuals' physiology.

Relation to Theories

Through further analysis between our results and social psychological theories, it has been made evident that our results regarding activities associated with other's behaviours in states of positive and declining well-being reveal an association to attribution theory. Specifically, in explaining the causes of participants behaviours in different states of well-being. For example, motivation to exercise, motivation to get work done, eating healthier, and sound sleep were the most common behaviours associated with positive well-being. This allows our research to attribute positive states/feelings of well-being to promoting engagement in positively reflected behaviours. Thus, individuals who experience positive behaviours are more likely to work harder to maintain their positive state/feelings,

increasing their level of physical health and mental well-being. Differentially, headaches, muscle tension, eating little to none, eating excessively, and sleeping less were behaviours revealed among participants who experienced declining states of well-being. As a result, the results also reveal that there is an attribution between declining states/feelings of well-being causing negatively reflected behaviours. With that being said, if individuals are expressing declining states/feelings of well-being, they tend to experience negative side effects in terms of their physical health.

Continually, it seems that participants within this study experience more dispositional attributions, rather than situational attributions. Meaning that regardless of whether their states were positive or negative, their internal feelings affected their overall satisfaction with their physical health and mental well-being, resulting in a consensus of unsatisfied answers among participants (Heider, 1958). Therefore, if most participants are unsatisfied with their physical health and mental well-being, we can attribute these levels of dissatisfaction to perceived internal feelings. However, from a situational perspective of attribution, some participants may be more influenced by their social environment, in that the results displayed moderate levels of stress during the school year among university aged students. This means that school is representative of their social environment and the moderate feelings of stress are a result of the external factor of school demands placed on students. More specifically, in order to make sense of this finding within attribution theory, when the level of school demands increases or decreases, students' level of stress increases or decreases as a result.

In addition, the theory of cognitive dissonance played a key role in determining the perceived relationship between students' physical health and mental well-being. This relationship was most clearly displayed in the results regarding coping mechanisms being used as a way of restoring the balance between participants' cognitions. With that being said, the results revealed sleeping and talking to someone as the most common ways for coping with stressful situations. This means that when participants are feeling stressed, the stress acts as the cognition and the need to utilize coping mechanisms is the way in which participants attempt to balance the dissonance of their emotions and behaviours. Thus, when participants have declining states of mental well-being, but use sleep as a way of coping with their feelings, they are displaying behaviours of cognitive dissonance in that the behaviour of sleeping does not align with the expected desirability to improve one's mental well-being. Similarly, individuals who used the method of talking to someone in order to cope with stress also revealed a relation to cognitive dissonance by being motivated to seek help, these individuals are restoring balance within their cognitions to avoid the feeling of discomfort or stress (Festinger, 1962).

As well, the results regarding participants' perception of how frequently they believe they engage in activities that are meaningful to their lives, reveal that the majority answer of "moderately" is greatly correlated with the theory of cognitive dissonance. This is because it represents a behavioural process within cognitive dissonance known as counter-attitudinal behaviour. Within this process, respondents disclosed moderate participation in meaningful activities, however the large majority of participants are also dissatisfied with their physical and mental well-being. Thus, these two factors convey an inconsistency among participants' behaviours/activities and the believed perception of their physical health and mental well-being. With that being said, students' feelings of being stressed or dissatisfied with physical and mental well-being has proven to associate

negative terms when referring to university. This means that students will be motivated to attempt to eliminate the feeling of discomfort and achieve a more balanced cognitive outlook regarding their university experience.

Coping Methods

Coping methods of university students are a heavily researched and debated topic. Our findings suggest that although regular exercise and maintenance of physical health will only benefit the individual, many university-aged students engage in various other coping mechanisms. In opposition to our hypothesis, exercise was rarely selected as a significant coping mechanism for stressful situations, with 57.7% selecting against it. This allows us to question the true nature of the problem at hand. If physical activity was a more commonly used coping mechanism, it is possible that we would see the declining rates of mental well-being turn around.

Many participants chose "talking to someone" or "sleeping" as coping mechanisms 53.3% of the time. Perhaps 'sleeping the stress away' only avoids the stress and leads to more overwhelming feelings of worry and trouble in the future. Researchers Herbert, Meixner, Wiebking and Gilg (2020), conducted a research study aimed at university students, to determine the impact that regular physical activity had on perceived levels of stress. Herbert et al. (2020) found that incorporating low to moderate physical activity into the daily schedules of university students will not only improve their psychological well-being but show significant reductions in perceived stress in all areas. This research speaks volumes to the importance of incorporating daily physical activity into the lives of university-aged students, as they will then experience reduced levels of overall stress and improved psychological states.

Moreover, authors Graaf, Ten Have and Monshouwer (2011) found significant research concluding that physical exercise is directly correlated with a lower likelihood of mental disorders and better mental health. Our research clearly emphasizes this connection, but through insights gained during our research, we are able to acknowledge that a lack of motivation may cause a severe struggle to maintain a healthy, active lifestyle. The lack of motivation coupled with the absence of physical activity may prove to have a negative impact on mental well-being. Exceptional motivation is often a result of quality mental well-being, and thus reinforces the conviction that superior mental well-being promotes superior physical health.

Further research on the use of exercise as a coping mechanism for stress is needed, but our findings, coupled with previous literature, show significant evidence in favour of utilizing exercise as a healthy coping method for stress.

Broader Significance

Although our sample only included undergraduate students from McMaster University, we believe our findings to be generalizable to the broader society of university students. Not only does our research provide significant insights for the McMaster community, but would provide many deeper understandings for other university communities. Understanding the reciprocal nature of our variables is vital to interpreting and utilizing the data. We found that the strong correlation between mental well-being and physical health was a clear indicator of larger societal problems, specifically the lack of healthy coping mechanisms used by university students. We were unable to determine the impact

that self-identified gender had on our variables due to lack of male respondents, we believe that this may have skewed our findings, due to the hegemonic masculinity that is still present in our society today.

In relation to our findings, we suggest further research on gender specific experiences at university, more importantly the connection between perceived mental well-being and physical health. With that being said, although our results are based on perceptions of McMaster students, future implications of our research can aid other universities by making them aware of the perceived level of stress that university students experience. This would allow universities to identify ways to adapt their campus provided services to improve the mental well-being of students across a greater population. This could involve the incorporation of physical health programs that are proven to increase mental well-being overall. As well, future research could look at the long-term effects of stress experienced among students during their university careers and the way in which this stress contributes to the maintenance of physical health and mental well-being habits in later adulthood.

Conclusion

Summary

The main focus of our study was to provide further insight on the composite relationship between the mental well-being and physical health of undergraduate university students. Our research aimed to examine the complex relationship between mental well-being and physical health and to further determine the significance of these correlations. We were able to conceptualize this correlation by focusing on the main themes of physical health, mental well-being and university. When coding the results of our study, we added additional codes that would allow us to better analyze whether or not participants perceived their overall mental well-being and physical health in a positive manner or more negatively. By using cognitive dissonance theory, we were able to better understand the correlation between mental well-being and physical health and how a negative correlation between the two may create dissonance in individuals.

Additionally, we utilized attribution theory in order to understand how participants may attribute certain states of mental well-being to behaviours associated with either positive or negative physical health. In order to ground our study and conceptualize our ideas, we analyzed existing literature that focused on this connection. Much of this research however, focused on how physical health impacts mental well-being, in comparison to our study which focused on the opposite, how mental well-being impacts physical health. For future research, we touched on limitations that may be considered when conducting future research on this topic. The data collected for this study was obtained by posting on McMaster University related Facebook pages. By using the online survey platform, LimeSurvey, participants anonymously completed our survey and provided us with a total of 45 responses. Our data concluded that poor mental well-being is a large contributor to poor overall physical health.

Limitations

While conducting our research, we found multiple limitations in our methods, literature, and theory that we used. The first limitation in our approach was the method of data collection used. As we conducted this research throughout the ongoing COVID-19

pandemic, we were unable to use in person and on campus data collection methods. As a result of the circumstances and safety protocols of the pandemic, we relied on posting on McMaster University related Facebook groups to recruit our participants as our main method of data collection. This method was flawed as it was very difficult to gain permission to post on these pages, as well as to recruit a large number of participants from these pages to complete our survey. Further, these online forums made it difficult to encourage participants to fully complete our survey. Some participants did not fully complete our survey, forcing us to exclude their partial data that was collected. Originally, our group aimed for a sample size of roughly 75 participants, however, we only received 45 participants in total.

As a result of our small sample size of participants, we faced other limitations during the data analysis process of this study. Specifically, there was a lack of gender diversity in the participant responses, as roughly 60% of our participants self-identified as female. As our group sought to gain insight in gender differences within our research topic, the lack of gender diversity caused us to exclude questions involving gender completely. Since the majority of participants self-identified as female, the lack of diversity in gender responses would not have provided data that is generalizable to show differences between gender. When analyzing the participants of this study, it is notable that about 86% of our participants were either 20 or 21 years old. This may create a limitation within our study, making it more likely that many of our participants were in their third or fourth year of their undergraduate program as the results of our study are not generalizable across all levels at McMaster University. Given this information, future researchers on this topic should aim to reduce the gaps between the level of study of each participant in order to produce more generalizable data to all undergraduate students. By doing this, researchers may be able to compare differences between each year of study as well. As a result of the ongoing pandemic, it is also important to note that our data may vary as a result of current societal conditions. It would be interesting to conduct similar research in the future in order to compare the results of both studies to view the impact that the COVID-19 pandemic may have placed on participants and their perceived mental well-being and physical health during this period of time.

As our research relied on participants to answer questions through LimeSurvey, in an anonymous and online manner, our research may be limited in that there is no way to ensure that participants responded authentically and accurately. As mental well-being may be a challenging topic to discuss, it is possible that some respondents did not answer questions accurately to their actual perceived level of mental well-being. This can also be applied to the topic of physical health, as many individuals feel pressured to maintain a high, desirable level of physical health due to societal pressures and may answer inaccurately as a response. Essentially, this can be accredited to a possible desirability bias in participants, where participants select answers that they perceive as socially desirable or favourable to others. In this scenario, this bias may have caused participants to select responses that they perceive as correct or applicable to our research study. Although there is no guarantee of this bias, it is very possible that it may have influenced our results.

Significant Insights

The conclusions and results of this study are evidently significant in providing insight into the lived experiences of McMaster University students. Our research indicated that the state of one's mental well-being has serious implications on physical health, indicating that there is likely a correlation between these two variables. This finding is especially applicable, as it demonstrates how declining mental well-being may directly impact the overall physical health of undergraduate students. Further, it provided insight on contributors of declining mental well-being. Some of the major contributors to declining mental well-being in undergraduate students were directly associated with university itself. When asked to provide words associated with university, 62.5% of respondents provided terms associated with negative mental well-being, such as stress, overwhelming and depression. This finding is indicative in suggesting that university as a whole negatively contributes to the mental well-being of undergraduate students. This information can explain how stress negatively contributes to both mental well-being and physical health.

Further, there is importance in noting that participants' increasing dissatisfaction with both physical health and mental well-being may be due to the lack of sufficient coping mechanisms when dealing with stressors. With this information, future undergraduate students may be able to better prepare mindful coping mechanisms to deal with their stress. Often, exercise and healthy eating habits have been found to have positive impacts on both overall well-being and health when dealing with stress. However, these healthy coping mechanisms were not a popular response within our study where about 57.7% of participants voted against using these coping mechanisms. Rather than using these coping strategies, most participants responded that they either "talk to someone" about their stress or "sleep". This is a representative finding, as it reflects that more than half (53.3% of participants) selected responses associated with poor coping mechanisms to deal with stress. With this information, it may be suggested that universities provide students with more de-stressors, workshops and resources that provide information on how to deal with stress in more healthy ways. By providing these resources, it is possible that both the mental well-being and physical health of undergraduate students may be improved.

Within existing literature, findings have demonstrated that there is a clear relationship between physical health and mental well-being. Much of this literature focuses on how improving one's physical health often improves their state of mental well-being. Despite this correlation, there was a large gap in research surrounding how mental well-being impacts physical health, the reverse of the previous research topics. Our research provides information on some reasons why undergraduate university students are frequently unable to reach the recommended level of physical activity for their age range. Participants in our study most often attributed this to high levels of university related stress, with about 42.2% of participants stating that they had moderate levels of stress throughout the school year. Our research also found that about 93.3% of participants were unsatisfied or very unsatisfied with their mental well-being. These findings demonstrate the significant impact that stress may play in one's level of mental well-being. This stressed the idea that McMaster University and other academic institutions should provide better resources that may be helpful for students to improve their stress level, as it is evident that stress decreases mental well-being.

According to our qualitative, open ended questions, participants viewed physical health or well-being in a more positive light. When asked to list words associated with the term "well-being" in relation to physical health, the most common and frequent responses received were "healthy living" and "energy". The positive word associations in this context demonstrate that students believe physical health can have a positive impact on overall mental well-being. From the perspective of a student, these results may encourage them to participate in more physical activities that could improve their overall level of physical health. In contrast, from the perspective of the university, this information should be taken seriously and attempts to further improve the well-being of students by implementing more activities involving physical activities should become more prominent.

Concluding Thoughts

In conclusion, our research provided insight on the correlation between mental well-being and physical health in undergraduate students at McMaster University. We wish that our findings can provide students information on what may be contributing to their poor mental well-being. Further, we hope that the university will use this information to provide students with better, more accessible resources to improve their mental well-being. We believe that by doing this, students will be more satisfied with both their mental well-being and their overall physical health. Our team hopes that future researchers on this correlation will be able to reach a larger, more diverse demographic of students with a larger variety in age and gender. By conducting future research, more generalizable data may be received and can be more easily applied to these topics. We believe that it would also be interesting and significant to reconduct similar research on this topic after the COVID-19 pandemic passes. This may provide insight on the impact that the pandemic placed on students overall mental well-being, and in turn, their physical health.

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Quantitative Study of Upper Year Undergraduate Students at McMaster University: *Assessing the Intersection of Remote Learning, Social Experiences and Living Environments*

Isabella Batista[1], Victoria De Freitas[1], Jet'aime Fray-Samuel[1], Ashmeen Hayer[1], Theia Jamal-Sunderji[1], and Ashley O'Brien[1]

Abstract

The concentration of this quantitative study is on McMaster undergraduate students and their experiences with remote learning and the intersection between home and school life. We focused on four variables to conduct our research, including living environment, remote learning, social relationships, and well-being. The three social psychological theories that guided our research and aided in understanding our findings were social identity theory, role theory, and symbolic interactionism. Our sample size included 35 McMaster students 18 years of age and older, who responded to our 31 survey questions on the McMaster Research Ethics Board approved LimeSurvey. Our findings suggested that participants felt their environment was helpful for success in their studies. We also discovered that remote learning did not positively impact participants' well-being and that their living environment did impact their well-being. Additionally, our data was inconclusive regarding the success of the McMaster Student Wellness Center for student well-being. Our results indicate that the transition to remote learning was difficult for students as many students responded in agreement to questions or statements that outlined negative experiences. We hope that our research can make the remote learning experience more positive for McMaster undergraduate students.

Introduction

For many people, an essential part of growing up involves experiencing university. In a university environment, you tend to meet new people, you have a chance to learn more about yourself, and sometimes you get a change to move away from home and become independent. Some would say that this experience is an integral part of emerging adulthood as it is a period that plays a large part in what shapes your future. The topic we researched is the lived experiences of undergraduate students at McMaster University on remote learning. We chose this topic because we are all currently experiencing a pandemic that has reshaped our daily tasks. As students, our daily tasks previously consisted of attending school, learning, and collaborating with others. Now that in-person learning has transitioned to remote learning, we are all undergoing a transition that

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[1] Undergraduate Student, Honours Social Psychology Program, Faculty of Social Sciences, McMaster University, Hamilton, Ontario, Canada

requires us to adapt. Our goal was to cultivate a more in-depth understanding of how undergraduate students managed to be at home in an environment with other responsibilities, roles, and distractions compared to an academic setting. Since we are undergoing the same challenges, we wanted to discover if and how our struggles compared to other populations of the McMaster undergraduate student body. We wanted to foster in ourselves and those who viewed our research a more diverse perspective and understanding about how complex and interconnected remote learning, home life, and school life can or cannot be.

The purpose of our research was to gain information about a topic that is not heavily researched yet. As we tried finding existing research about the impact one's home and school life has on their academics, we realized there was no substantive amount of information available in the literature relating specifically to our topic. Previous research has mentioned that students reported that one of the most prominent challenges faced by switching from in-person to remote learning was their learning environment (Khlaif & Salha, 2020). However, Khlaif and Salha's (2020) research does not discuss the specific challenges students faced in their learning environment. Similarly, the existing literature notes a relationship between university students, where they live during their studies, and their identity development (Jordyn & Byrd, 2003). Nevertheless, our research has been conducted to understand further the intersection between where students live and remote learning. Additionally, there was no literature that we could find relating to the development of social relationships during a pandemic. This research gap is one reason why we chose our topic and decided to ask the specific research question, "*how are undergraduate university students' lived experiences of remote learning impacted by the intersection of individuals' home life and school life?*" Our research addresses whether students found their home life and school life merging to be beneficial or detrimental. The recency of changes and uncertainty of the future exemplifies why we found it essential to conduct our research on this topic.

Social psychology is the organized investigation of the causes and nature of human social behaviour (Delamater et al., 2015). Social psychology's primary concern is studying and documenting human behaviour and its causes and effects (Delamater et al., 2015). Additionally, social psychologists systematically study humans' behaviours using the scientific method (Delamater et al., 2015). Our research can contribute to social psychology because we studied the contexts and influences in which individual behaviour was impacted. Everyone's experiences with remote learning vary, and by researching ordinary circumstances these students are in, we can understand micro and macro-level changes with the transition to online learning. We addressed social relationships, families, academics, living environments, and well-being in our survey, and our study allows us to recognize the interconnectedness of these multiple domains and draw conclusions on individual behaviour and outcomes.

This paper begins with a literature review that analyzes and connects existing research to our topic and findings. Emerging themes within the existing literature are Identity and Living Environment, Identity in Academic Environments, Environmental Impact on Academic Success, Living Environment Effects on Social Relationships, Environmental Influences on Mental Health, and Mental Health and Academic Success. Then in the theory section, we discuss social identity theory, role theory, and symbolic interactionism and how they contributed to the questions we asked and the results we received.

Subsequently, our methodology section explains how our survey was created, the sampling methods used, our target population, the recruitment steps, which groups were contacted, how we obtained consent, how data was analyzed, and our ethical considerations. After that, we present the findings/results of our research by including explanations of what we found and tables and graphs to illustrate our participant responses. We then have our discussion section that consists of an in-depth analysis of our findings and how they can improve the university institution and student experiences, followed by a summary of our findings. Lastly, our conclusion section that summarizes the results and includes our limitations, significant insights, concluding thoughts and acknowledgments.

Literature Review
Identity and Living Environment

Multiple variables can influence an individual's identity. An individual's identity is constructed by their role identity, social categories, and personal characteristics (Rohall et al., 2014, p. 123). It is agreed that a significant component of identity formation is experiencing the university lifestyle. Many researchers have investigated the relationship between identity development concerning individuals' thoughts, feelings, and behaviours during the transition to post-secondary education, with little to no investigation into the motivations that caused the change. A study conducted by Jordyn and Byrd (2003) focused on the impact a change in the living environment had on identity development status. Their study concluded a relationship between university students, their status of identity development, and whether they lived at home or away at school (Jordyn & Byrd, 2003). Their research findings suggested that various coping strategies were created by students that aided them in strenuous situations and moved them beyond their adolescent identities (Jordyn & Byrd, 2003). The nature of this research proves to be a critical component in understanding the correlation between one's living environment and identity.

Jordyn and Byrd's (2003) research was conducted about 20 years ago, which presents a limitation in conducting future research like ours. Due to the research gap, it would be hard to indicate whether the results still hold for current students. Fortunately, a recent study conducted by Yuan and Ngai (2018) determined that student university experiences helped construct one's identity. Students retain many role identities during their post-secondary education, contributing to the development of their overall identity. Current McMaster students' role identities include being a family member, a roommate, a student, an employee, and more. Depending on their current living arrangements, one or more of their roles may be more salient than the other. For example, when a student lives with their family but is also a caregiver to their siblings, the chances are that their caregiver role will be more salient than their role as a student. These conflicts in roles can result in a student's academic success being compromised.

Although most students decided to spend their time with family during this pandemic, some opted to live away from home. By living away from home, their salient identity becomes that of the student, and they have the chance to focus more on their studies. Consequently, their roles as friends or family members become less salient. The study conducted by Yuan and Ngai (2018) focused on the examination of social roles and their relation to identity formation. The study concluded that although students were spending

more time away from their family, their identities were still being cultivated, which led them to create new meanings for themselves (Yuan & Ngai, 2018). One's identity is formed based on their social interactions, and we can assume students at this time may be experiencing a shift or change in their social identity. As this research examined Eastern culture, the question is whether it will relate to Westernized cultures.

As family plays a massive role in shaping an individual's identity, their impact on one's social identity can be overwhelming. Price and Prosek (2019) researched the lived experiences of LGBTQ+ students who either felt rejected or supported by their parents and how they impacted their overall mental health. The findings of the research were that parents were loving and supportive of their child's sexual orientation. However, we understand that it would affect an LGBTQ+ individual's identity if the parents were not accepting. Individuals who do not have to question their identity are more likely to hold a positive self-concept about themselves, compared to individuals who feel like they are not worthy and lack a strong emotional connection with their family members.

Overall, all three articles proved essential in developing our research topic, as they discussed the relationship between identity and living environment. However, there were some oversights in the articles that must be discussed. The article by Jordyn and Byrd (2003) focused on students' identity development and not identity in and of itself. The research looks at the connection of living arrangement, as it considers leaving home during a student's university career, to the position an individual's identity development is in (Jordyn & Byrd, 2003). From Jordyn and Byrd's (2003) research, it seemed as though an identity status influenced how students thrived in different living environments, whereas Yuan and Ngai (2018) concluded that a change in one's living environment created an atmosphere where students discovered and cultivated their identity. This information prompted us to question whether the relationship between identity and living environment was causal or simply correlated. It is also essential to research all areas of a topic, which was not done by any three articles examined.

Although Yuan and Ngai's (2018) study focused on the student impact of the transition to post-secondary education, it would be ideal to see whether there were similar impacts for students still living at home. On the other hand, Jordyn, and Byrd (2003) examined students living at home and away from home. It was not reported whether students were residing alone or with peers, which would affect how their identity was progressing. A limitation to Price and Prosek's (2019) research was that they excluded bisexual individuals. Bisexual individuals are a huge part of the LGBTQ+ community, so by only focusing on lesbians and gays, Price and Prosek (2019) left a portion of a community out of the study. In recognizing the limitations of these articles, we ensured that our research included all student life areas that we felt were relevant.

We were also able to find some current barriers that were not thoroughly examined in the previous research that we thought would be interesting to investigate further. Considering the pandemic is a recent development in our lives, its effect on identity is a grey area that needs to be researched. Since all three articles were conducted before the pandemic was a significant component of our lives, our research investigated its current impact. This transition has prompted a significant increase in familial influence on students. As parents are one of several socialization agents, our research assesses whether the struggles students are having with the transition are correlated to parents' new or additional influence, which was partially examined in the article by Price and

Prosek (2019). The articles by Yuan & Ngai (2018) and Jordyn & Byrd (2003) investigated identity development, whereas the Price and Prosek (2019) article examined formed identity, which is focused on in our research. Since we had similar experiences to our target population, we recognized the various ways in which it could be researched.

Identity in Academic Environments

Changes in our normative experiences due to the pandemic have altered how identity is structured. An analysis of the pandemic's impact on medical students' professional identity development was conducted by Cullum et al., (2020). It concluded that the pandemic's widespread changes have caused medical students to lose valuable learning experiences that would have helped them develop their professional identities (Cullum et al., 2020). It is suggested that online learning and being a part of virtual student societies could significantly influence developing the professional identities of current students going through the transition (Cullum et al., 2020). As the in-person part of being a student has been taken away with the online learning transition, students' virtual experiences are necessary for their social identities to continue to develop. Students grew accustomed to the identities they created on the campus, and with the abrupt changes that occurred, students were left at a disadvantage.

A study conducted by Graupensperger et al., (2020) concluded that due to the rapidness of school closures, activities that were once central to students' identities became inaccessible, which impacted their mental health and well-being. The focus of this study was on student-athletes, and it was determined that once they were able to reconnect virtually with their teammates during the pandemic, they had better mental health as they were able to maintain their athletic identities (Graupensperger et al., 2020). Although this study examined student-athletes primarily, it gives insight into how the pandemic has influenced students' social identities.

Both Cullum et al., (2020) and Graupensperger et al., (2020) have limited research in their target populations. Cullum et al., (2020) focused solely on medical students, while Graupensperger et al., (2020) only examined student-athletes. Due to the lack of the research population, we cannot determine whether there is a correlation between students' academic environments and identities. Therefore, the investigation of its effect on all students is necessary. Our research focused on the multitude of students being affected by the transition, including a more in-depth understanding of whether the transition affects students in all faculties similarly. For this reason, our research involved examining McMaster students from multiple social groups.

Environmental Impact on Academic Success

When thinking about a student's experience with online learning, it is crucial to consider the context of their work and study environments. At the beginning of the lockdown, universities transitioned to a remote learning style, which extended through the 2020-2021 academic year. We assumed that their household roles would have significantly impacted their academic achievement with students being back in their home environments. Although surprisingly, there is limited existing research on the link between one's living arrangement and academic performance.

A relatively recent study by Simpson and Burnett (2019) examined how students' engagement and living environments impacted their academic performance. They

compared the lived experiences and academic achievements of first-year residence students and first-year commuter students (Simpson & Burnett, 2019). The results showed that out of 870 students, commuters yielded higher GPAs than those who lived in residence or other campus housing (Simpson & Burnett, 2019). The article stated that a possible reason for this was the overwhelming responsibilities that commuters managed daily (Simpson & Burnett, 2019). With the recent developments due to the pandemic, research on this topic must continue because, with in-person learning, students had a choice whether to be commuters or not. Students who had been commuting during their university career were used to managing their time appropriately, whereas students who did not commute had extra spare time. However, the transition eliminated students' choices and required all students to adopt lifestyles of managing multiple responsibilities at once. Our research was designed to understand this situation better and see how students were adjusting.

Additionally, Khlaif and Salha (2020) conducted a study focused on uncovering the challenges regarding the switch to remote learning in Libya, Palestine, and Afghanistan. They used semi-structured interviews with 60 participants and observed 60 online classes for their data collection. Results indicated that students reported the most prominent challenges were their learning environments, lack of quality digital content, digital inequality, and the concern for their digital privacy (Khlaif & Salha, 2020). It was mentioned that remote learning might be complex for some students due to different living environment issues.

The study conducted by Simpson and Burnett (2019) examined the effect of first-year students' living environments on their academic performance. Although it is essential to consider first-year students' experiences, our research was more concerned with understanding how upper-year university students adjusted. We focused on this population because they have grown accustomed to the university lifestyle, and the change impacted them the most.

Additionally, we questioned the generalizability of Simpson and Burnett's (2019) results because it was collected ten years ago, which did not consider technological advancements or the recent pandemic. Khlaif and Salha's (2020) study provided insight into students' difficulties with the new remote learning model in developing countries due to COVID-19. Although the information gathered helped provide understanding about lower socioeconomic backgrounds, the sample used may not be reliable because of the small sample size used and the lifestyle differences compared to other social classes. For this reason, our research attempted to uncover whether university students in the Western world were experiencing similar challenges in their homes and in their ability to adapt.

Living Environment Effects on Social Relationships

The transition to remote learning has dramatically impacted how students interact with each other and develop new relationships. While researching, there was a lack of studies on how remote learning impacted social relationships. Understandably, remote learning is possible because of the recent advancements in technology, so that recency could account for the lack of research on this topic.

Pan (2020) conducted an online study in several provinces of China for university students returning home due to COVID-19. According to Pan (2020), out of the 94

students who responded, 40% of them found dating at home to be boring, 27% found being with their families during this time was "so-so," while around 16% of students did not find it incredibly boring (p. 595). Additionally, 10% of students reported feeling very bored at home, 7% were thriving, many students were not happy with returning home, and some were coping fine (Pan, 2020, p. 595). This result indicates that some homes created barriers that impacted student social experiences. The study also identified students' feelings about leaving campus and returning home and how they perceived the intersection of their living environments and social lives.

Additionally, Li et al., (2020) conducted a study in China focused on changes in sexual activity and behaviours due to COVID-19. The study gathered data from various individuals, but they focused on the results of China's residents between the ages of 15-35 that had penetrative sex at least once in the past six months. The results of 967 participants indicated that changes in sexual behaviours and activities occurred (Li et al., 2020, p.2). Around 68% of participants were in an exclusive relationship, 38% of participants reported a deterioration of their relationships during the pandemic, 22% of participants reported a drop in sexual appetite, and 41% experienced a reduction in the recurrence of sex (Li et al., 2020, p.3). The study also acknowledged that engaging in masturbation and viewing pornography increased since the start of the pandemic (Li et al., 2020). It was evident that young Chinese individuals' social worlds will be different, as research indicated behaviours are changing.

Both studies provided insights into the social damages experienced by Chinese individuals due to the pandemic protocols and restrictions. Pan's (2020) study holds relevance to our research as it researched the current pandemic's impact on students' lives. Unfortunately, because Pan's (2020) study used a small sample size, it is questionable if the results are generalizable. The study by Li et al., (2020) used a larger sample size, which indicates that the results could hold for a larger population. A limitation of the studies conducted in China is that Eastern results may not apply to Westernized populations. Therefore, our research component was to see how undergraduate students at McMaster University adjusted to life at home and how their social relationships and behaviours changed.

Environmental Influences on Mental Health

Due to the urgency and recency of the transition to online learning and sending students home, there is a lack of research regarding undergraduate students' lived experiences while undergoing this transition. When we first transitioned, the sudden change and the stress of the ongoing pandemic left many confused, nervous, and trying to adjust. Gillis and Krull (2020) examined techniques being used for the transition, students' perceptions of the transition, and the barriers faced by their introduction to sociology students. The results showed that students struggled with distractions, increased anxiety, and felt less motivated (Gillis & Krull, 2020). This increase of anxiety stemmed from several significant changes that recently occurred, including the pandemic, returning home, online learning, family, or social issues (Gillis & Krull, 2020). Those from lower socioeconomic backgrounds disproportionately faced more barriers with the transition as they lacked adequate workspaces or had to worry about finances (Gillis & Krull, 2020). However, the strain of responsibilities students experienced at home were subjective, depending on their living situation. With this information, we can assume that

McMaster students are experiencing similar barriers to remote learning, compromising their mental health.

In a similar study, Tharani et al., (2017) researched how the learning environment affected undergraduate nursing students' mental health. The researchers studied 15 Pakistani nursing students and used 15 semi-structured interviews. Results indicated that if students' learning environments were favourable, their learning performance was high and that their overall well-being was good (Tharani et al., 2017). The factor that had the most influence on their mental health was their learning environment (Tharani et al., 2017). Students reported struggling with several aspects of learning, such as unaccommodated schedules, high academic expectations, and a lack of resources, all of which contributed to negative well-being (Tharani et al., 2017). A supportive atmosphere was crucial in maintaining emotional stability and managing academic stress. A learning environment should provide minimal stress, support from acquaintances and professors, and adequate educational resources.

A similar limitation of both studies was that they used incredibly small sample sizes. Gillis and Krull's (2020) sample displayed the potential for generalizable results because it included a slightly larger population. As for Tharani et al.,'s (2017) research, it was evident that the results were less likely to be generalizable, considering only fifteen participants were included. Additionally, both studies focused on specific populations, which disregarded how other populations were affected by the same problems. For results to be reliable, similar studies need to be conducted on diverse populations.

Our research further analyzed the impact of one's living environment and mental health alongside remote learning. Based on the article results, we inferred that since McMaster University students' living and learning environments had become one, similar mental health issues were being experienced. Our research helped us acquire more details about students' living arrangements and how their environments subjectively affected their mental health.

A limitation of the Tharani et al., (2017) article was that it did not explicitly address what we were looking for regarding our study. However, it did cover the basics of how a learning environment played such a pivotal role in students' lives. In recognizing this limitation, we attempted to fill this gap by ensuring that diverse populations were contacted during the recruitment process to account for the entirety of the McMaster population.

Mental Health and Academic Success

A study of 63 students was conducted by Heiligenstein et al., (1996), which focused on understanding the correlation between depression and academic impairment in college students. Their findings determined that students with moderate to severe depression showed high intellectual impairment (Heiligenstein et al., 1996). Furthermore, 92% of students missed their classes, experienced decreased academic efficiency, and had interpersonal problems (Heiligenstein et al., 1996, p. 61-62). Awadalla et al., (2020) conducted a study to understand university students' experiences with depression and anxiety and how these mental health struggles affected their academic performance. Participants who were screened for generalized anxiety disorder were less satisfied with their studies and had lower GPAs (Awadalla et al., 2020). The same can be concluded about participants diagnosed with major depressive disorder, as they also had lower GPAs (Awadalla et al., 2020). Awadalla et al., (2020) determined that at least one out of

three university students would suffer from moderate to severe depression. Due to how emotionally taxing dealing with mental health issues can be, it is understandable that academic performance can be compromised.

Both articles were similar in that their findings concluded that depression in college and university students could cause an academic downfall. However, they differed as one study looked specifically at college students and the other at university students. We believe it would be beneficial to have results obtained from different institutional levels as they provided a broader perspective of experiences and influences. Additionally, both articles used screening tools to measure and assess the symptoms of depression and anxiety. The use of screening tools was beneficial because they provided empirical scientific results, which was better than having participants provide information that could have implied self-diagnosis. With both studies acquiring data in similar fashions, we could make relevant comparisons between them.

However, there were a few limitations present in the research by Heiligenstein et al., (1996). Heiligenstein and colleagues (1996) published their article over 20 years ago, so college students' problems back then may not be the same issues students face today. Our research has updated information about the correlation between well-being and academic success, and the impact remote learning has on overall student mental health. It is recognized that students diagnosed with depression and anxiety already struggled with managing in-person classes. With the current circumstances, students with mental health problems may find it even harder to adjust to the new learning style. Our research was able to help clarify why it is crucial to understand how individuals are adjusting to remote learning and assists in our understanding of mental health struggles during these difficult times.

Another drawback was that the sample size for the Heiligenstein et al., (1996) article was small, which caused a greater risk of the sample size being unusual by chance. Small sample sizes are less likely to be generalizable to the population, which is why our goal was to reach out to several student clubs and organizations to attain data on a diverse subset of students. A limitation in the Awadalla et al., (2020) research was that the researchers conducted the study in the United Arab Emirates. Due to the drastic cultural and lifestyle differences, multiple variables can affect university students' mental health in the UAE. Thus, our research sought to understand how mental health affected university students' academic success in Western cultures.

Theory

Introduction

During the initial phases of our research process, we selected three theories that we thought would help us understand the data that we collected from participants. The theories that we chose included social identity theory (SIT), role theory (RT), and symbolic interactionism (SI). These three theories were selected because they helped us decipher and comprehend the vast transitions students had experienced since the pandemic began and school was moved to an online format. Moreover, these theories were essential to our understanding of the intersection of academic and home life concerning remote learning.

Social Identity Theory

Social identity theory (SIT) was founded in the early 1970s by cognitive psychologist Henri Tajfel (1986) and social psychologist John Turner (1986). A social identity can be described as a part of a person's self-concept, derived from their knowledge of membership within a particular group and the emotional significance of that association (Scheepers & Ellemers, 2019). Individuals can have multiple social identities that depend on the social group that is most prominent in any given situation (MacKay et al., 2019). For example, when an individual is at school, their social identity may be more prominent concerning the program they are in or the clubs they are associated with. When the same student is at home with their family, their salient social identity may align more with that aspect of their lives. Social identities can also come from the peer groups that individuals associate with at school or from the school itself (MacKay et al., 2019).

SIT maintains that individuals strive to hold a positive self-concept consisting of personal and social identities (Delamater et al., 2015). Thus, there is an acknowledged relationship between individuals' self-esteem and intergroup differentiation (Brown, 2000). In other words, maintaining and developing a positive social identity depends on the groups the individual is associated with, and the comparison of one's in-group (the group they belong to) to other groups known as out-groups (Delamater et al., 2015). An individual will be motivated and pressured to positively evaluate their in-group to maintain a positive self-concept (Delamater et al., 2015).

We chose to use SIT to understand how students identified with others in their living environments now that learning is online. We also found that this theory was vital in determining how our participants felt about their school or "in-group." It was also essential to our understanding of individuals who felt that they could not build or maintain their social relationships or felt that they were no longer part of previous social relationships due to new in-group identifications. To understand if individuals still felt socially connected to their peers at McMaster from a remote learning environment, we asked questions such as *"I am still able to connect with like-minded individuals from McMaster during the transition to online learning."* We also asked if it had been more complicated for participants to sustain connections with others during the transition. These two questions gauged our understanding of how participants' identities evolved due to the drastic changes experienced. Social identity is a crucial part of having a positive self-concept, so when individuals feel their connectedness with their interpersonal relationships has weakened or become harder to maintain, it can diminish a positive social identity.

Role Theory

Another theoretical framework our research used was role theory (RT). Throughout the literature, the responsibility for developing RT is a grey area as the theory emerged from the work of multiple theorists. Although RT is addressed in multiple forms of literature, there is no clear indication of who the critical theorist is. RT can explain the different social positions people occupy and the associated behaviours of themselves and others that are expected to be upheld (Hindin, 2007). Additionally, there is an assumption in RT that predictable behaviours are context-specific depending on one's position and situation (Hindin, 2007). As RT can be interpreted and applied in multiple contexts, our research focuses on the concepts of role strain and role conflict.

Sociologist William J. Goode developed the theory of role strain in 1960 (Hopper, 2020). Goode (1960) recognized tensions between roles among one single status and

defined role strain as "the felt difficulty in fulfilling role obligations" (Goode, 1960, p. 483). Our research focused on learning about the strain undergraduate students felt with the increased workload and responsibilities associated with remote learning. For example, professors decided to do fewer examinations and more assessments, which resulted in students having to do more work than anticipated. These added pressures exemplify the concept of role strain because the student role involves balancing multiple classes with assessments, examinations, lectures, readings, and labs at one time. Students being pulled in multiple directions to satisfy everything required of them demonstrates the concept of role strain.

Additionally, role conflict was a significant component of our research. Role conflict looks at the tensions between the multiple statuses we hold (Khan Academy, 2014). Typically, individuals take on the role of a student outside of their home environments; however, students face being students in their living environment with remote learning. Corresponding to our research, we examined the intersection of everyone's multiple identities and roles to understand the concerns, difficulties, and limitations associated with the transition. For example, students were expected to adhere to the same academic requirements as in-person and their roles as a son or daughter, employee, parent, or sibling. Before remote learning, some students learned in an environment specific to their academic success and were not expected to assume multiple roles during that time, although this was not a universal experience.

With the transition, there was a demand for students to resume their alternative responsibilities during school hours because many resided in environments that required students to perform other roles. Some of our survey questions held importance in our understanding of role conflict. For instance, we incorporated RT into our survey by asking questions that identified if student responsibilities had changed during the transition from in-person to remote learning. One of our questions asked if participants felt as though they were a fundamental part of their household, and another asked if students felt that their role in the household had drastically changed with remote learning. Unfortunately, we could not ask questions regarding the amount of change or the specific aspects of their roles that had changed due to the pandemic. We believed this theory and the questions we asked to address participants' roles provided us with better insights into the impacts of individuals' fluctuating roles concerning online learning.

Symbolic Interactionism

Symbolic interactionism is a theoretical framework born out of the work of Chicago School sociologist George Herbert Mead (Huebner, 2012). Although Mead (1934) is thought of as the primary founder of symbolic interactionism, Herbert Blumer (1980) was the one who came up with its name. Both theorists focused on symbolic interactionism, though they approached this theory in divergent ways. While Mead's (1934) work is grounded primarily in pragmatism, Blumer has been coined as a realist and idealist in his work (Blumer, 1980). As Blumer (1980) has stated, there is a reality out in the world with a nature to be discovered, and he sees the world as being dependent on how it is perceived. Mead (1934), on the other hand, saw the world and human interaction through the lens of pragmatism. As Blumer (1980) noted, Mead (1934) believed that there is a world out there but that it may be perceived by individuals uniquely. Mead (1934) also presumed that the real world does not have a fixed or fundamental nature but may be

changed based on an individual's perception, the individual concerning another, and the context of the situation at hand (Blumer, 1980). Particularly, we used Mead's (1934) pragmatic symbolic interactionism lens to understand the meaning-making processes and subjective interpretations of our participants' current situations.

The most basic premise of symbolic interactionism is that social order and human nature are products of symbolic communication among individuals (Charmaz et al., 2019). Society is produced and reproduced in the language used during interactions with others and the interpretation of that language, where interaction involves the shared use of symbols through verbal language and non-verbal communication (Charmaz et al., 2019). According to Blumer (1969), there are three main premises of symbolic interactionism. The first is that individuals act towards things based on the meanings attached to them (Blumer, 1969). Second, meanings are not natural but are negotiated and agreed upon through interactions with other individuals (Blumer, 1969). Lastly, individuals manage symbolic meanings through an interpretive process (Blumer, 1969). We learn about the meanings of various things by interacting with others, and meanings can shift over time based on the nature of the social interaction and the context in which they occur (Blumer, 1969).

In our research, we tried to understand how individuals dealt with this transition to online learning and their perceptions of their well-being, their relationships with others, and their current living environment. This theoretical framework helped us examine students' responses to our survey questions while considering the meaning they attached to their current circumstances. We asked students various questions to gauge whether their social worlds had drastically changed since the transition to remote learning. By asking questions such as *"how would you rate the quality of the content being delivered online,"* we tried to understand if the meanings they attached to the education they were receiving had changed.

Moreover, the first premise of symbolic interactionism states that individuals act towards objects based on the meanings attached to them (Blumer, 1969). Our study explored if the meaning of "student" had changed for individuals now that school was online based on their answers to our survey questions. Our research also offered valuable information on how individuals had negotiated the meanings they attached to their current circumstances. We also addressed participants' negotiated meanings through questions about whether they had a positive or negative experience, whether their social relationships had changed, and the state of their mental health (Blumer, 1969). For example, we found information about negotiated meanings by asking students questions such as *"the quality of education provided online this year for most classes is on par with previous years,"* as well as *"online schooling has positively impacted my well-being."*

Concluding Statements

SIT, SI, and RT were integral in understanding and discussing the data we collected from participants. These theories helped us interpret and understand how students dealt with the transition to online learning regarding the intersection of one's academic and home life. SIT improved our understanding of how individuals identify with their school, their peers, and their home life now that schooling is remote. RT supported us with our insights into participants' role statuses and their current role strains. Also, SI theory was vital to us when interpreting the meanings that participants held relating to this transition.

Methodology

Our research was a quantitative study that focused on McMaster undergraduate students' lived experiences regarding remote learning. Specifically, our research question was "*how are undergraduate university students' lived experiences of remote learning impacted by the intersection of individuals' home life and school life?"* The research was approved by the McMaster Research Ethics Board (MREB#: 0327), which allowed us to begin the research process. We conducted our research through an anonymous online survey hosted on the MREB approved platform, LimeSurvey. Snowball and convenience sampling methodologies were used to gather our data (Clancy, 2020). The domains we focused on were living environment, remote learning, social relationships, and well-being. The survey consisted of multiple choice and Likert scale questions, and the response options were between *strongly agree, agree, neutral, disagree, strongly disagree,* and *no response*.

Our survey was activated on November 16th, 2020, and recruitment began on November 27th, 2020. Since we had to recruit participants online instead of in-person, we used three recruitment scripts tailored to each club/society and distributed them via email. The first recruitment script was labelled "*Email/Facebook Recruitment Script for Holder of Participant's Contact Information*." This script was used to request club directors or presidents to facilitate emails and posts about our research to a larger body of students that fit our sample population criteria on our behalf. The second recruitment script was labelled *"Email/Facebook Recruitment Script Sent on Behalf of the Researchers by the Holder of the Participants' Contact Information*." This script allowed other individuals and clubs to email or post on our behalf for our research. The final recruitment script was labelled *"Email/Facebook Recruitment Script for Direct Post by Group Members (after securing permission from administrators)."* This script allowed us to directly send an email or post about our survey research to a particular body of students. Additionally, we sent a recruitment poster alongside the scripts above, which was used at the discretion of the individuals overseeing the clubs, societies, and Facebook pages.

Initially, the clubs and societies that we contacted included the BSA- Black Students Association, Nu Omega Zeta Sorority, COPE: A Student Mental Health Initiative, McMaster Pre-Law Society, Socialist Fightback Student Association, McMaster SocSci, The Social Psychology Society, McMaster Relay for Life, McMaster Diabetes Association (MDA), McMaster PNB (Psychology, Neuroscience, and Behaviour) Society, and McMaster Engineering Society. Upon realizing that an overwhelming number of groups were unresponsive, we sent a reminder email and recruited from other groups. The other groups contacted were the McMaster Italian Cultural Club, McMaster official accepted (2021, 2022, 2023) class pages Facebook, McMaster Actuarial Society, Society of Off-Campus Students, FirstGen McMaster, McMaster Association of West Indian Students, McMaster Chinese Student's Association, McMaster Medicine and Health Society, McMaster Undergraduate Women in STEM Club, McMaster Humanities Society, McMaster Linguistics Society, Biochemistry and Biomedical Science Society, Biology Society, Human Behaviour Society, PNB Mental Health Society, McMaster Anthropology Society, Health, Aging, and Society Student Association, McMaster Social Work Student Collection, McMaster Sign Language Club, McMaster Vietnamese Student's Association, McMaster Hindu Students Association, 35 Mil's McMaster's Student Cinema Society, McMaster Unspoken, Zero Waste McMaster, and McMaster Sociology Society.

Unfortunately, after contacting over 30 clubs, societies, and groups, we received only five group responses.

Our sample population consisted of 2nd to 5th-year and above Undergraduate McMaster students. We chose to include students in their 5th-year and above to account for the varying degree completion timelines for individuals. All survey participants were McMaster students ages 18 and older, with no other specified characteristics included in the sample population. The estimated time that it took participants to complete the 31-question survey was approximately ten minutes. The survey included our letter of information, which covered participant consent and withdrawal guidelines. After participants read the letter of information, they selected whether they agreed or did not agree to participate, which provided us with implied consent. Additionally, the letter of information included a disclaimer informing participants that we would be unable to retrieve their information once their survey was submitted due to our survey's anonymity. Our goal was to keep our survey active until February 12th, 2021, or close it sooner if we reached 75 submitted surveys. On February 12th, 2021, we expired our survey with only 35 responses.

On February 19th, 2021, we began our data analysis using LimeSurvey, Microsoft Excel, PSPP, and the Statistical Package for the Social Sciences (SPSS). These software packages were available through Mac iOS. One student investigator was put in charge of data analysis and received help from other student investigators from time to time. The data was safely stored in a file on student investigators' personal computers and was password-protected only for researchers who were part of this project to access. Any data analysis that was done and deemed inadequate or not useful was deleted. As of April 30th, 2021, all data from this research project was deleted to ensure participants' confidentiality and safety.

Initially, we experienced difficulties using SPSS and transitioned to PSPP. To properly use PSPP or SPSS, we coded our data into numerical values. For every question analyzed using one of these programs, the data was recorded onto a Microsoft Excel document. Data coding followed the basic format of assigning a number between one to six depending on the question to one of our survey options (ex: agree, disagree, neutral). This coding process was done for many of the survey questions that we thought were of interest. Then, as a group, we chose which questions to focus on in our poster presentation. We initially used PSPP to generate basic descriptive statistics but did not have satisfactory results with the final graphs and tables. We then used SPSS, but due to our minimal knowledge of SPSS, we accessed and utilized several online video tutorials through YouTube to work with the software.

Using SPSS, we created several bar graphs and histograms for the data we chose to analyze. We also looked at the mean, mode, median, range, frequency, and standard deviation of our data responses. As of March 5th, 2021, we had coded the questions we deemed most relevant to our study, which concluded our data analysis process. However, because we had to code our data from qualitative responses to numerical values, the diagrams, and tables generated from SPSS were not easily understandable to anyone outside our research group. As a result, we recreated our graphs on excel to reflect our findings in a digestible format.

The updated bar graphs had the advantage of being easily absorbable for other viewers while being visually appealing. The four questions we transformed into bar graphs

for our poster presentation were question 8, "*I feel as though my role in my household has changed significantly due to online schooling,*" question 14 "*it has been harder for me to sustain connections with others during the transition to online learning,*" question 19 "*online schooling has positively impacted my well-being,*" and question 21 "*how would you rate the quality of the content being delivered online?*" We thought these questions emulated some of our most exciting findings and reflected some of our data's recurring themes. Additional graphs of other survey responses are included in this final paper and were created on Microsoft Excel.

Some possible ethical concerns were presented to participants taking part in our research. Possible psychological risks included feeling demeaned, embarrassed, worried, or upset, and possible social risks included a loss of status, privacy or reputation, and economic risks. We employed a variety of techniques that mitigated the psychological risks of participants. Firstly, data was gathered through an anonymous online survey which ensured participant comfort, protection, and anonymity. To further support participants, the survey was completed online in an environment comfortable to the participants, which mitigated any chances of social risks. As the participants completed the survey, they skipped any questions they felt uncomfortable answering and were given the option to avoid submitting the survey they began. Although the chances of social risks were lower than the chances of psychological risks, steps were taken to ensure they were as minimal as possible by protecting participants' identities in this study. Finally, to minimize psychological and social risks encountered when participating in this study, the letter of information included at the beginning of the survey had contact information for the McMaster Student Wellness Centre for further support. The survey's psychological and social risks were below minimal risk and posed no risks more significant than those encountered in everyday life.

Additionally, one of our student investigators was a member of a sorority we recruited from. Since she was a part of the overall recruitment process, we ensured no conflict of interest or bias by appointing another student investigator to recruit the sorority. All other student investigators had a peer-to-peer relationship with the sampled population, which is why our way of avoiding biases and minimizing our conflict of interests was by having our participants' responses and engagement anonymous.

Overall, our research process has been discussed in as much depth as possible. Through a troubling recruitment process, we received 35 anonymous responses from our online survey. The time-consuming process of completing our research included ethics board approval, data collection, and data analysis. To ensure this research was conducted appropriately and ethically, all risks were addressed, and steps were taken to minimize them as best as possible.

Results

In total, 35 student participants at McMaster University, ages 18 years and older, responded to 31 online survey questions about the intersection of one's home and school life regarding the remote learning model. The following figures illustrate some of the most relevant demographic and interesting findings from our survey results.

For gender, an overwhelming number of participants identified as female (65%), followed by participants identifying as male (3%), and others unwilling to disclose by selecting no response (31%).

Figure 1
Frequency Chart – Gender

GENDER	FREQUENCY
Male	1
Female	23
No Response	11
	n=35

Figure 2
Frequency Chart - Faculty

FACULTY	FREQUENCY
Social Science	17
Science	4
Engineering	3
No Response	11
	n=35

The participants belonged to a select few faculties at McMaster University, where the majority were from the Faculty of Social Sciences (49%), then the Faculty of Science (11%), followed by the Faculty of Engineering (9%). Our survey also allowed participants to refrain from responding by selecting the no response category (31%).

Figure 3 illustrates question 4, "*the people that I am currently living with influence my academic performance in a positive way*." The results show that 11.43% (n=4) answered with *strongly agree*, 20% (n=7) answered with *agree*, 40% (n=14) answered with *neutral*, 5.71% (n=2) answered with *disagree*, and 22.86% (n=8) were grouped into the *no response* category. *Strongly disagree* was omitted from the graphing analysis as participants did not select it. From these results, we see that the participants' living environments and those they were living with did have a neutral to a positive impact on their academic performance.

Figure 3
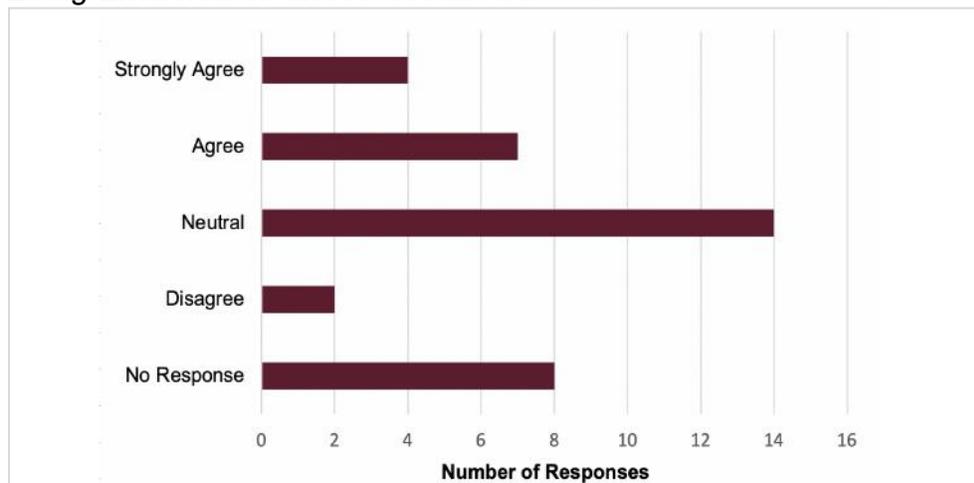*Living Environment and Academic Success*

Figure 4 compares question 7, "*I feel as though I am an integral part of my household*," and question 8, "*I feel as though my role in my household has changed significantly due to online schooling.*" The results for question 7 show that 11.43% (n=4) answered with *strongly agree*, 40% (n=14) answered with *agree*, 11.43% (n=4) answered with *neutral*, 11.43% (n=4) answered with *disagree*, and 25.71% (n=9) were grouped into the category of *no response*. In question 8, the results show that 17.14% (n=6) answered with *strongly agree*, 22.86% (n= 8) answered with *agree*, 11.43% (n=4) answered with *neutral*, 20% (n=7) answered with *disagree*, 5.71% (n=2) answered with *strongly disagree*, and 22.86% (n=8) were grouped into the *no response* category. Question 7 displays that most of the respondents indicated they have a prominent role in their households. However, in question 8, 40% (n=14) of the respondents selected *agree* and *strongly agree*, while 25.71% (n=9) of the respondents selected *disagree* and *strongly disagree*. We can deduce from these results that participants felt they were a fundamental aspect of their functioning households and felt they had increased responsibilities due to the transition.

Figure 4
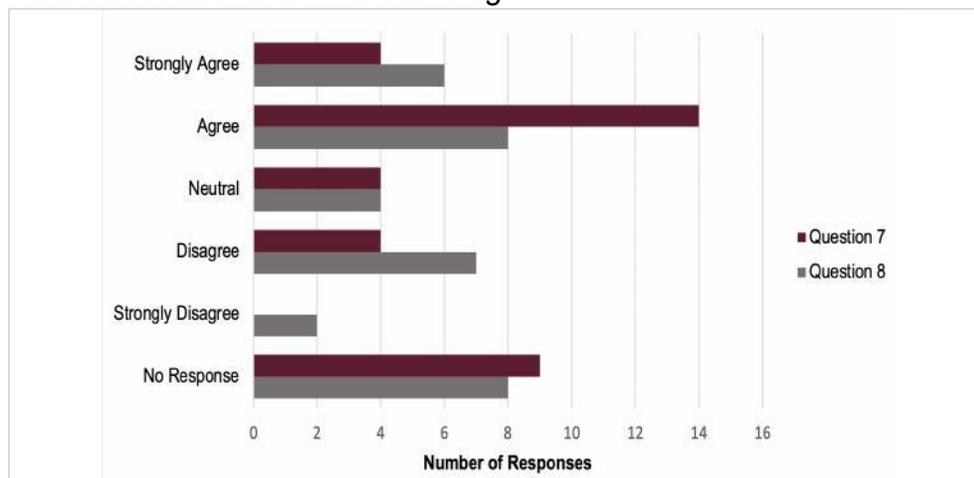*Role Identities and Online Learning*

Figure 5 compares question 10, "*my social relationships have been negatively impacted by everything being transitioned to online*," and question 14, "*it has been harder for me to sustain connections with others during the transition to online learning.*" The results for question 10 show that 20% (n=7) answered with *strongly agree*, 34.29% (n=12) answered with *agree*, 8.57% (n=3) answered with *neutral*, 8.57% (n=3) answered with *disagree*, and 28.57% (n=10) were grouped into the category *no response*. The results for question 14 show that 28.57% (n=10) answered with *strongly agree*, 28.57% (n=10) answered with *agree*, 8.57% (n=3) answered with *neutral*, 2.86% (n=1) answered with *disagree*, 2.86% (n=1) answered with *strongly disagree*, and 28.57% (n=10) were grouped into the category of *no response*. The results indicate that with students transitioning to online learning, their social relationships were left at a disadvantage and that throughout their remote learning experience, it has continued to be difficult to sustain relationships.

Figure 6 illustrates question 19, "*online schooling has positively impacted my well-being.*" The results show that 8.57% (n=3) answered with *agree*, 8.57% (n=3) answered with *neutral*, 31.43% (n=11) answered with *disagree*, 20% (n=7) answered with *strongly disagree*, and 31.43% (n=11) were grouped into the category of *no response*. *Strongly agree* was omitted from the graph analysis as participants did not select it. The results indicate that a substantial number of our participants did not feel that online learning had positively impacted their well-being. A total of 51.43% (n=18) of respondents indicated that they *disagreed* or *strongly disagreed* with the statement posed. As this is the current learning model utilized at McMaster University, it is essential to recognize if the students are experiencing compromised mental health because of it.

Figure 5
Maintaining Social Relationships
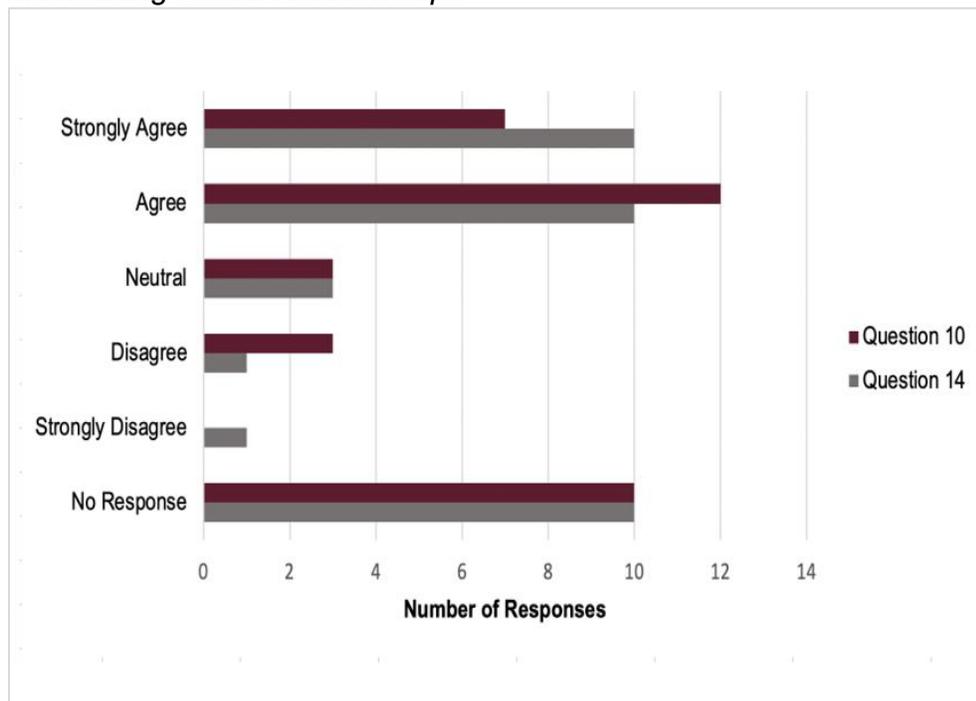
Figure 6
Online Schooling and Well-Being
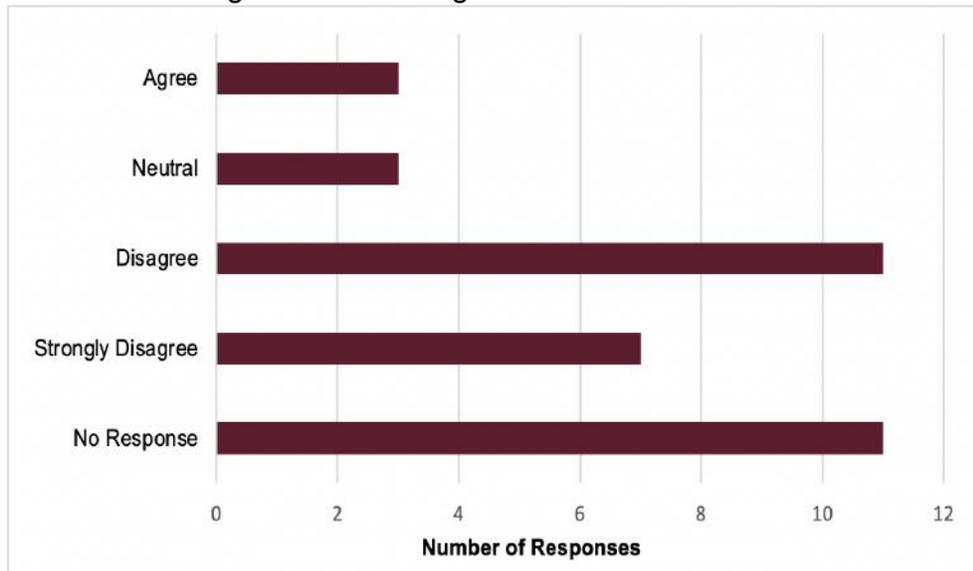
Figure 7 illustrates question 20, "*the McMaster Wellness Centre has been a beneficial support for me during the pandemic.*" The results show that 5.71% (n=2) answered with *strongly agree*, 5.71% (n=2) answered with *agree*, 28.57% (n=10) answered with *neutral*, 14.29% (n=5) answered with *disagree*, 14.29% (n=5) answered with *strongly disagree*, and 31.43% (n=11) were grouped into the category of *no response*. The results are very mixed with this question as 28.57% (n=10) of participants *disagreed* and *strongly disagreed*, while 28.57% (n=10) of our participants remained *neutral*. With these mixed results, we can infer that most participants have negative or indifferent feelings about the care being offered by a student service expected to support students in their time of need.

Figure 7
The McMaster Student Wellness Support Services
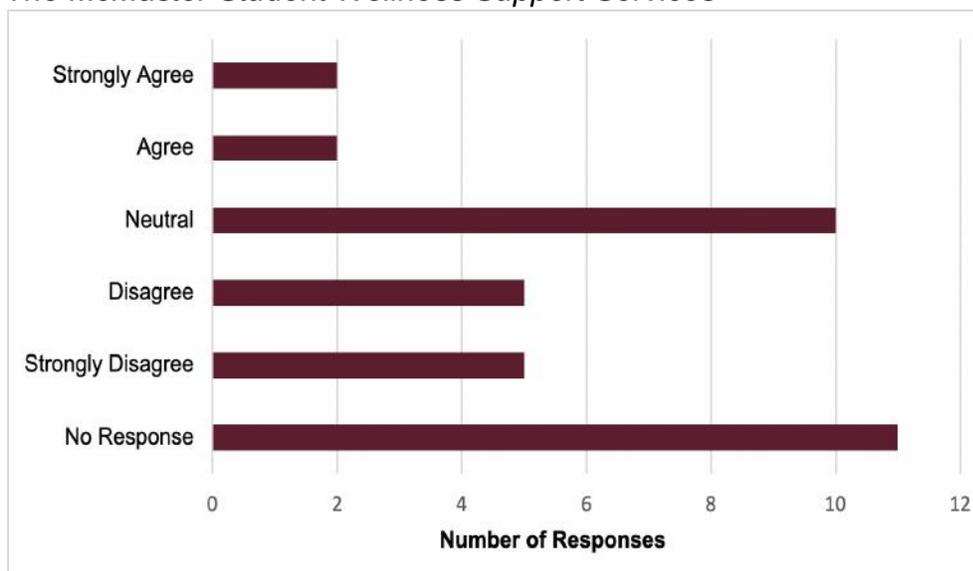
Discussion

Living Environment

   Asking about one's living environment is essential in understanding student remote learning experiences because, with campus closure, students spend most of their time in their living environments rather than in academic settings. Our assumption before receiving the results was that students' living environments would have a severely negative impact on their academics and well-being. However, our data shows that most students felt indifferent about their living environment or felt it had positively influenced their academics, as illustrated in Figure 3. These results may be because the university is a stressful environment and that stress could be detrimental to students' mental health, which negatively impacts their academic success. However, being home in a safe and familiar space may provide a sense of comfort and relaxation. Additionally, Simpson and Burnett (2019) proved that commuters had higher GPAs than those who lived in residence or other campus housing. This supports our results on how students felt their living environments fostered academic success.

   On the other hand, our personal experiences allow us to recognize that being in a living environment consisting of family or friends has its downsides. Therefore, we asked participants to respond to the statement, *"I feel as though my role in my household has changed significantly due to online schooling,"* illustrated in Figure 4. This allowed us to refrain from being invasive but also helped us gauge whether students had to take on multiple roles due to remote learning. Our results indicate that 51.43% (n=18) of participants *strongly agreed*, *agreed*, or felt *neutral* that the transition to remote learning had impacted the roles they had to manage. Additionally, when we asked participants to respond to *"I feel as though I am an integral part of my household,"* illustrated in Figure 4, 62.86% (n=22) *strongly agreed, agreed*, or felt *neutral*, indicating that they viewed themselves as essential in maintaining their households, which came with added responsibilities. These findings confirm the theory of role conflict when there are difficulties between individuals' multiple roles (Khan Academy, 2014). Based on our findings, we infer that the participants who agreed their role had changed due to remote learning struggled in their living environments to maintain statuses of being a student, sibling, friend, daughter, son, and more. Each role included a set of responsibilities, and when they emerged one at a time, it was easier to manage, whereas compared to remote learning, students were expected to assume multiple roles at the same time.

   Our overall findings of living environments and remote learning are not as clearly defined as we had hoped. Our findings' ambiguity in this section is mainly because our sample was incredibly small and biased in gender, faculty, and other demographics. Therefore, we are unable to determine if these results hold for diverse populations. Unfortunately, when our participants were asked, *"where are you currently located? If you select "other," please specify where,"* 68.57% (n=24) identified being in North and Central America, while 31.43% (n=11) chose not to respond. Because we were unable to ask in detail about their beliefs and traditional practices in their living environments, we inferred that most families living in North and Central America had adapted to Canadian culture, limiting our understanding of Eastern living environments. As noted above, Eastern and Western cultures and traditions differ, and those differences include family life, responsibilities, work, and education expectations.

We expect future researchers to conduct studies on diverse populations' lived experiences on this topic to find the similarities and differences between Eastern and Western student experiences. By doing this, social psychological research can expand the understanding of traditional and Western cultural experiences and contribute to teaching and learning methods in post-secondary settings.

Social Relationships

As discussed earlier, social identity is created through one's group membership and the emotional significance that the identity holds for the individual (Scheepers & Ellemers, 2019). During a student's time at university, their social identities are created by the peer groups they associate themselves with. As the transition from in-person learning to remote learning took place, we assumed that the transition would result in students no longer being able to identify with their peer groups, which would negatively impact their social identity. For this reason, the question, *"I am still able to connect with like-minded individuals from McMaster during the transition to online learning,"* was asked. Our research indicated that our assumption was correct as 40% (n=14) of students *strongly disagreed, disagreed*, or felt *neutral* about being able to connect with students on campus. There was a pattern observed that connected the social relationships students had and the transition to remote learning. While there was a decline in connecting with like-minded individuals from campus, there was also a decline in sustaining social relationships, as seen in Figure 5. A university campus is a place where students create and cultivate social relationships to develop their social identities. Unfortunately, students could not access societies and clubs in their original environments (on-campus, in-person group meetings) because of the transition.

Existing research by Graupensperger et al., (2020) showed how the lack of access to in-person groups negatively impacted students. Findings suggested that student-athletes had positive mental health when they could reconnect with their peers, and when they were unable to connect with them, their mental health suffered (Graupensperger et al., 2020). This makes sense because in school, group membership influences one's identity, and without being able to maintain those relationships, individuals were essentially disconnected from some parts of themselves.

We hope that McMaster uses our findings to implement better teaching methods during the pandemic. As students at this university, we recognize how most professors have chosen to upload pre-recorded lectures instead of hosting live lectures. We feel that by incorporating more live lectures or interactions throughout students' learning experiences, they will be able to better maintain relationships with classmates and their fellow peers. As university students tend to lead busy lives, seeing friends in classes or between classes was a way to sustain their friendships, but with remote learning, that became challenging. Therefore, even though it is in a new environment, live online lectures bring back interacting with peers and classmates. This avoids the negative impact on students' mental health when they feel disconnected.

Remote Learning and Well-Being

Understanding students' experiences with remote learning was a crucial aspect of our research. We found that the well-being of students significantly intersects with students' experiences with online learning. We made some assumptions before collecting data from

participants suggesting that remote learning and not being able to go to classes in-person would impact students' well-being and other aspects of their lives. Based on the data outlined below, we can say that our assumptions were correct, but that we also found more interesting information that was not initially anticipated.

As stated in Khlaif & Salha's (2020) study, learning environments and the quality of online schooling were students' main concerns. As we also know from Tharani et al.,'s (2017) study, the learning environment was a primary factor concerning participants' well-being, and most of our participants shared similar results. When asked, "*the environment you are currently living in has impacted your well-being,"* 42.86% (n=15) of our participants *agreed*, and 17.14% (n=6) *strongly agreed*. With this data, we concur that one's living environment is a predominant contributor to their well-being. Additionally, considering the sudden transition to remote learning, we can infer that the urgent switch had adverse effects on their well-being.

Furthermore, our results demonstrate that more than half of the participants reported that online schooling had not positively impacted their well-being. As revealed in Figure 6, 31.43% (n=11) *disagreed*, and 20% (n=7) *strongly disagreed* when asked if there was a positive impact. Our interpretation of these findings is that a significant number of students were not having a positive experience with remote learning. However, since 31.43% (n=11) of participants chose not to answer this question, we cannot assume that this is a generalizable result amongst all McMaster students. It is also important to note that although students disagreed that online schooling had positively impacted their well-being, this does not necessarily mean that it had been negatively impacted. Unfortunately, we were unable to gain further insight into the nature of most of the participants' disagreement with online learning without posing more detailed and intrusive questions. Since we can see some ambivalence regarding the impact of online learning, it is a grey area that would benefit from further analysis in future studies.

A significant struggle that we found students had been with the McMaster Wellness Centre. As shown in Figure 7, 14.29% (n=5) *disagreed*, and 14.29% (n=5) *strongly disagreed* when asked if the McMaster Wellness Centre had been a beneficial service. Only 5.71% (n=2) of participants *agreed*, and 5.71% (n=2) *strongly agreed* to this statement. Here we notice that the participants had mixed experiences regarding the support they received from McMaster's Wellness Centre. With 28.57% (n=10) of our participants indicating they felt *neutral* and 31.43% (n=11) of our participants choosing not to respond, it was difficult to determine whether McMaster's Wellness Centre provided adequate support or if students were attempting to access these resources.

These new understandings that we gained have implications for the quality of well-being support at our university. Awadalla et al., (2020) determined that at least one out of three university students would suffer from moderate to severe depression. With that being said, we think it is vital that students are receiving adequate support for their well-being. As stated previously, participants largely *disagreed* or *strongly disagreed* when we asked if remote learning has positively impacted their well-being. With these results, it was unclear whether the meanings students attached to the McMaster Wellness Centre were positive, negative, or somewhere in between. Due to this, we are unsure if students had been accessing the centre, if they had been having trouble accessing it, or if they had an unpleasant experience altogether.

These findings are essential for McMaster to recognize the quality of their services and make necessary changes. We hope our results can push the university to improve how mental health and other services contribute to student wellness. Services like the Wellness Centre are meant to support students in their time of need, and a pandemic is a significant event that students need help getting through. The fact that students felt unsupported is concerning and is something that needs to be addressed immediately.

We also asked participants if they felt that "*the transition to online schooling has been difficult*." The majority, 34.29% (n=12), indicated that they *agreed*, and 25.71% (n=9) *strongly agreed*. Simultaneously, 8.57% (n=3) did not feel this way about the transition by indicating that they *disagreed* with the statement. However, due to ethical restrictions when we asked the participants about their living environment and whether they had to move home, we could not determine the extent of the transition. The data that we collected from our sample is like the study by Gillis and Krull (2020), where they examined techniques that sociology students used to deal with the transition to online learning, their perceptions of the transition, and the barriers they faced. They found that students had struggled with increased anxiety, distractions, and decreased motivation due to this transition, where those with lower socioeconomic statuses were disproportionately impacted (Gillis & Krull, 2020). We infer that our participants were likely feeling the same way considering most of them *agreed* or *strongly agreed* that the transition was difficult.

We also found that when participants were asked, *"how would you rate the quality of the content being delivered online?"* there were mixed results. For instance, 34.29% (n=12) of participants rated the quality of content *fair*, 22.86% (n=8) rated it *poor*, and 11.43% (n=4) rated it *good*. Symbolic interactionism theory connects well to these findings because of the split results we obtained. Some individuals that participated in our study may have found that remote learning and the content being delivered online were unfavourable because of their learning style, while others saw it as positive and beneficial. In turn, individuals were more likely to attach different meanings to the quality of content and the transition to online learning. In many ways, these results provide us insight into individual differences and meanings attached to learning in general.

Further, these mixed results indicate additional research needs to be conducted to address why some students found the quality of content to be good or fair and why some found it to be poor. These mixed results can be due to different classes that students took or even different faculties that students belonged to. More qualitative data on questions like this could provide the university and faculties with a better understanding of how to make the quality of content better now that schooling is being conducted online and for future emergencies that may have similar circumstances.

Conclusion
Summary of Results and Findings

When assessing the results for student living environments, we noticed that most of our participants felt their environment was conducive to their academic success. Additionally, we saw that students experienced merging roles in their households and concluded that there were both positive and negative impacts. For the most part, one's living environment was not as hostile of an experience as we expected, which is essential to recognize.

Concerning social relationships, our research indicated that most participants felt that they experienced difficulties connecting with students on campus, sustaining social relationships and that their social relationships had been negatively impacted due to the transition to online learning. It appears that overall, student relationships suffered from the implementation of the remote learning model.

In terms of remote learning and well-being, we found that participants felt their living environments had impacted their well-being and that online schooling did not positively impact their well-being. We also noticed that the McMaster Wellness Centre was not beneficial to many participants during the pandemic. However, some were neutral on this matter, indicating that they may not have tried to access the centre. Additionally, most participants felt that the transition to online schooling was difficult, which is plausible, as the change was sudden. Lastly, we obtained mixed results about online learning quality, which could be due to various factors.

Based on our results, we can generally conclude that the transition to remote learning has heavily impacted McMaster students. Our findings show that students had difficulty managing the transition to remote learning, as many of our participants responded in agreement with statements and questions about negative experiences.

Limitations

Although our group took the necessary measures to mitigate the chances of having biased or skewed data, we were unsuccessful. The first limitation of our research is our small sample size, where we received 35 responses, and of those, 11 were partial. A small sample size with only 24 fully completed surveys makes it difficult to determine if our results represent the McMaster undergraduate population. This university is incredibly diverse with students from various countries, yet our results came only from North and Central America. We recognize that Western and Eastern cultures have different values, beliefs, living environments, traditions, and lifestyles; therefore, we cannot understand international students' experiences with the lack of diversity in our results.

Additionally, our findings are unbalanced by gender as 23 individuals identified as female, one identified as male, and the remaining participants chose not to disclose their gender. We hoped to have an equal number of participants in the gender category, but unfortunately, that is not the case. In turn, our data is skewed to represent female experiences while leaving us with very little understanding of the remote learning male experiences.

We also encountered difficulty during the recruitment process, as mentioned in the methodology section. We noticed that our survey lacked participants; therefore, we reached out to groups on multiple occasions to increase our sample size. Not only did we want more participants, but we wanted different participants that belonged to a variety of groups at McMaster University to have diverse and relatable findings. Even though we dedicated time to the recruitment process, only five groups chose to acknowledge our study. They were the Student Mental Health Initiative, McMaster Social Psychology Society, Human Behaviour Society, McMaster Social Science Society, and Nu Omega Zeta Sorority. Although we appreciate their involvement in our research, we were still left with a small sample size that hinders our ability to generalize the results to the entirety of the McMaster undergraduate population.

Moreover, the faculties in which our participants belonged skew our data as they only came from the Social Sciences, Science, and Engineering faculties, where 49% (n=17) of our participants were Social Science students. In university, it is recognized that each faculty and department has varying workloads and types of assessments, making it difficult to compare one faculty to the other. These differences are why we strived to have members from various faculties contribute to our research, although we know that our results do not account for even half the faculties at McMaster University. Additionally, we were restricted from recruiting Health Science students due to ethical protocols, which separated them from the undergraduate population. It seemed unfair to skip a portion of the population when our goal was to understand the entirety of McMaster's undergraduate student experiences.

Furthermore, the inability to ask students specific questions that were deemed invasive and above minimal risk made for limitations as our findings were ambiguous due to the need to interpret obscure questions and results. For example, our findings were inconclusive in determining whether there was an improvement in student experiences due to their living environment. Although we asked students whether they felt as though they were an integral part of their household, we cannot determine whether their involvement in their household was beneficial or detrimental to their academic performance because those questions were deemed invasive.

Additionally, because the campus was closed, our study was conducted in an online environment. With time constraints and our recruitment and data collection's online nature, it was more efficient for us to conduct a quantitative study. A significant limitation of a quantitative study is that we could not ask open-ended questions apart from a few demographic questions. Our study would have been more encompassing of participants' experiences if they could elaborate on their perspectives in greater detail. Also, by conducting a quantitative study with listed options to choose from, we essentially expected participants to fit into one of those categories. The reality is that individuals might have wanted to answer a question differently but were restricted from doing so. Because we conducted a quantitative study and have a small sample size, our results are not generalizable. Unfortunately, with the pandemic, there were limited options available to us, as we were restricted from using a more qualitative approach regarding data collection, leaving us to make use of what was approved for our research.

Significant Insights

A fundamental component of undergraduate students' experiences that our research provides insight into is the positive and negative effects of remote learning in multiple domains of their lives. Undoubtedly, the university is an increasingly intense environment that requires students to learn how to navigate. With our research on the impacts of the transition from in-person learning to remote learning, we have learned more about whether students can adjust and adapt for better or worse. One of the primary issues we focused on was how students navigated the intersection of their life as a student and their life as a family member, friend, or group member. Notably, we found that most participants felt strongly about how their social relationships had been impacted negatively due to the transition. Participants also conveyed that it was challenging to sustain connections with the new learning model. We expected students to have varying opinions about remote

learning because of our access to technology and how that can contribute to sustaining relationships, but the distance impacted people even with technological advancements.

An academic environment typically offers students quiet study spaces with no distractions, resources to utilize for their academic work, and other students to collaborate with. Our research provides insight into how students felt their academic success was either compromised or benefited from having a new learning environment. Interestingly, our research suggests that the people participants lived with had primarily impacted their academic performance positively. Participants also reported that the people they lived with were supportive, although a few individuals did not feel this way. Regardless, it is comforting to know that some aspects of the transition were positive; however, these were unexpected findings as we assumed the results would have indicated the opposite.

Additionally, a remote student's role comes with household, family dynamic, and social relationship tensions. Students must prioritize their education, and it can be challenging to do that while managing multiple responsibilities. Our research confirms in some ways the tensions that we were feeling when adapting to the transition from being a student on campus to being a student at home. This research provides insight into how students coped with the transition, and if they could manage their daily intersecting roles. From what we have learned, an overwhelming number of participants reported that their household roles had changed significantly because of remote learning.

Another aspect of our research was learning how students' dating lives had been impacted since the significant transition to learning remotely. We asked, *"how often are you using dating applications?"* and found that only four participants infrequently used dating applications while the rest never used them. Furthermore, we asked if *"having access to online dating options has made finding and maintaining relationships during the pandemic easier,"* and participants did not agree with this statement most of the time. These findings provide us with further awareness of student dating lives and the fact that dating applications may not be the most popular method for finding romantic relationships. It also provides insight into how students prefer to create relationships, as the online dating option existed. Still, they chose not to use applications, even though a large portion of their dating pool (students on campus) were not accessible. However, although we obtained exciting insights, they were ambiguous questions that would benefit from further research into a more comprehensive understanding of student dating lives and romantic relationships during a pandemic.

A further fascinating insight was the current processes and changes that need to be made at an institutional level. Our research can help the institution recognize the areas that students are struggling in and restructure them to bridge the gap. Furthermore, remote learning comes with a different educational style that may or may not work for specific individuals. Remote learning requires students to maintain a particular level of responsibility and time management, as they must adjust to being more independent learners rather than collaborative learners. In this area of inquiry, we found a couple of interesting points to consider. Firstly, we noticed that participants were quite split when rating the quality of content being delivered online. When we asked participants about this, some said that the quality was poor, and others thought it was good or fair. We found similar results when we asked, *"the quality of education provided online this year for the majority of classes is on par with previous years."* Although more people disagreed with this statement, some participants indicated that it was either the same or neutral.

Concluding Thoughts

In conclusion, our goal was to research a relevant topic for current and future students at McMaster University. With the uncertainty of the duration of the COVID-19 pandemic, students' experiences in post-secondary education will be different, and we felt it was essential to support students and bring awareness to the impact remote learning has on their lived experiences. Incoming students can use our study to determine if attending post-secondary education is something they want to do while the online learning model is employed at the university or if they want to defer and continue their studies once things return to normal. Current students can use our study to recognize that their feelings are shared with their peers and know that they are not alone.

Additionally, these results show that there are varying experiences in the McMaster population, so our research can help the university make necessary changes to improve the student experience. Our research proves beneficial because we are aware that there will be long-term implications for students due to the transition; therefore, our research can be used to understand student experiences during the pandemic and be further studied to understand how students have been affected in the long term. We also hope that future research uses a more extensive and more diverse sample to produce generalizable results.

Overall, our study has been incredibly insightful for learning about student experiences when significant changes occur to their learning environments, and we hope the findings of this study can be used to make improvements for all students.

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The Effects of Online Learning During the COVID-19 Pandemic on Undergraduate Students' Well-Being at McMaster University

Kenya Cassidy[1], Cassandra De Lorenzis[1], Janelle Enns[1], Kenda Offinga[1], Haley Owens[1], and Emily Sorasit[1]

Abstract

The present study investigates how online learning has influenced the well-being of undergraduate students. In March 2020, the COVID-19 pandemic was declared, thus forcing all education to be administered online. The following research employs an anonymous online survey that uses both qualitative and quantitative measures to evaluate the impacts of online learning on students' well-being. The survey targeted undergraduate students in second year and above at McMaster University and yielded a sample size of 61 participants. Four key variables were assessed: cognitive wellness, physical well-being, interpersonal relationships, and academics. Using symbolic interactionism (SI), self-determination theory (SDT), identity theory and basic psychological needs theory (BPNT), this study aims to provide a deeper understanding of the effects of mandatory online learning on students' overall well-being. An analysis of internal processes (i.e., meaning-making, role taking, types of motivation, satisfaction of basic psychological needs) shows that each facet of students' well-being has been negatively impacted by online learning, with an emphasis on motivation and cognitive wellness. Results suggest that further research and improvements to online education are necessary to fully understand this relationship. Students recommend different/removal of anti-cheating software, modified participation, more interactive content delivery, and reduced workload and content to improve online education delivery.

Introduction

Since the COVID-19 pandemic was declared in March 2020, the ways in which education has been administered is only one of many changes that accompanies the virus. As McMaster University declared its 2020-2021 academic year to be delivered completely online, we wonder how the university population will perceive and handle these changes. As current fourth year students of McMaster, we are curious about the experiences of our fellow peers and the similarities that may occur between our ordeals and the general theme of the data collected. Considering the undergraduate population of our school, we are choosing to investigate how the changes of online learning during the COVID-19 pandemic have impacted students' well-being at McMaster University. As

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[1] Undergraduate Student, Honours Social Psychology Program, Faculty of Social Sciences, McMaster University, Hamilton, Ontario, Canada

members of the university demographic, the goal of this research is to better understand how our peers experience the adjustment to online learning and to uncover data that will allow the University to better assist its undergraduate population.

Social Psychological Context

This research was designed in accordance with existing social psychological concepts and will help to expand on these topics. The social-psychological concepts used and developed in this study include but are not limited to meaning-making processes, interpersonal interactions, identity salience, extrinsic vs. intrinsic motivation, and the basic psychological needs of autonomy, competence, and relatedness. These concepts are positioned within the social psychological theories of symbolic interactionism (SI), self-determination theory (SDT), identity theory, and basic psychological needs theory (BPNT), which guided the design of this study and the interpretation of its results.

Research Questions

Our area of study regarding the effects of online learning in undergraduates at McMaster University works as an umbrella statement for multiple areas of study and finite factors of said effects. Foremost, cognitive wellness will be included as an area of investigation. From this topic, we hope to better understand the positive and negative wellness and intrapersonal effects that this adjustment in the delivery of academics has caused the students at the University, and how these changes have impacted their experiences. Physical well-being was also considered, specifically in comparison to the last academic year of 2019-2020, prior to the pandemic. We are interested in learning if physical well-being can be impacted by the change of environment, the varying levels of stress, and levels of fatigue compared to in-person learning. The use of comparison to the prior academic year is also the reason we are only including undergraduates who are in their second year of study and up. Additionally, we will also be looking at interpersonal relationships, specifically communication and levels of connection to peers, family, and friends in comparison to pre-COVID-19 circumstances. Finally, a large portion of our research will be focused on the academic aspect of online learning. We are interested in students' academic achievements in comparison to pre-pandemic experiences, as well as comparisons of time consumption, motivation levels, level of academic difficulty, and other aspects of the university experience.

Purpose of the Research

The question that will be at the forefront of our minds in conjunction with being the foundation of our research is as follows: How have the changes of online learning during the COVID-19 pandemic impacted undergraduate students' well-being at McMaster University? It is in unanimous agreement that the COVID-19 virus has changed lives, however the question remains has it changed in more positive or negative ways? As students, this population was chosen to acknowledge the experiences of our peers alongside other undergraduate students at McMaster University. The chosen topic also represents an untapped opportunity while the prevalence of COVID-19 is still rampant, and the presiding consequences are still unfolding. Although research is scarce on the topic of undergraduate students' experiences with online school in relation to COVID-19, we hope to gain an understanding of how the virus has impacted students' well-being,

both academically and personally. Pertaining to McMaster University, we would like to achieve a better understanding of how our limited population is experiencing these changes, whether it be positively and/or negatively. Through our research, we gained crucial information regarding the students of McMaster and hope to be given the opportunity to present our findings to the University to gain better insight into the well-being of their students.

We chose to utilize a quantitative methodological approach to our research, specifically an anonymous online survey. This method was chosen not only with consideration to a lack of time and funds, but also holds a component of anonymity, and can provide us with a larger opportunity for data collection. The anonymity of the survey provides limited ethical issues, as the population may participate at their own free-will, and all identities remain anonymous and confidential. This method also provides us with more opportunities to collect information, as unlike interviews, surveys are quick and easy to complete. The following section contains a review of the literature to further provide us with knowledge of past research in order to identify what we can do to improve the literature within our study.

Overview

In this paper, a theoretical framework is identified that helped better guide us while conducting our research. Our research purpose will later be discussed, as well as the current problem and what we hope to learn from our data. Our literature review will further situate the context of our topic and provide us with knowledge of past research to identify what can be improved with our observations. Furthermore, the research methodology utilized will be identified in the later section, along with our research questions regarding our areas of interest and compelling themes. Further, we will also outline our results and provide a discussion interpreting the meaning of these results while linking them back to the theoretical framework and literature review. We provide notable limitations that we have identified, and how we can improve on these in the future, as well as provide recommendations for further research.

Literature Review

Online learning is often examined and compared with education that is delivered on campus, face-to-face. The effects of online learning on students' well-being are mediated by varied factors, such as motivation, whether the individual's psychological needs are satisfied, and stress level (Chang et al., 2013; Chen & Jang, 2010; Fang et al., 2019; Figlio et al., 2013; Im & Kang, 2019; Yang et al., 2020; Yeh et al., 2019). However, studies on this topic typically cover voluntary online learning; where in the circumstances of COVID-19 this has not been voluntary, therefore, investigation from a new perspective is needed. In this review, factors that influence the quality of online learning as well as the effects of online learning on students' well-being will be discussed and analyzed, followed by the limitations and recommendations of previous studies. Due to a lack of research discussing well-being as a part of the impact of online learning, we will be observing the factors and effects as malleable guides rather than strict categories.

Factors of Influence

Motivation

Motivation is one of the key components that has a direct impact on students' learning outcomes, both offline and online (Yeh et al., 2019; Chang et al., 2013). There are a variety of factors that may affect a student's motivation levels; Im & Kang (2019) suggest that "qualities of online learning content" are significant factors in determining students' motivation levels (p.113). Additionally, it was observed that the level of motivation affects students' sense of satisfaction of learning more so than the learning outcome (Im & Kang, 2019). Satisfaction of learning refers to the level of joy and satisfaction one feels while learning (Topala & Tomozii, 2014). Given this information, if students are satisfied with the quality of the content they are learning in their online courses, hypothetically they would be more motivated, and in turn they would have increased satisfaction of learning.

Another factor that may contribute to a students' motivation levels is achievement goal orientation (Im & Kang, 2019). Im & Kang (2019) describe achievement goal orientation as the intent that affects the individual's decision of how and why they should participate in specific learning activities. Achievement goal orientation focuses on the ways in which individuals "think about their motivation and intent to learn" (Im & Kang, 2019 p. 113) and has been previously used as a framework that explains students' motivation. However, in some other studies, motivation can sometimes become a confounding variable since level of motivation can vary for different individuals depending on personality traits, age, and so on (Figlio et al., 2013). Therefore, students' motivation levels will be divergent in terms of the difference between in-person courses and online courses. Although no link between motivation and students' well-being has been examined, we propose that a higher level of motivation may predict better mental well-being of students, or vice versa, that greater well-being improves motivation.

Autonomy & Self-Efficacy

According to Basic Psychological Needs Theory (BPNT), there are three major elements of psychological needs: autonomy, competence, and relatedness (Fang et al., 2019; Chen & Jang, 2010). Moreover, research has demonstrated that autonomy is related to students' participation or engagement level in that it has a weak but positive relationship with an individual's engagement during online courses (Fang et al., 2019). As mentioned previously, autonomy refers to the "need to act with a sense of ownership of [one's] behaviour [to] feel psychologically free" (Van den Broeck et al., 2016, p. 1198). Therefore, students who have higher levels of autonomy are more likely to engage with their online courses, consequently leading to their success in those courses. Although limited studies have explicitly focused on this relationship, researchers propose that students' autonomy and engagement in their courses are positively correlated (Fang et al., 2019). Nevertheless, the level of autonomy required to succeed varies depending on the individual and the context. Autonomy needs satisfaction for students without mental health impairments during online learning will be distinctive from students with impairments, as they may face additional barriers or disruptions due to the illnesses they experience (McManus et al., 2017). Therefore, these students need more flexibility and support than what currently exists. Regarding self-regulated learning, several strategies are proposed by Yeh et al., (2019), including metacognition or thinking about thinking, effective planning, and organizing an environment dedicated to studying.

Along with autonomy, self-efficacy is frequently mentioned in related studies (Im & Kang, 2019; Chang et al., 2013; Chen & Jang, 2010). They share similar definitions, and both have a positive relationship with regards to successful online learning. In the context of online learning, self-efficacy refers to an individual's beliefs about one's capability to successfully complete the course (Im & Kang, 2019). Compared with autonomy and stress levels, self-efficacy is identified as the strongest predictor of course engagement level. Moreover, a high level of self-efficacy also predicts a higher level of motivation (Chang et al., 2013). John M. Keller (1987) developed the attention, relevance, confidence, satisfaction model (ARCS) to examine the impact of self-efficacy on the motivation of students during online learning and found its influence on male students is stronger compared to female students (Chang et al., 2013). However, more studies are needed to validate the gender difference situated in the context of impacts of online learning on students. In relation to our interest in well-being, Chen & Jang (2010) note that individuals enhance their emotional well-being through developing a positive self-concept and fulfilling the three basic psychological needs. Though no connection between autonomy and students' well-being is specifically mentioned, we propose that they share a positive relationship since once the autonomy need is fulfilled, students are more likely to experience a positive sense of self.

Competence

Among the three components of psychological needs, competence holds the most significant positive effect on students' learning engagement (Fang et al., 2019). Feeling competent is associated with feeling confident about the tasks that are assigned in the courses (Chen & Jang, 2010; Fang et al., 2019). Previous studies have found that when students are more engaged in the content and learning environment, they are more likely to feel confident about themselves and focus on what they gain from learning (Chen & Jang, 2010; Fang et al., 2019). Thus, students are more likely to discuss course-related topics with peers during group activities and discussions (Fang et al., 2019). Fang et al., (2019) also emphasizes the significance of analyzing competence as it is directly related to engagement level, which will be discussed in more detail in the following section. Although competence is a crucial factor to investigate, it is rarely measured. Moreover, there is no explicit connection discussed between competence and students' well-being. We speculate that the fulfillment of competence needs and well-being of students are positively correlated since the fulfilment of competence needs predicts a higher engagement level, which may then lead to improved students' well-being.

Participation & Engagement Level

In much of the literature, participation and engagement work to facilitate the satisfaction of the need for relatedness or participation and engagement are the measures of the need for relatedness (Chen & Jang, 2010; Fang et al., 2019). Participation and engagement involve individuals having an inclusive and connected experience. Similar to the other components of basic psychological needs, in the context of online courses, when students engage with others and/or feel included in discussions, their need for relatedness is fulfilled, which in turn fulfills their need for autonomy (Fang et al., 2019). Participation and engagement levels are also connected with one's intrinsic motivation and play a crucial role in completing online courses (Fang et al., 2019). Pertaining to participation and

engagement level, three areas are investigated: the medium that delivers study materials and course content, facilitators, and learners (Fang et al., 2019). Among all three areas that have an impact on students' engagement level, social interactions between students and/or facilitators greatly increases learners' participation and engagement levels (Cho & Cho, 2014; Fang et al., 2019).

Vlachopoulos & Makri (2019) extensively explore how different types of interaction influence students' learning experiences in the context of online learning. Three types of interactions are included: peer interaction, facilitator-learner interaction, and learner-content interaction, with a lack of focus on learner-content interaction (Vlachopoulos & Makri, 2019). However, it directly reflects the impact of online learning on students; therefore, it is crucial for us to investigate the connection between students and the learning content or material. Moore (1989) also proposed a framework called the transactional distance theory, which emphasizes how online education can create additional barriers to communication between learners and instructors (Vlachopoulos & Makri, 2019). This initiates our interest to explore the impact of online learning on students and to aim for improvement in terms of how the learning process is conducted and delivered.

Meanwhile, recommendations to improve engagement are also proposed in the research. For peer-to-peer interactions specifically, it has been suggested to provide discussion topics and encourage collaboration on a voluntary basis (Vlachopoulos & Makri, 2019). To increase facilitator-learner interaction, it has been suggested to provide frequent feedback, leading in voluntary discussions, and continuous encouragement (Vlachopoulos & Makri, 2019). As for learner-content interaction, this can be enhanced by providing clear instructions and having the learning process be as interactive as possible (Vlachopoulos & Makri, 2019). No certain association between engagement level and students' well-being is suggested, but we propose a high engagement level may predict better well-being of students as fulfilling relatedness needs may enhance one's well-being.

Academic Satisfaction

Academic satisfaction is a learning outcome with varying effects and implications depending on the research context. In Im & Kang's (2019) study on factors affecting student outcomes in online schooling, they define the satisfaction of learners to be one of the most vital and researched learning outcomes. The results of this study disclose that the most prominent determinant for academic achievement is learning satisfaction (Im & Kang, 2019). Moreover, learner's participation as well as test anxiety also greatly influence academic satisfaction (Im & Kang, 2019). Similarly, an article by Chen & Jang (2010) details how course satisfaction is frequently connected to motivation, leading them to study the connection between motivation and self-determination theory (SDT). Contrarily, results of the study suggest that SDT does not successfully predict course satisfaction as a learning outcome (Chen & Jang, 2010). Thus, the data suggests that academic satisfaction may prove better as a research factor rather than an effect, though the inconsistencies in research results warrants caution in generalizing the effects of academic satisfaction.

Perceived Stress

As numerous articles would demonstrate, perceived stress in this research context tends to be limited to an extraneous variable rather than a main research factor. Im & Kang's (2019) research observes test anxiety as a variable that directly affects academic outcomes and defines it as feelings of stress during testing situations. The research results show that academic satisfaction, participation, and achievement increase when test anxiety increases, likely identifying that more test anxiety is linked to increased motivation, which leads to greater achievement (Im & Kang, 2019). This increased motivation may be due to online testing environments being less stressful than in-person testing situations (Im & Kang, 2019). In Thoits' (1983) reformulation of the social isolation hypothesis, she elucidates the parameters of 'isolation' and hypothesizes that increased identity obtainment is contrarily associated with less mental distress. Comparably, Thoits (1983) uses psychological distress as a measure for her research and the data shows that increases in age, family income, and education are linked to decreases in psychological distress. Most notably, women are more stressed than men and psychological distress does not significantly increase with amassing identities to result in role strain, proving Thoits' reformulated social isolation hypothesis (Thoits, 1983).

Furthermore, in a study by Yang et al., (2020), they regard negative thoughts as a facet of the 2019-nCoV victimization experience—the harmful experience of living through the current pandemic—and research how positive mentality and resilience mediate the negative effects. This data exhibits a decrease in negative mental health effects when positive thinking and resilience intervene (Yang et al., 2020). Overall, the displayed data suggests that stress can lead to increased work ethic, where it significantly increases in women, negatively affects students in a pandemic, and decreases with optimism and resilience (Im & Kang, 2019; Thoits, 1983; Yang et al., 2020).

Effects of Online Learning
Feelings of Isolation
Feelings of isolation are more present than ever given the state of the world during a pandemic. This has been exacerbated as education has been transferred online, leaving students one of two choices: defer their education or continue it online. Vlachopoulos & Makri (2019) make note of how students often feel isolated when partaking in distance education (DE) in their study on education communication from a distance. Given that isolated feelings can almost be viewed on a spectrum due to its varying nature, it makes sense to think of the effects of isolated feelings to also be varied (Thoits, 1983). Thoits (1983) reformulates the social isolation hypothesis to observe the differences between isolated and integrated individuals' identity accumulation and makes sure to note that isolation can be both a symptom and cause of mental illness. The research results find that amassing identities are more common for isolated individuals since they are usually under 50 years old and will naturally gain more identities during their life course (Thoits, 1983).

Furthermore, isolated individuals will be more affected by identity change if they segregate their identities due to an inherent lack of network-embeddedness (Thoits, 1983). Similarly, McManus et al., (2017) details feelings of isolation when barriers to learning for those struggling mentally are evident because of unresolved accessibility issues, students felt further estranged from the institution (McManus et al., 2017). Overall, findings would suggest that feelings of isolation and isolated identities are significantly

impacted by a lack of interaction via online education and conditions can become increasingly worse.

Overall Learning Experience

Besides feelings of isolation, several other significant outcomes are observed among the research that may prove valuable for our study. First, Im & Kang (2019) found that increased participation leads to an increase in self-regulated learning, test anxiety, self-efficacy, satisfaction, and achievement – demonstrating that increased participation may be the key to success in academics. Moreover, Yeh et al., (2019) unveils that having a dedicated study space has numerous positive effects such as an increase in time management skills and persistence. Persistence is also positively related to nearly all e-learning behaviours that are conducive to academic success (Yeh et al., 2019). Healthy learning behaviours for online schooling are positively correlated with self-regulation methods, ultimately leading to increased grade predictions – and the reverse can be said for those with more mastery-avoidance goals (Yeh et al., 2019). Yeh et al.,'s (2019) research shows that attaining general positive studying behaviours can increase academic success.

Other valuable research on learning performance comes from Chang et al., (2013) where they conclude that increased internet self-efficacy has positive effects on motivation as well as learning outcomes; students that feel more technologically competent also feel increased confidence and find course content more relevant (Chang et al., 2013). Thus, the research by Chang et al., (2013) implicates that a measure of internet self-efficacy speaks to one's abilities as a student to an extent. The preceding research indicates that participation, persistence, supportive learning behaviours, and internet self-efficacy may be useful factors to use in our research on well-being and online learning.

Implications of Literature

As the discussed data would suggest, there are numerous limitations to the existing research surrounding the factors and effects of online-learning and wellness-based data. Most notably, Im & Kang (2019) are mindful of the fact that the number of studies researching the interconnected systems of learning outcomes and distinctive factors is very limited, thus, there is a gap waiting to be filled in this specific area of research. As a result of the lack of research for academic achievement in connection with wellness, we included academic achievement as a factor in the study at hand. Moreover, stress levels are rarely discussed as an effect or factor of the aforementioned studies, therefore we also included a measure for stress levels within our own research. Figlio et al., (2013) specifically observe that supplementary qualitative work and surveys on social intricacies in online learning environments can be valuable, thus we included this gap in our research too.

Lastly, McManus et al., (2017) valuably note how online learning research lacks measures of issues about disability, so we embraced this factor in our study. Other limitations in the research include the need for longitudinal research (Yeh et al., 2019), panel data (Fang et al., 2019), and other methods besides self-report (Im & Kang, 2019), but the nature of our study does not allow for us to fully explore these factors directly. Therefore, our study has included measures for academic achievement, stress levels,

social complexities, and disability-related issues because these factors have limited supporting data in studies about well-being and online learning.

Theory

In this section, the theoretical frameworks of symbolic interactionism and self-determination theory will be outlined, providing definitions and context regarding why they were chosen and how they guided our research. Further, the theoretical perspectives of identity theory, derived from symbolic interactionism and basic psychological needs theory, derived from self-determination theory, will also be outlined and discussed within the context of our research.

Symbolic Interactionism

Symbolic interactionism (SI) is a broad perspective that is ever-present in sociology and social psychology. SI was founded by George Herbert Mead and Charles H. Cooley and is said to be an overarching framework that lays the groundwork for more specific theories (Delamater et al., 2014). SI came from the Chicago School, with key theoreticians like Mead, Cooley and Dewey working to elaborate on SI as a theoretical perspective (Meltzer et al., 2015). Symbolic interactionism holds the perspective that the human experience and social order are the products of negotiated meanings produced through social interaction (Delamater et al., 2014). In other words, humans utilize a complex interpretive process during interactions to shape the meanings of the things under discussion (Denzin, 2004). These meanings are influenced not only by the other people within the interaction, but also by the current cultural world (Denzin, 2004). Meanings can also be negotiated by the individual as they possess the agency to create their own subjective experience through interaction, making agency another central tenet of SI and the meaning-making processes (Denzin, 2004).

Herbert George Blumer was another early symbolic interactionist who coined the three premises of SI (Blumer, 1969). First, humans react to things according to their associated meanings, second, social interaction facilitates the meaning-making process, and lastly, interpretation of interactions helps shape and change meanings (Blumer, 1969). These three premises work to unravel the inner workings that social interaction and meaning-making processes entail for individuals. Symbolic interactionism highlights the importance of these meaning-making processes, but also the malleability of them, in that meanings can easily change over time through new social interactions (Blumer, 1969).

Charles H. Cooley began the tradition of SI with early ideas of the self emerging out of experiences in primary groups and the influence of the media, specifically, the focus was on the family (Cooley, 1998). Cooley also focused on role taking, where the self is a social object whose meaning is negotiated through interactions (Cooley, 1998). The meaning of the self is understood through role-taking, where the individual imagines themself in the other person's role to understand how the other person sees them and therefore, how they should see and identify themself (Cooley, 1998). Alternatively, Mead focused on meaning-making, the reciprocal process of interaction which joins the self and society together as well as taking the position of the other within a social situation to see how other people view the individual (Mead, 1934).

As previously mentioned, there are many different versions of SI used in different contexts and across multiple disciplines as well as a multitude of theories built off SI, one

of which that is relevant to our research is identity theory (Denzin, 2004). The primary theorists of identity theory are Sheldon Stryker and Peter J. Burke. These individuals came from different strands of this theory; however, they worked together to identify the commonalities between the two strands to refine and expand the scope of identity theory (Stryker & Burke, 2000). Stryker primarily focused on how the social structure impacts the self and in turn how the self impacts social behaviour, while Burke primarily focused on the impact that internal self-processes have on social behaviour (Stryker & Burke, 2000). Both conceptions of identity theory easily go hand in hand, therefore for our purposes we will be focusing on identity theory as a whole rather than looking at one specific strand.

Identity theory holds the importance of self-meanings in guiding an individual's behaviour as a main premise (Stryker & Burke, 2000). This theory builds off role theory by adding three additional types of identities alongside role identities, including person, social and group identities (Stryker & Burke, 2000). Identity theory states that individuals often occupy more than one identity at a time and acknowledges that salient identities are more likely to be enacted at any given time as they are central to the individual's identity (Stryker & Burke, 2000). The extent of an identity's salience depends on how much the individual has invested in this particular identity, for example, the quantity and quality of social ties that have been built through this identity is a factor in this (Stryker & Burke, 2000).

To summarize, symbolic interactionism is a theory that focuses on social interactions and the meanings that arise out of these interactions, however the individual is understood as having the ability to create their own subjective reality as well. Moreover, identity theory is derivative of SI and looks at how individuals negotiate their identities, keeping in mind identity salience and the possibility for multiple identities to be enacted at any given time. The ideas of meaning-making, role taking, and identity are relevant to our research as our perceptions of our own identities and roles may change as our means of education has. For example, with school being online, our forms of communication and therefore social interactions have gone from mostly in-person to mostly on-screen, which may have implications for the ways in which meanings are created, exchanged, and interpreted. Further, the content of these meanings can have consequences in how we identify ourselves and interpret our roles.

Self-Determination Theory

Self-determination theory (SDT) is a theory of human motivation which holds the perspective that humans seek out challenges and new experiences to further develop and master; it also considers the impact of different social environments and the implications they may have on motivation (Deci & Ryan, 2008b). Early works of this theory date back to the 1970s, with the main theorists being Edward L. Deci and Richard M. Ryan. These two produced this theory and have since continued to give rise to new adaptations and further understandings of SDT (Deci & Ryan, 2008b). Within the past two decades, the amount of research utilizing SDT has increased dramatically as this theory has been used in a multitude of applied research settings (Deci & Ryan, 2008b). In this section, a brief overview of Deci & Ryan's conception of SDT will be provided, followed by a further look into BPNT which was born out of SDT.

Self-determination theory is characterized by intrinsic and extrinsic motivation (Deci & Ryan, 2008a). Intrinsic motivation is when the individual inherently finds their behaviour

satisfying and/or interesting, therefore, the behaviour is engaged in due to positive feelings that arise from it (Deci & Ryan, 2008a). On the other hand, extrinsic motivation is when the individual engages in a behaviour due to it resulting in a separate consequence, for example, a tangible reward or threat of punishment (Deci & Ryan, 2008a). These tenets of intrinsic and extrinsic motivation are not additive, in fact, studies have found that when extrinsic factors were used to motivate behaviour that was already intrinsically motivated, the intrinsic motivation decreases for this behaviour (Deci & Ryan, 2008a).

Moreover, SDT can further explain extrinsic motivation by identifying the three ways in which the individual internalizes the extrinsic motivation, these are differentiated by their level of autonomy (Deci & Ryan, 2008a). First, introjection is the weakest type of internalization, involving the individual acknowledging the external contingency, but not accepting it as their own (Deci & Ryan, 2008a). This type of internalization involves minimal levels of autonomy, therefore people who engage in this type of internalization tend to not feel a sense of ownership over the behaviour they engage in, for this reason the individual feels controlled by the behaviour (Deci & Ryan, 2008a).

The next form of internalization is identification, which involves the individual both acknowledging and accepting the importance of the behaviour, therefore accepting it as their own (Deci & Ryan, 2008a). This type of internalization involves a greater sense of autonomy; therefore, the individual does not feel controlled by the behaviour they are engaged in (Deci & Ryan, 2008a). Integration is the last form of internalization in which the individual successfully integrates the behaviour with other aspects of their self, and the behaviour is assimilated into their sense of who they are (Deci & Ryan, 2008a). This type of internalization is the fullest form of internalization, meaning there are high levels of autonomy involved and the previously extrinsically motivated behaviours become self-determined (Deci & Ryan, 2008a).

Furthermore, SDT is also characterized by the distinction between autonomous and controlled motivation which reflect the individual's intention to act (Deci & Ryan, 2008a). Controlled motivation refers to extrinsic motivation and internalized extrinsic motivation in the form of introjection, the motivation for these behaviours is controlled by external factors and therefore are not autonomous (Deci & Ryan, 2008a). Alternatively, autonomous motivation refers to intrinsically motivated behaviours and internalized extrinsic motivation in the form of identification and integration (Deci & Ryan, 2008a). The motivation for these behaviours is autonomously controlled, meaning it is at least partially controlled by internal factors, such as the satisfaction of the need for autonomy (Deci & Ryan, 2008a). Additionally, there is a third type of motivation which arises when there is a lack of intention to act, called amotivation (Deci & Ryan, 2008a).

A significant difference between autonomous and controlled motivation is their outcomes. Autonomous motivation has been associated with many positive outcomes such as enhanced performance and greater psychological well-being, whereas controlled motivation is not associated with these results (Deci & Ryan, 2008a). This raises the question: how do we facilitate autonomous motivation as opposed to controlled motivation? The best way to promote autonomous motivation would be to facilitate the internalization of extrinsic motivation via identification and integration, with integration being the primary goal (Deci & Ryan, 2008a). For this to be possible, the social conditions

that the individual is under must meet their basic psychological needs as this tends to facilitate identification and integration (Deci & Ryan, 2008a).

Basic psychological needs theory (BPNT) is one of the six sub-theories of SDT founded by Deci & Ryan (2008a). BPNT helps us to understand the impact that social environments have on the type of motivation the individual possesses for any given behaviour (Deci & Ryan, 2008b). BPNT states that for an individual to achieve effective internalization of extrinsic motivation, there are three basic psychological needs which need to be met, these needs include autonomy, competence, and relatedness (Van den Broeck et al., 2016). The need for autonomy refers to the individual's "need to act with a sense of ownership of their behaviour and feel psychologically free" (Van den Broeck et al., 2016, p. 1198). The need for autonomy is the most contested of the basic psychological needs as cultural relativists argue that the need for autonomy is a Western ideal stemming from individualism (Deci & Ryan, 2008a).

On the contrary, SDT would make the counterargument that culture does influence people in important ways, but all humans have essential needs as individuals (Deci & Ryan, 2008a). This argument is solidified by research which found that the satisfaction of the need for autonomy was important in various cultures, though this need may be satisfied differently from one culture to another (Deci & Ryan, 2008a). Moreover, the need for competence refers to the individual's "need to feel a sense of mastery over the environment and to develop new skills" (Van den Broeck et al., 2016, p. 1198), while the need for relatedness refers to the individual's "need to feel connected to at least some others, that is, to love and care for others and to be loved and cared for by others" (Van den Broeck et al., 2016, p. 1199). The need for relatedness is seen as less essential for some outcomes; for example, a child may be satisfied by playing with a toy by themselves even though they are not a member of a group in this scenario or have close relations at play (Van den Broeck et al., 2016).

To summarize, SDT is a theory of motivation which identifies two main types of motivation: autonomous and controlled, the social and interpersonal environments the individual is exposed to helps to determine which type of motivation will be initiated for the behaviour at hand. Autonomous motivation has many prevalent positive outcomes, making it the preferred type of motivation, but to facilitate autonomous motivation more freely the basic psychological needs of autonomy, competence and relatedness must be met in the current social environment. The ideas of motivation in relation to the environment are relevant in our research as the environments in which students are used to learning and studying in have been forcefully changed due to the COVID-19 pandemic. As per SDT, these environmental changes can have consequences for students' motivation to engage in online schoolwork. Moreover, the change in environment, but also the change in content delivery may have implications on students' ability to have their basic psychological needs met.

SI & SDT in the Present Study

The principles of SI and SDT are useful when looking at the impacts that the changes of online learning during the COVID-19 pandemic have had on students' well-being. SI and SDT served as the theoretical frameworks for the study at hand, more specifically with use of identity theory and basic psychological needs theory. Both SI and SDT focus on the individual and the impacts their interactions and social environment have on their

internal processes, whether it be role taking, meaning-making, or motivation. A fundamental commonality between SI and SDT is their view of individuals as goal seeking and motivated to work towards these goals (Delamater et al., 2014). For example, BPNT and SI work concurrently since the individual often gets satisfaction of their needs for autonomy, competence, and relatedness from social interaction (Chen & Jang, 2010). This next section will explore how these theories will offer deeper insight into the impacts that the switch to online education has had on students' well-being.

As mentioned previously, SI has been identified as a useful theoretical approach when looking at online learning and the interaction and communication involved in it (Vlachopoulos & Makri, 2019). We know the concept of meaning-making is central to SI, and currently, meanings are constantly being negotiated during the ever-changing and uncertain times of the COVID-19 pandemic. Symbolic interactionism understands these meanings as arising from interactions and our interactions themselves have had to change greatly in coping with the pandemic. During this time, many things have shifted to online format, for example, quality time with family and friends has often been replaced with facetime calls, and in-person classes have been replaced with pre-recorded or live zoom lectures. There are many factors in the current situation of the COVID-19 pandemic that may be altering the meanings many have held for concepts such as "school life" and "home life" and what it means to be "in class". Also, our meaning-making processes themselves are being altered with the present changes to interactions. For these reasons, SI has been determined to be a useful theoretical lens for the purpose of this study.

Additionally, identity theory offers a useful perspective to our research topic. Our understanding of our roles and identity salience is changing during these times as well. Individuals must learn to make distinctions between their roles now that many of these roles are being performed in the same physical space—home. This has important implications for identity salience as salient identities are more likely to be enacted at any time, this means that the given situation has the potential for these salient identities to always be enacted or to have salient identities competing at all times.

For example, if an individual's most salient identities are "mother" and "student" prior to the pandemic, it was most likely clear when each of these identities was to be enacted based on a physical location—at school or study spaces versus at home. Now, both identities of "student" and "mother" are most likely active within the same space. If these two identities are each enacted within the same location, what will happen? The individual will have to negotiate their identities, draw clear lines between them and may potentially have to identify with one identity more than the other. However, we know that more than one identity can be enacted at any given time, but now that these identities are all performed in the same physical space, will the lines between these identities become blurred? Will these identities all be enacted at the same time all the time? These are the types of questions identity theory poses in the context of this study. Identity theory combined with SI and SDT will help us acquire a deeper understanding of these questions and we hope with our research we are able to answer them.

Moreover, when looking at the changes to online learning and the impacts it has had on the well-being of students at McMaster, the topic of motivation is a prevalent issue. Are students still achieving autonomous motivation or has this switch resulted in an increase in controlled motivation, with the external factors being due dates, the grades you receive, or the threat of punishment for late assignments? We know that the type of

motivation is mediated by the satisfaction of basic psychological needs, therefore a question arises: are students still able to meet these needs or has stress, uncertainty, and social isolation acted as a barrier to this satisfaction? Specifically, threats to the fulfilment of the needs for competence and relatedness are of concern. With the difficulties that online learning brings, a sense of mastery over the environment may be more difficult to achieve, especially since the current "school" environment is quite precarious.

Additionally, skills may be more difficult to develop during these times when much of the learning is now up to the individual to complete and understand, specifically in lectures that are pre-recorded where there are minimal opportunities for questions or comments. Particularly, the need for relatedness is being threatened significantly during these times as interactions have become minimal and mainly occur online. It is evident that the need to feel connected to others could easily not be met during the current social climate of the COVID-19 pandemic. To elaborate, students are no longer interacting with peers during lectures and tutorials, friends from school may be living in different cities and social interaction is scarce.

Self-determination theory has been previously used in studies looking at online learning to identify and address issues of motivation in these online learning settings, therefore it will be useful to include in our research (Chen & Jang, 2010). In addition, using BPNT alongside SDT will be helpful as it generates changes for enhanced motivation (Chen & Jang, 2010). In fact, a study conducted by Chen & Jang (2010) found that the satisfaction of basic psychological needs was the strongest positive predictor of learning outcomes in online learning settings. This has helped lead to recommendations to increase autonomous motivation in these online classroom settings, such as providing meaningful rationales as to why the task at hand is relevant (Chen & Jang, 2010).

In the context of our research, symbolic interactionism and self-determination theory work concurrently to offer a deeper understanding of the effects that the switch to online education has had on students' well-being. More specifically, identity theory and basic psychological needs theory will be used to examine these impacts. These theories examine the individual's internal processes such as meaning-making, role taking, types of motivation and satisfaction of basic psychological needs. Therefore, all these theoretical perspectives put together will offer us a comprehensive understanding of the impacts on students' well-being arising from the switch to online learning during the COVID-19 pandemic.

Methodology

This section will outline the methodological approach we employed in our research and will also clearly outline the steps we took in the research process. In this research, we followed a quantitative methodological approach with components of qualitative methodology when employing an online anonymous survey through the McMaster Research Ethics Board approved website LimeSurvey. This research was approved by the McMaster Research Ethics Board (MREB#: 0327).

Rationale

The purpose of this study was to determine how the changes of online learning during the COVID-19 pandemic have impacted students' well-being at McMaster University. In

March of 2020, McMaster University abruptly announced that in-person classes would be cancelled, and the rest of the winter term would continue via online learning. Students enrolled in classes at this time, as well as the entire university community had no other choice than to adapt and adjust to a new way of learning. This new form of content delivery was carried into the spring and summer terms as COVID-19 continued to pose a threat to society. With the rapid increase of COVID-19 cases and deaths, it was assumed the Fall 2020 term would be conducted online with the hope that society would be back to normal in time for students and faculty to return to in person classes for the Winter 2021 term. However, it was not until the Fall 2020 term began where it was announced that the Winter 2021 term would also be online, making it the first time in history where universities had no choice but to conduct the full school year completely online. As students who were impacted by these changes to university life, this is what inspired us to investigate the effects of online learning on students.

Participants

In our research, we were looking to study participants who met the following criteria: students at McMaster University who are currently enrolled in an undergraduate program in their second year of university or above, therefore 18+ years of age. We chose not to include first year students as we wanted our participants to have the ability to reflect on and compare their current academic experience to their on-campus experience. Participants were given the opportunity to complete an online, anonymous survey on a voluntary basis. We were hoping for an ideal sample size of 75 participants, but ended with a sample size of 61 participants, data collection stopped on February 12th, 2021.

Recruitment

All six researchers that participated in recruitment had peer-to-peer relationships with the participants. We also have one group member who had familial relationships with students at the university, however we planned to combat these conflicts of interest by employing an anonymous survey and having that individual avoid any contact that could be perceived to be a conflict of interest. As previously mentioned, participants were recruited on a voluntary basis, this was done through student-based organizations and clubs at McMaster University. Specifically, we recruited from the following clubs and organizations: McMaster Italian Cultural Club, McMaster Theatre & Film Society, and the sorority Nun Omega Zeta by asking for permission to send out an email or social media post to those who belong to these organizations. Additionally, participants were recruited through McMaster associated social media outlets via Facebook and Instagram. We gained permission to post the link to our survey on McMaster affiliated Facebook groups and Instagram pages such as McMaster Social Psychology Society (Facebook and Facebook group chat), McMaster Class of 2021 (Facebook), McMaster Class of 2022 (Facebook), and McMaster Social Sciences Class of 2023 (Facebook).

Participants would have found the email/recruitment script as well as a link to the survey as posted within the social media post. The link took participants to a webpage where they would have found the letter of information as well as a button to confirm their consent to participate in the study. Once they had read the terms and provided implied consent via a checkbox, they would have been able to click onto the next page where the

survey would have then taken place. Clicking the checkbox indicated that participants have provided their informed consent to participate in the research.

Survey Information

Our online, anonymous survey included 30 questions, including one consent question, two qualitative questions and 27 quantitative questions, most of which made use of a 5-point Likert scale. This survey should have taken participants approximately 10 minutes to complete and involved no risks greater than those in everyday life. Additionally, the participants had the opportunity to disengage from the survey at any time prior to completion and could choose not to answer any questions they may feel uncomfortable with. However, once the survey was submitted, participants were no longer able to remove their participation as we were unable to retract the data since there is no way to trace the answers belonging to the participant who wishes to withdraw. Moreover, once the data collection period closed, we used Microsoft Excel to analyze the data collected through Lime Survey. We also used descriptive and thematic coding for the qualitative questions.

Quantitative Data Analysis

We decided to use Microsoft Excel to analyze our quantitative data due to the large number of video tutorials for conducting data analysis on this platform that are widely available on the internet. We did not have access to SPSS as this platform is normally on the desktop computers at McMaster University and we were learning completely online for the duration of this course. We ran into issues exporting our data from LimeSurvey into PSPP during the early stage of data analysis, so we opted for Excel, which appeared to be the most plausible option.

Firstly, we ran descriptive statistics on all our sociodemographic variables, which included four questions regarding year of study, age, gender, and faculty. Program was originally included as a quantitative sociodemographic variable as well, but due to the open-ended nature of this question and the wide range of responses we received, we decided to analyze this data qualitatively. From there we created frequency tables and histograms for all 27 quantitative questions, including the four sociodemographic questions.

Once we created all the frequency tables we went through and selected the questions with the most apparent and relevant results as measures of each area of well-being to compare in cross tabulations. We identified one variable for physical health, one for interpersonal relationships, one for cognitive wellness, three for academics, one for motivation, one for stress, one for identity segregation and one for engagement level. We also decided to include two of our sociodemographic variables in the cross tabulations, gender, and faculty, since they were the most relevant and we thought they had the most potential to impact our results.

We conducted 46 cross tabulations in total across our variables. From here chi-square statistics were run for each cross tabulation to identify whether the relationship between the variables was statistically significant or not. This was calculated in excel with the formula P-value'=chi test (observed values, expected values)'. These chi-squared tests identified nine statistically significant relationships, one of which we discounted due to our small sample of male participants (8), leaving us with eight statistically significant

relationships (see Table 1). Subsequently, correlation coefficients were calculated based on these statistically significant relationships, this was calculated in excel with the formula r'=CORREL(Array 1, Array 2)'. Out of the nine correlation coefficients calculated, four of them appeared to be positive while the other five were negative. Only one of them was considered a moderate-to-strong correlation, one was moderate, while the other ones were either weak or weak-to-moderate.

Qualitative Data Analysis

To conduct our data analysis for the qualitative question "do you have any recommendations for improvement in the delivery of online/virtual courses (assessment strategies, course load: readings, number of assignments, number of exams, delivery of content)?" we began with descriptive coding. This process included gathering all the qualitative responses, reading through each response and taking notes on the responses that stood out to us, especially those that were mentioned repeatedly. We proceeded to read through all responses again, recording the number of times certain words or content were mentioned. From here we were able to determine which themes were significant and began to code the data into groups or themes. After noting significant themes, we were able to reduce the data, eliminating anything that was redundant or insignificant. After eliminating insignificant data and determining the more common themes, we read through the data another time, recording the frequency each theme was mentioned so we were accurately able to determine the most common themes. After descriptive analysis was complete, we moved onto thematic analysis which included identifying patterns into four themes which were the most common (see Figure 11). In the analysis of these themes, the literature review was consulted in order to deduce the implications on this area of research. Our interpretations of student answers were cross analyzed with literature findings and from there we connected the themes back to the research question.

Due to the open-ended nature of the program question and the wide range of responses we received, we decided to analyze this data qualitatively. The same process was followed to conduct the qualitative data analysis for this question. Due to the wide range of programs within the six identified faculties, no significant themes were found within the data.

Timeline for Research
Recruitment
  Start: November 18th, 2020
  End: February 12th, 2021
Data Collection
  Start: November 23rd, 2021
  End: February 12th, 2021
Data Analysis
  Start: February 13th, 2021
  End: March 12th, 2021

Possible Challenges & Risk Management

Psychological risks and social risks must be addressed when identifying the ethical issues that may arise in the research. Psychological risks while participating in the survey

may have included questions triggering feelings of embarrassment, worry or upset which may ultimately have caused additional stress for the participants. We combated this issue through the disclosure and explanation of intent of the research that was included in the letter of information which participants read before taking the survey. The intent of the research was to understand the lived experience of students who had no choice but to conduct most, if not all learning in an online environment to determine what effects (positive or negative) this has had on students. We hope to present the effects of the research to McMaster University, as well as professors at McMaster to show them how it has affected students while providing suggestions for improvements. Furthermore, social risks may have included privacy and confidentiality concerns. We addressed these by ensuring the participants' privacy and confidentiality in the letter of information, as well as a checkpoint that asked the participants for their informed consent before moving forward with participation in the survey.

Additionally, management of this risk was carried out by employing an anonymous survey. Participants had complete anonymity as they were able to take the survey at any time and any place with internet access. Additionally, participants could skip answering any question they did not want to answer. They were also able to choose not to submit the survey at any point before final submission. Moreover, participants were given additional information regarding access to McMaster University's wellness resources. On the final submit page, participants had access to a link which guided them to McMasters' Student Wellness Centre where they were able to access additional psychological support if they deemed it necessary.

Results
Sociodemographics
To begin, we had 94 survey responses of which 33 were not included in our results as they did not meet the completeness requirement of 75%, including the required response of yes to the consent question. This left us with a sample size of sixty-one (n=61) participants who all met the completeness criteria and answered yes to the consent question. However, the generalizability of our results is questionable due to the lack of sociodemographic diversity of our participants. In general, we believe our results best represent the viewpoints and experiences of twenty-one-year-old women in their fourth year of study in an undergraduate program at McMaster University in either the Faculty of Science, Social Sciences, Health Sciences, or the DeGroote School of Business.

Gender
Firstly, we left the question regarding gender as a blank for our participants to fill in, so as to not discriminate against any gender identities and to get the most accurate measure possible. The vast majority of our sample identified as female with fifty-one (51) respondents answering our question regarding their gender identity with either '*female*' '*f*' or '*woman*'. Eight (8) of our participants identified as male, and one (1) participant did not provide a response to this question. One (1) of our participants responded to this question with '*heterosexual*', most likely because they misunderstood gender identity for sexual orientation, we coded this response as *N/A*. In total there were two *N/A* responses for the question of gender identity. Overall, 83.6% of our sample identified as *female*, 13.1% identified as *male*, and 3.3% of participants did not provide a response to gender identity

(*N/A*). This shows how our data is skewed significantly to represent the viewpoints and experiences of women.

Age

Secondly, we also left the question regarding age as a blank for our participants to fill in, mainly due to the potential wide range of ages of our participants. 11.5% of our sample was *nineteen*, 11.5% were *twenty*, 60.7% were *twenty-one*, 13.1% were *twenty-two*, 1.6% were *twenty-four*, and 1.6% were *thirty-three*. This shows that though the age range of our participants is quite vast, ranging from *nineteen* to *thirty-three*, most participants were *twenty-one*. With significant numbers being *nineteen*, *twenty*, and *twenty-two* as well. Our sample then represents the most typical age range of post-secondary students, representing mainly the viewpoints and experiences of twenty-one-year-olds.

Year of Study

Thirdly, due to the requirements for participation in our study being undergraduate students enrolled at McMaster University in second year or above, we provided four options in our question inquiring about the participant's year of study. Overall, 14.8% of our sample was in *second year*, 9.8% were in *third year*, 67.2% were in *fourth year*, and 8.2% were in *fifth year or above*. This shows that our data is skewed significantly to represent the viewpoints and experiences of fourth year students, as to be expected due to the large number of participants who were twenty-one years old.

Faculty

Lastly, we included a question inquiring about the faculty of our participants. This question provided the respondent with six answers encompassing all the faculties at McMaster University, with the option to 'select all that apply' to allow for the inclusion of people who are double majoring and to provide the most accurate results as possible. It is also important to note that we included an open-ended question about our participants' program, the results of which were very diverse and covered a wide range of programs within the six identified faculties.

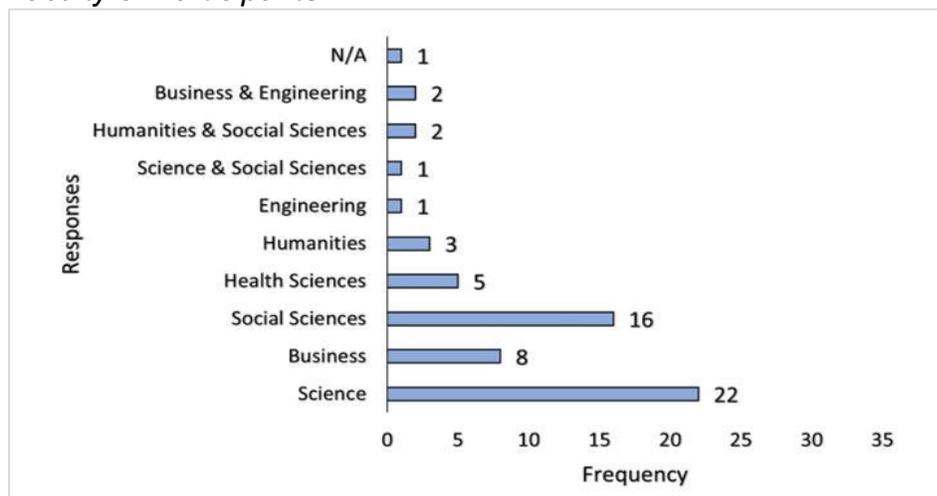**Figure 1**
Faculty of Participants

Figure 1 shows the distribution of our sample across the faculties. Overall, 36.0% of our sample was in the *Faculty of Science*, 13.1% were in the *DeGroote School of Business*, 26.2% were in the *Faculty of Social Sciences*, 8.2% were in the *Faculty of Health Sciences*, and 4.9% were in the *Faculty of Humanities*. Additionally, 1.6% of our sample was in the *Faculty of Engineering*, 1.6% were in the *Faculty of Science and the Faculty of Social Sciences*, 3.3% were in the *Faculty of Humanities and the Faculty of Social Sciences*, and 3.3% were in the *DeGroote School of Business and the Faculty of Engineering*. 1.6% of our sample also fell under the category of *N/A* as they did not provide a response to this question.

This shows that our sample was diverse in terms of faculty, with most of our participants being in science, social sciences, or business. We had the smallest sample of students from the *Faculty of Humanities* and *Faculty of Engineering*. For this reason, our results may not be representative of the viewpoints and experiences of students in these two faculties. Finally, we had a smaller sample of students from the *Faculty of Health Sciences*, but due to the overall smaller size of this faculty in comparison to the others, we believe that our results may still be generalizable to students in the *Faculty of Health Sciences* as well.

Cognitive Wellness

To begin, cognitive wellness was one of the four identified areas of well-being we attempted to measure. Overall, our results showed that online learning had a negative impact on our participants' cognitive wellness.

The question "My mental wellness has improved during online classes in comparison to in-person classes" was intended to measure the overall impact that online learning has had on the cognitive well-being of our sample. 50.8% of participants *strongly disagree*, 29.5% *disagree*, 8.2% were *neutral*, 8.2% *agree*, and 3.3% *strongly agree*. Due to some issues with the wording of this question, we cannot take away from this question alone that cognitive wellness has been negatively impacted by online learning. However, we can conclude that cognitive wellness has not improved during online learning for most of our participants.

Figure 2
Question: I feel less mentally drained from online classes in comparison to in-person classes
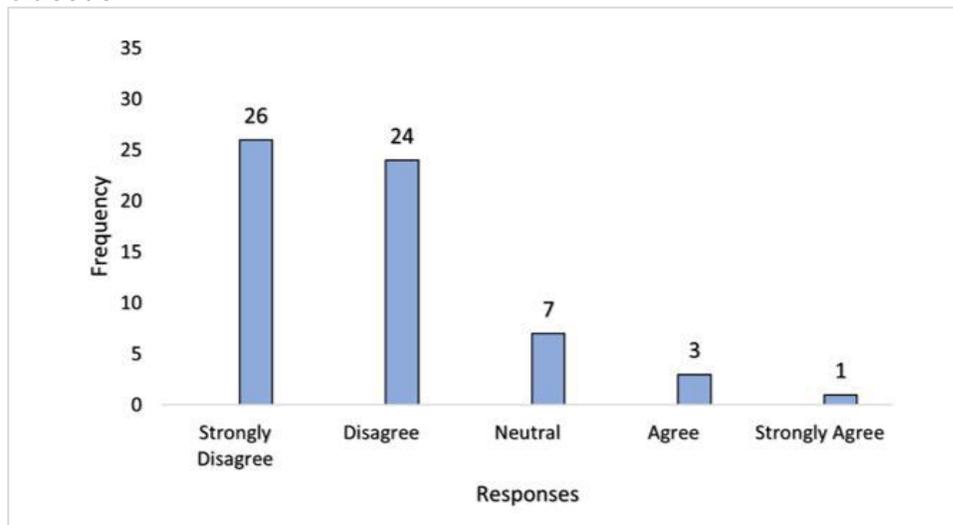
The question in Figure 2 was intended to measure if our participants were feeling less mentally drained since beginning online classes. As shown in this figure, 42.6% of participants *strongly disagree*, 39.3% *disagree*, 11.5% were *neutral*, 4.9% *agree*, and 1.6% *strongly agree*. We can take away that the majority of our participants feel more mentally drained since beginning online classes, when compared to in-person classes, indicating increased mental fatigue.

From this, we can conclude that online classes have not improved the cognitive wellness of our participants, and in fact online classes have led to our sample experiencing increased mental fatigue. These findings paired along with our findings surrounding stress allow us to conclude that online learning has negatively impacted the cognitive wellness of our participants.
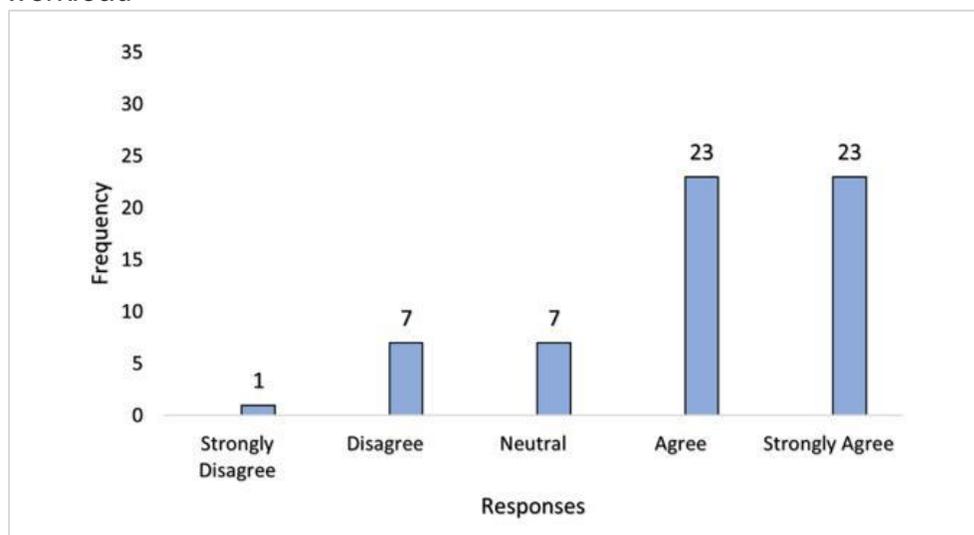
Stress

We included a measure for stress, which we initially categorized under the area of cognitive wellness, since we believe that stress most directly affects the individual's cognitive well-being as opposed to our other three areas of well-being. With that being said, stress inevitably affects the individual's physical health as well as their academics, but for the purposes of our research we intended to look at stress and its role in our participants' cognitive well-being.

The question about whether online classes are more stressful than in-person classes with regard to workload was intended to measure if online classes have increased levels of stress in our participants, in comparison to in-person classes. As shown in the figure, 1.6% of participants *strongly disagree*, 11.5% *disagree*, 11.5% were *neutral*, 37.7% *agree*, and 37.7% *strongly agree*. This shows that most participants felt that online classes were more stressful than in-person classes in terms of workload. From this we can assume the negative impacts this increased stress will have on our participants'

Figure 3
Question: Online classes are more stressful than in-person classes with regard to workload

cognitive wellness given what we know about the detrimental effects of stress on mental health.

Physical Well-being

   Physical well-being was one of our main areas of well-being we were attempting to measure. The questions under this area of well-being aimed to measure overall physical health, energy levels, and specific physical strains caused by online learning, including eye strain, neck/back strain, and headaches. Overall, our results showed that online learning had a general negative effect on our participants' physical well-being.

   In Figure 4, the responses of *strongly disagree* and *disagree* have been collapsed into *disagreeance* and the responses of *agree* and *strongly agree* have been collapsed into *agreeance.* We did this because no respondents (0) selected the strongly disagree option, so by collapsing the categories we can more accurately see the distribution of our results. This question was intended to measure the overall physical health of our participants during online school in comparison to during in-person school. As shown in the figure, 21.3% of participants are in *disagreeance*, 21.3% are *neutral*, 55.7% are in *agreeance*, and 1.6% did not provide a response to this question (*N/A*).

   It is important to note with these results that a large part of our sample was *neutral* on this question, the same number of participants were neutral that were in *disagreeance*. This could potentially be due to the question being worded in a way that is over-simplistic and does not consider severity of sickness. Participants may also not have felt confident that they were answering correctly, since they had to compare the amount of days sick from the previous year, and this is often hard to recall. Overall, these results show that most of our participants have been sick less during online school, potentially showing an improvement in physical health among our sample. However, the large number of *neutral* responses should be noted, along with the shortcomings of the question wording, and the subjectivity and potential lack of reliability that comes with asking participants to recall how often they were sick last year.

Figure 4
Question: I've been sick less during online school then when attending in-person classes
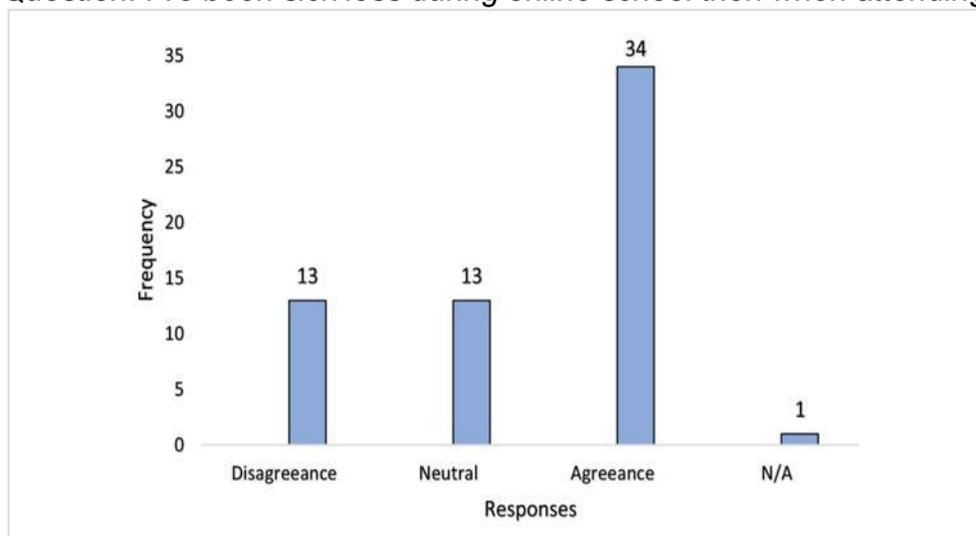
Additionally, the question "my energy levels have lessened since beginning online classes compared to when I've been enrolled in in-person classes" was intended to measure our participants' energy levels since beginning online classes as a variable of physical well-being. 1.6% of participants *strongly disagree*, 11.5% *disagree*, 8.2% were *neutral*, 37.7% *agree*, and 41.0% *strongly agree*. From this, we can conclude that most participants experienced decreased energy levels since beginning online classes, showing the negative impact of online learning on physical well-being.

Firstly, the question "I have experienced eye strain due to online classes" was evidently intended to measure if our participants have experienced eye strain due to online classes (see Figure 5). 0.0% of participants *strongly disagree*, 4.9% *disagree*, 9.8% were *neutral*, 47.5% *agree*, and 37.7% *strongly agree*. This shows that most of our participants experienced eye strain due to online classes, demonstrating a negative impact of online learning on physical well-being.

Secondly, the question "I have experienced neck/back strain due to online classes" was evidently intended to measure if our participants have experienced neck/back strain due to online classes (see Figure 5). 0.0% of participants *strongly disagree*, 1.6% *disagree*, 1.6% were *neutral*, 47.5% *agree*, and 49.2% *strongly agree*. This shows that there was consensus among participants that they have experienced neck and back strain due to online classes since all our participants, except for two, agreed with this question. This allows us to conclude that neck and back strain is an apparent negative impact that online learning had on the physical well-being of our sample.

Thirdly, the question "I have experienced headaches due to online classes" was evidently intended to measure if our participants have experienced headaches due to

Figure 5
Questions: I have experienced eye strain due to online classes, I have experienced neck/back strain due to online classes, and I have experienced headaches due to online classes
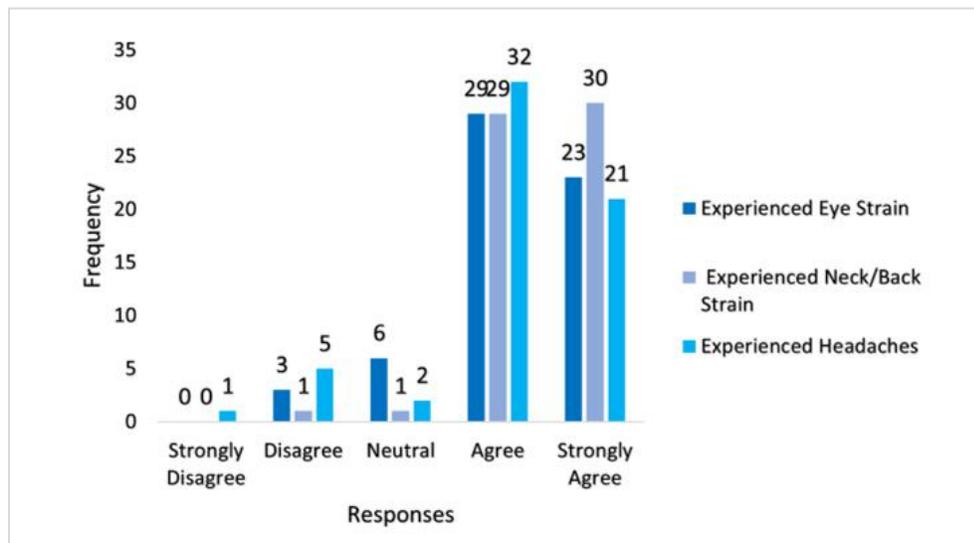
Note. We also included specific measures for the physical strains of online learning in the form of eye strain, neck/back strain, and headaches.

online classes (see Figure 5). 1.6% of participants *strongly disagree*, 8.2% *disagree*, 3.3% were *neutral*, 52.5% *agree*, and 34.4% *strongly agree*. This shows that most of our participants experienced headaches due to online classes, allowing us to conclude that headaches are a negative impact that online schooling had on our participants.

Overall, our results demonstrate that online learning has had a negative impact on our participants' physical well-being. Despite the majority reporting being sick less since starting online school, the overwhelming consensus surrounding the increased physical strains demonstrates an overall negative impact of online learning on physical well-being. Specifically, online classes have resulted in increased physical strain on our participants, with the majority reporting experiencing eye strain, neck/back strain, and headaches. Our participants have also experienced decreased energy levels since starting online classes.

Interpersonal Relationships
In the category of interpersonal relationships, we investigated several scopes which included students' willingness to seek assistance from peers and/or faculty members, students' perceptions of connectedness with family and friends, the frequency of communication with family and friends, and time spent with family. Dependent on the focal point of interpersonal relationships, distinct opinions were exhibited. One of the questions explored participants' opinions on the statement "I often reach out to other students and/or faculty for assistance". 11.5% of participants *strongly disagree*, 24.6% *disagree*, 18.0% were *neutral*, 36.1% *agree*, and 9.8% *strongly agree*. As a result, we can conclude that there are similar numbers of students who are somewhat frequently seeking assistance from students and/or faculty members and somewhat rarely seeking assistance from students and/or faculty members, with a slight emphasis on students who seek assistance frequently.

Most of our participants reported a negative response to the question about whether they felt more connected to their family and friends during online learning versus in-person learning. 42.6% *strongly disagree*, 47.5% *disagree*, 3.3% were *neutral*, 4.9% *agree*, and 1.6% *strongly agree*. This shows that most of our participants felt less connected to friends/family during online school.

Figure 6
Question: I feel more connected to my friends/family during online school compared to in-person school
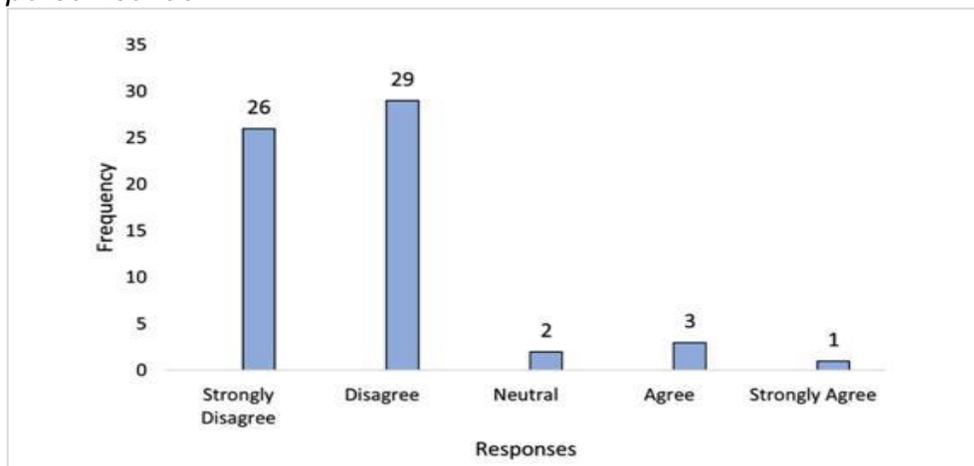
In terms of the question investigating opinions on the following statement 'I have been communicating less with my peers/friends during the online school year than during in-person classes', 3.3% *strongly disagree*, 3.3% *disagree*, 1.6% were *neutral*, 41% *agree*, and 50.8% *strongly agree*. Half of our participants reported communicating less with families and friends during online learning, which further explains the previous finding, a decrease in perceptions of connectedness with families and friends. Lastly, a question examining the viewpoint on the statement "online school has increased how much time I spend with family". 1.6% of our participants did not provide a response (*N/A*), 4.9% *strongly disagree*, 37.8% *disagree*, 6.6% were *neutral*, 37.8% *agree*, and 11.5% *strongly agree*. The disparate responses to this question may be explained by a lack of clarity in terms of the definition of time spent with families. In general, our participants felt less connected with their families and/or friends since online learning, which is a major part of fulfilling psychological needs.

Academics

Due to our main interest in this research, the impacts of online learning on students' well-being, academic-related experiences were thoroughly examined. Several areas focusing on a comparison between online learning and in-person classes were assessed in our research, including students' preferences of online lectures versus traditional in-person lectures, ability to stay on-task, amount of time spent completing schoolwork, education quality, academic achievement satisfaction, academic performance/grades, and engagement level.

Most of our participants expressed a preference for traditional in-person lectures over online lecture style. Particularly, 68.9% of our participants preferred in-person lectures over online lectures, 11.5% were *neutral,* and 19.7% preferred online learning over in-person lectures.

Figure 7
Question: I prefer online lecture style (live or pre-recorded) compared to in-person lectures
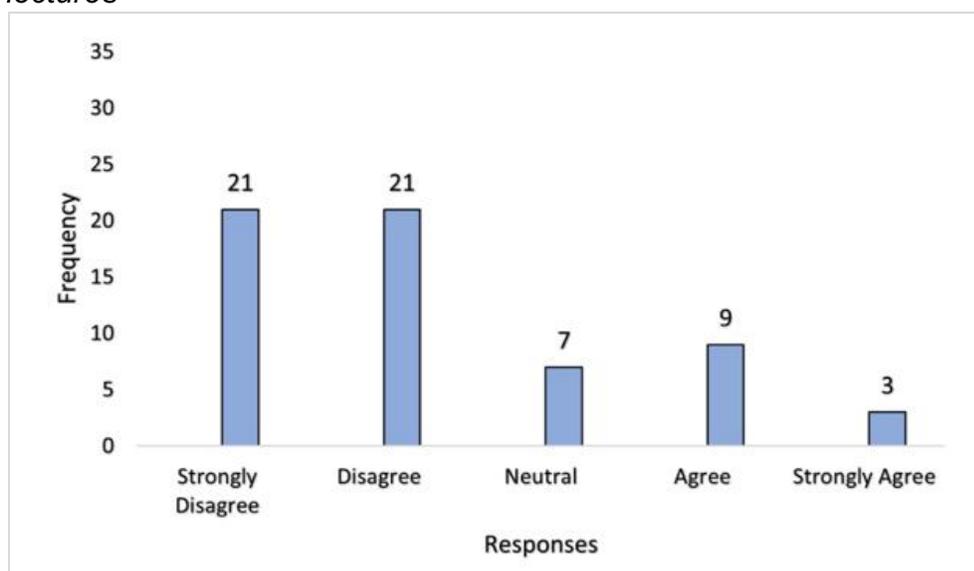
To measure students' engagement level, one of our survey questions explored participants' ability to stay focused while completing schoolwork. 85.2% of our participants reported experiencing difficulty staying on task while doing online schoolwork compared to in-person classes, 4.9% were *neutral*, and 10.0% found it easier to stay focused during online learning compared to in-person classes. Moreover, 65.6% of our participants perceived spending more time on completing schoolwork during online learning, 3.3% were *neutral*, and 31.1% perceived spending less time on completing schoolwork during online learning. This suggests that our participants experienced more difficulty engaging with academic learning during online classes compared to in-person lectures, which may lead to a decline in effectiveness and efficiency of learning.

In order to learn more about the preferences of the education delivery method, three other measures were examined in this study, which were education quality, academic achievement satisfaction, and academic performance/grades.

Majority of our participants perceived that the quality of online education is worse compared to in-person classes. Specifically, 1.6% of our participants *strongly disagree*, 11.5% *disagree*, 8.2% were *neutral*, 32.8% *agree*, and 46.0% *strongly agree*.

The responses are significantly skewed towards agreement with the statement, suggesting that a notable decline was observed in the quality of education since transitioning to online learning. This contributes to the negative impact that the COVID-19 pandemic has had on students' well-being.

Figure 8
Question: The quality of my education with online classes is worse than in-person classes
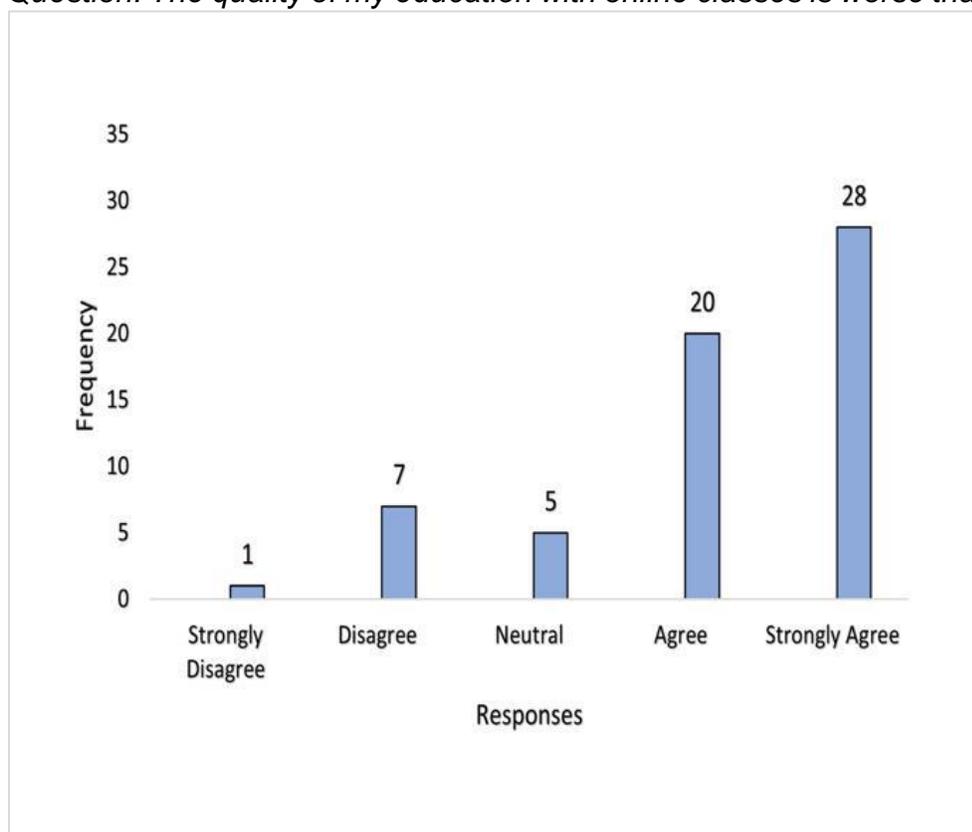
Figure 9

Question: I feel satisfied with my academic achievements since being in online school, compared to in-person classes

Among all responses, 14.8% strongly *disagree*, 23% *disagree*, 27.9% were *neutral*, 26.2% *agree*, 6.6% *strongly agree*, and 1.6% did not provide a response (*N/A*). Participants' opinions on this question were evenly distributed with a minor prominence placed on the category of disagreement, but the high rate of *neutral* responses should be considered when interpreting these results.
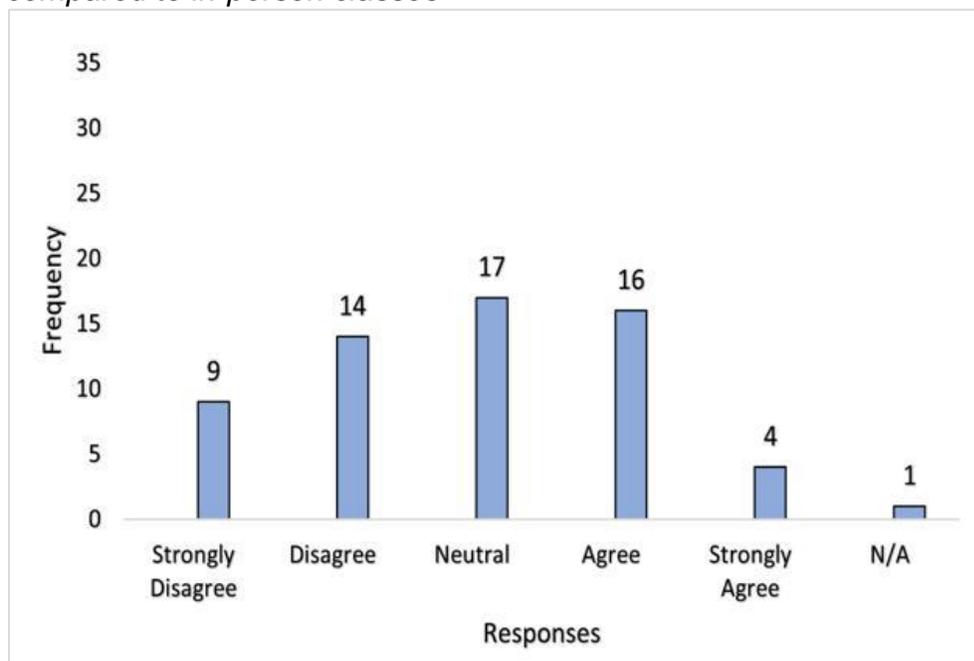
24.6% of our participants reported a *decrease* in their grades during online learning versus in-person classes, 37.8% found no change in their grades during online learning, 27.9% reported an *increase* in their grades, and 10.0% either did not provide a response (*N/A*) or selected *prefer not to say*. As shown in Figure 10, most participants experienced an improvement in their academic achievements. On the other hand, a similar number of participants experienced a decline in academic achievement as those who experienced no change.

These findings suggest that more effort needs to be devoted into online learning for it to be considered comparable with traditional in-person lectures, which is aligned with the literature review conducted for this study. Furthermore, within the academic area of well-being we also included a qualitative question, with which we aimed to uncover students' recommendations for improvement in the delivery of online learning.

Some common themes discussed were the need to reduce workload and content (62.2%), the need for a more interactive content delivery method (37.8%), modified participation (21.6%), and different/removal of anti-cheating software/online proctoring software (8.1%). Participants' answers were organized and coded by the common themes that emerged from all responses. This figure demonstrates the frequency of common themes emerging from our participants' responses to this question (n=35).

Figure 10

Question: Since starting online classes, compared to in-person classes, have your grades:
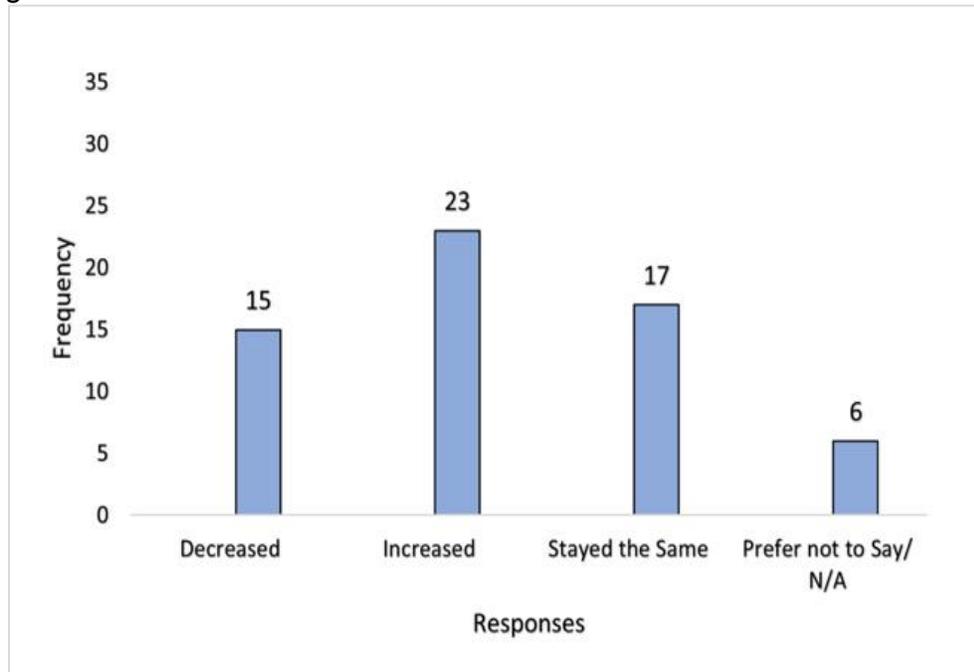
Figure 11

Question: Do you have any recommendations for improvement in the delivery of online/virtual courses (assessment strategies, course load: readings, number of assignments, number of exams, delivery of content)?
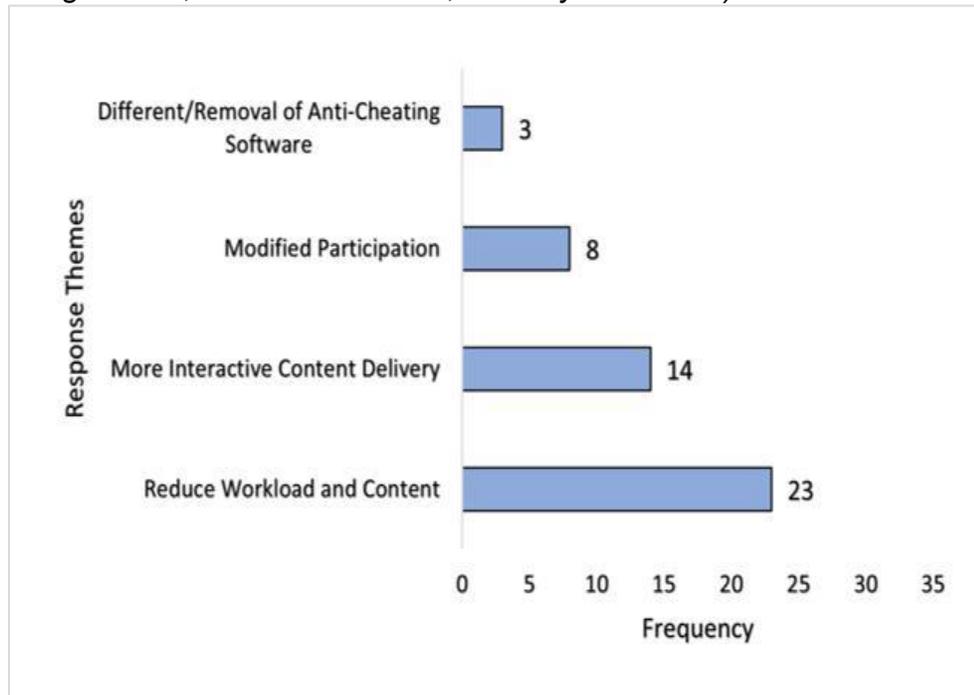
Reduce Workload and Content

I feel as though professors think we have more time on our hands and therefore give out more assignments. But with 5 profs doing that at once is overwhelming and not manageable… I only have 1 live zoom class a week, whereas the rest of profs pre record lectures and/or post slides and I teach myself. I think that is unacceptable for the amount of money I am paying and not receiving anything close to the academic standard.

> …Many of my courses have 2 hours of scheduled class time but often lecture content adds up to be around 4hours of recorded time per week. But getting through pre-recorded lectures takes much longer than it would in person…

Majority of our participants disclosed an overwhelming amount of workload and difficulty with the transition process between traditional in-person lectures and online learning. Among the responses shown above, the component 'time' was frequently highlighted and emphasized. This also aligned with one of the previous questions exploring students' responses to the statement "I feel as though less time is spent doing schoolwork online versus in-person classes" (24.6% *strongly disagree*, 41.0% *disagree*, 3.3% *neutral*, 19.7% *agree*, 11.5% *strongly agree*). A lack of time to regulate students' mindset and connect with families and friends may contribute to a decrease in students' well-being during online learning, which can be reflected in this quote: "Modified assignment, test, and midterm schedule to allow for more self-care during the time of a global pandemic killing millions of people."

However, opposing opinions were also demonstrated in our participants' responses: "Small quizzes and assessment seem more manageable than large tests and exams online. Difficult to have quiet time for long periods of time, difficult to focus for long periods of time after being on computer all day."

Diversity in responses to this question indicates the possibility of inconsistent interpretations of workload, and preferences of workstyle among our participants. Therefore, more flexibility, creativity, and empathy are critical for assisting students with the transition process from traditional in-person learning to online learning. In general, many responses from our participants reveal a need for reduced course load during online education.

More Interactive Content Delivery Method

"More interaction is required to learn. Students cannot learn from watching hours of pre-recorded lectures. It has been taught and encouraged since my first year of university that learning is strengthened through interaction with the material." Another theme that was highlighted frequently is the need for more interactive content delivery methods. Primary reasons include time-consuming, overwhelming length of lecture time, and decrease in students' engagement level. All three dimensions of engagement level in the literature are demonstrated in the responses: interaction between students and learning materials, interaction between students or peers, and interactions between students and instructors (Vlachopoulos & Makri, 2019). In combination with the quantitative question mentioned earlier that was intended to measure engagement level, it suggests that different dimensions of engagement level during online learning is one of the key determinants of online education quality and students' well-being, especially cognitive wellness.

Modified Participation Method

"Making things mandatory/marking for attendance would definitely incentivise me to participate. However, this is not fair to students with poor or inconsistent internet, in different time zones, etc. I believe there is no good way to do university online."A secondary theme regarding the lecture style was the request to modify the participation method of assessment. Among the responses that reflect this theme, participants either requested reduced or eliminated participation requirements for courses during online learning, which also resonates with the previous theme of reduced course load. This theme demonstrates the concept of autonomy, however, our speculation that a higher level of autonomy predicts improved well-being cannot be validated due to the failure to measure this variable explicitly in the quantitative survey questions.

Different/Removal of Anti-cheating Software

Lastly, a shared negative attitude towards anti-cheating or proctoring software was observed in the responses. Although it was less frequently mentioned compared with other themes, surveillance technologies are often a notable concern for many students. The related responses are as follows. '*... no use of invasive proctoring software... stop using invasive (in terms of privacy and security) proctoring systems; professors should use other methods to mitigate against cheating*…'

Other Variables

We also included measures for three other variables which were relevant to our research: motivation, identity segregation, and disability. Motivation was originally included as a measure for cognitive wellness, but because it directly relates to self-determination theory, which was a framework for our research, and could potentially impact all four areas of well-being, we felt it would be best to examine it as its own variable. Identity segregation was included to measure the impacts of another theory which provided a framework for our research, identity theory. Lastly, a question regarding disability and its impact on the experiences of online learning was included to address a gap in this area of research, as identified in the literature review.

Motivation

We included measures for both overall motivation and for the extent to which intrinsic versus extrinsic motivation is used for our participants when doing online school. Overall, our results show that online learning has a negative impact on our participants' motivation. This does not necessarily prove our prediction that higher levels of motivation lead to increased well-being among students, however we suppose our results can be used to indirectly prove this. Since our participants' motivation decreased and their overall well-being worsened, we can conclude that lower levels of motivation lead to worse well-being among students. In turn, we could assume this also means that higher levels of motivation lead to increased well-being among students, thus proving this speculation.

The following question (Figure 12) was intended to measure the impact that online learning has had on our participants' level of motivation. As shown in the figure, 0.0% of participants *strongly disagree*, 11.5% *disagree*, 3.3% were *neutral*, 26.2% *agree*, and 59.0% *strongly agree*. This shows that most participants feel as if their motivation levels

have been negatively affected by online classes, demonstrating that motivation has been negatively impacted by online learning.

Figure 12

Question: My level of motivation has been negatively affected by online classes in comparison to in-person classes
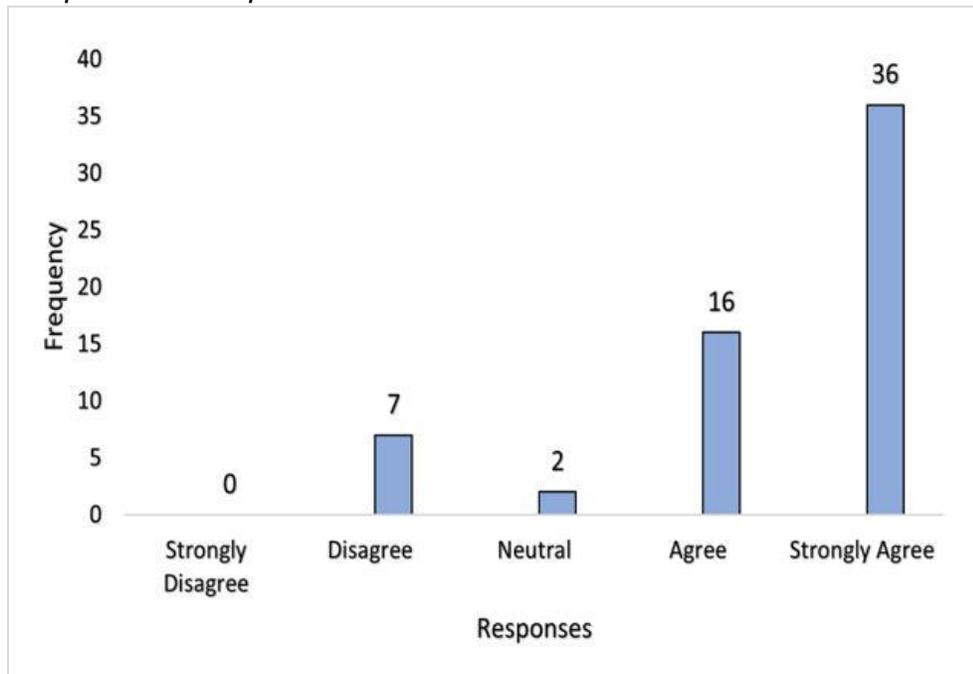
Figure 13

Question: My motivation for schoolwork comes from more internal sources (i.e., being interested in the content you're learning) than external sources (i.e., due dates, late penalties, etc.) during online learning

The question in Figure 13 was intended to measure the extent to which intrinsic motivation is used in comparison to extrinsic motivation during online learning among our participants. This question is a measure directly related to SDT and the negative outcomes that often come with extrinsic motivation. As shown in the figure, 13.1% of participants *strongly disagree*, 34.4% *disagree*, 19.7% were *neutral*, 24.6% *agree*, and 8.2% *strongly agree*. This sh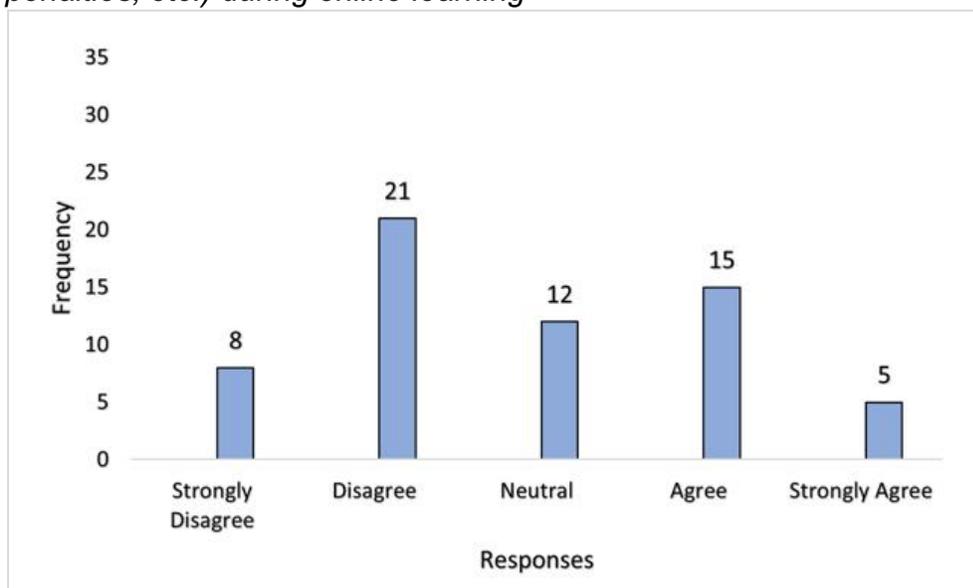ows that most participants feel as if their motivation comes from external sources, meaning they are engaging in extrinsic motivation. It is important to note that there was a large portion of participants who responded with *neutral*, meaning there might have been some confusion with the question wording. Additionally, participants may not have known how to tell where their motivation is coming from, meaning these results have questionable reliability.

Regardless, this allows us to conclude that extrinsic motivation is used more during online learning, which constitutes controlled motivation. We know that controlled motivation does not lead to the positive outcomes of enhanced academic performance and greater psychological well-being that autonomous motivation does (Deci & Ryan, 2008a). This finding suggests that the heightened use of controlled motivation during online learning will most likely lead to increased negative outcomes in the areas of academics and cognitive wellness. Overall, this finding alongside the finding that most participants feel as if their motivation has been negatively impacted by online learning allows us to conclude that participants' motivation has been negatively impacted by online learning. These negative impacts to motivation can potentially be seen in all four areas of well-being, but most notably in academics and cognitive wellness.

Identity Segregation

The question "my varying identities (i.e., student, friend, sibling, parent, co-worker) are less distinguished now in comparison to when school was in-person" was intended to measure the identity segregation of our participants' competing identities. This measure came directly out of our framework of identity theory and aimed to look at the multiple identities an individual has as well as their ability to distinguish between them in their new social environment for school, since it has moved online. 1.6% of participants *strongly disagree*, 8.2% *disagree*, 23.0% were *neutral*, 32.8% *agree*, 27.9% *strongly agree*, and 6.6% did not provide a response to this question (*N/A*). This shows us that most of our participants felt as if their identities were less distinguished since beginning online learning.

It is important to note there was a high non-response and *neutral* response rate for this question, with over a quarter (29.6%) of our participants falling into the *neutral* or *N/A* category. This means that this question was potentially confusing to participants, and they did not know how to answer, or tell if their identities are distinguished or not. Regardless, our results show that most participants felt as if their identities were less distinguished since starting online school, though the reliability of these results is questionable. The lack of segregation between identities can lead to negative impacts in all four areas of well-being, but most notably in the areas of cognitive wellness, interpersonal relationships, and academics.

Disability

The question "experiencing any type of disability can have a negative impact on online learning" was intended to measure the differential impacts that online learning may have on individuals living with a disability. This was included to fill in the gap in the literature regarding disabilities and online learning. 3.3% of participants *strongly disagree*, 3.3% *disagree*, 9.8% were *neutral*, 41.0% *agree*, 31.1% *strongly agree*, and 11.5% did not provide a response to this question (*N/A*). Due to the large number of non-responses to this question, participants may have found this question confusing, or did not feel comfortable answering. Overall, due to some wording issues and the low-risk nature of our research we cannot take away if online learning has any unique negative impacts on individuals with disabilities. Therefore, our research does not fill this gap in the literature of online learning pertaining to disability. What we can take away is that the general opinion among our participants is that experiencing a disability can have a negative impact on online learning. Possibly, the negative impacts identified through our research would be exacerbated by experiencing a disability, but further research is required to properly conclude this.

Significant Relationships

In this section, we want to highlight several statistically significant relationships between variables ($P \leq 0.05$ to be considered statistically significant). Statistically significant relationships indicate that a meaningful relationship is shared between two variables, apart from random chances. Due to the limitation of the small sample size of the current study, although the variables below were found to be statistically significant, this might not fully represent an actual effect between these variables. However, these could serve an educational and reference purpose for both junior researchers included in this study and for potential future research.

Table 1 demonstrates all the statistically significant relationships between variables uncovered during the cross-tabulation tests. *IR: Interpersonal Relationships; Gd: Gender; CW: Cognitive Wellness; EQ: Education Quality; Mot: Motivation; IS: Identity Segregation; AAS: Academic Achievement Satisfaction; St: Stress; EL: Engagement Level*.

Table 1
Statistical Significance Between Variables

				P-value (P)				
	IR	CW	EQ	Mot	IS	AAS	St	EL
IR		.0003						
Gd	.001							
CW			.025	4E-07	1E-07			.004
EQ							1E-05	
Mot			.001			.019		

Table 2 demonstrates the correlation coefficients (r) of all the statistically significant variables. *IR: Interpersonal Relationships; Gd: Gender; CW: Cognitive Well-being; EQ: Education Quality; Mot: Motivation; IS: Identity Segregation; AAS: Academic Achievement Satisfaction; St: Stress; EL: Engagement Level*. In this table, only *Motivation* shares a moderate-to-strong negative linear relationship with *Cognitive Wellness*. Additionally, *Education Quality* shares a positive mild linear relationship with *Motivation*. Other correlations were all found to be relatively weak, either positive or negative.

Regarding the relationship between *IR* and *Gd*, we primarily assessed whether our participants felt more connected to their families and friends during online learning versus in-person school. Therefore, it suggests that there might be a gender difference in terms of how they perceived their connectedness with their families and friends during online learning. However, due to the small sample size of the current study and the significant number of participants who identified themselves as female compared to male, this relationship might not be valid, therefore, it was discounted. As for the variables *IR* and

CW, we may conclude that a small positive correlation ($r = .29$) is present between perceived connectedness with families and friends and students' cognitive wellness.

Due to the nature of the way our survey questions were phrased regarding *AAS* ("Please consider the following statement and select an answer: I feel satisfied with my academic achievements since being in online school, compared to in-person classes") (see Figure 9) and *Mot* ("Please consider the following statement and select an answer: My level of motivation has been negatively affected by online classes in comparison to in-person classes") (see Figure 12), the correlation coefficient between *AAS* and *Mot* appeared to be negative ($r = -.46$), we confirmed that there is a negative small-to-mild linear relationship between *AAS* and *Mot*.

In addition, students' cognitive wellness was found to have a significant relationship with education quality ($P = .025$), motivation ($P = .0000004$), and identity segregation ($P = .0000001$) (see Table 1). A moderate positive linear relationship between *Mot* and *EQ* was observed ($r = .53$), which is aligned with findings mentioned in the literature review. Similarly, since the nature of the survey questions regarding *Mot* ("Please consider the following statement and select an answer: My level of motivation has been negatively

Table 2
Correlation Coefficient Between Statistically Significant Variables

				Correlation Coefficient (r)				
	IR	CW	EQ	Mot	IS	AAS	St	EL
IR		.29						
Gd	.32							
CW			- .35	- .64	- .40			- .47
EQ							.44	
Mot			.53			- .46		

affected by online classes in comparison to in-person classes") (see Figure 12) and *CW* ("Please consider the following statement and select an answer: My mental wellness has improved during online classes in comparison to in-person classes") oppose each other, though the correlation coefficient between *Mot* and *CW* appeared to be negative ($r = -.64$), we suppose that there is a moderate-to-strong positive correlation between these two variables. This finding aligns with our prediction that a higher level of motivation results in better student well-being. However, as previously mentioned, there is a possibility that there might not be real effects between these variables.

In the earlier sections, we also speculated that a higher engagement level would predict better students' well-being. Although a minor negative correlation exists between *EL* and *CW*, we expect that there is a minor positive relationship between these two variables, which is consistent with our prediction. Since we failed to measure autonomy and competence in our quantitative survey questions, we failed to validate or invalidate our other two speculations. These were: a higher level of autonomy correlates with an improvement in students' wellness, and a higher level of competence along with an increased level of engagement predicts better students' wellness.

Lastly, *St* was found to hold a weak-to-mild negative linear relationship with education quality although the correlation coefficient appeared to be positive ($r = .44$) (see Table 2). The survey question intended to assess *St* was "Please consider the following statement and select an answer: Online classes are more stressful than in-person classes with regard to workload" (see Figure 3) while the question assessed *EQ* was "Please consider the following statement and select an answer: The quality of my education with online classes is worse than in-person classes" (see Figure 8). This finding implies that the key to reducing students' stress levels during online learning may be greatly dependent on improvements in online education quality. While these variables might exert an impact on students' cognitive wellness, they are discussed as the main contributing factors of the decrease in students' cognitive wellness and will be discussed in detail in the later section.

Discussion

In the following section the results and their greater significance in our study of the effects that online learning has on students' cognitive well-being, physical well-being, interpersonal relationships, and academics will be discussed. These four measures of well-being will be expanded through the theoretical frameworks of SI, identity theory, SDT, and BPNT, as well as be compared to the findings of previous literature in this area of study.

To further interpret this study's findings, SI provides a framework for negotiating meaning-making in interactions, where meanings are influenced by others within the interaction and the current cultural world (Blumer, 1969). This is relevant for our research because the switch to online learning, as well as extraneous variables brought upon from living amidst a global pandemic, have played a role that resulted in decreased well-being. Identity theory shows the impact that salient identities and role-taking may have on an individual's opportunity to perform academically. SDT provides a framework that helps interpret the results for intrinsic and extrinsic motivation as well as autonomous motivation, controlled motivation and amotivation. BPNT helps us to understand the impact that social environments have on the type of motivation the individual possesses for any given behaviour (Deci & Ryan, 2008b). Moreover, BPNT postulates that there are

three basic but innate psychological needs which can affect an individual's well-being and motivation if they are not being properly met; these three needs are autonomy, competence, and relatedness (Van den Broeck et al., 2016). Finally, both SI and SDT focus on the individual and the impacts their interactions and social environment have on their internal processes, whether it be role taking, meaning-making, or motivation.

Cognitive Wellness

The results of our questions measuring students' cognitive wellness showed an apparent decline in this area of well-being since beginning mandatory online learning. In the four survey questions that were aimed to measure cognitive wellness, respondents expressed that due to online school they experienced increased stress and mental fatigue. Moreover, students also perceived difficulty with identity segregation and motivation as a result of online learning. Taking from a deductive approach, these results would suggest that cognitive wellness in students has decreased since beginning online learning.

Students were asked about their viewpoints on two statements measuring cognitive wellness and mental fatigue. As a result, most respondents displayed a lack of improvement in cognitive wellness (approximately 80.3%) and increased mental fatigue (approximately 81.9%) (see Figure 2). The literature on online learning needs additional research on its effects on well-being. As a result of this, our cognitive wellness analysis will concurrently refer to SDT and BPNT, to further explain the measurement of this area of well-being. The foundation of SDT relies on motivation and BPNT focuses on the psychological needs of autonomy, competence, and relatedness; these are connected in that to effectively internalize extrinsic motivation, an increase of which was observed in our data, the three psychological needs of BPNT must be fulfilled (Deci & Ryan, 2008a). Satisfaction of autonomy, competence, and relatedness then facilitate autonomous motivation (Van den Broeck et al., 2016) and, in turn, result in positive psychological outcomes and enhanced academic performance (Deci & Ryan, 2008a). Our four predictions infer the effects of these factors based on the literature.

First and foremost, motivation was speculated to increase cognitive wellness concurrently with motivation. Despite this prediction, most students expressed decreased motivation (approximately 85.2%) (see Figure 12) and a lack of improvement in cognitive wellness (approximately 80.3%). As our results elucidate, there is a moderate-to-strong positive correlation evident between motivation and cognitive wellness. Although this finding contrasts the original speculated relationship, our motivation prediction was supported. With that being said, our questions measuring motivation cannot be used to solely measure effects on cognitive wellness because motivation is a key component of SDT, thus affecting all areas of well-being in our research. The speculation for autonomy expected a positive relationship between autonomy and cognitive wellness. Given that our study failed to sufficiently measure autonomy in our survey, we cannot verify the direct relationship between autonomy and cognitive wellness. Further, fulfilment of competence needs is the strongest predictor of higher engagement levels (Fang et al., 2019), thus we predicted that increased competence would lead to improved cognitive wellness. As the variable of competence was not adequately measured, the correlation between competence and engagement level cannot be verified.

Lastly, participation and engagement levels are often measured in place of the psychological need for relatedness, and we speculated that higher engagement levels would coincide with better cognitive wellness. On the contrary, our results show a general lack of engagement from students during online school in the form of struggling to focus and decreased motivation (see Figure 12). In calculating the correlation coefficient for the relationship between students' engagement level and cognitive wellness, a weak negative correlation was revealed between higher engagement levels and increased cognitive wellness. Due to the opposing nature of the wording of these two questions, we suppose that there is a minor positive relationship instead, therefore supporting our prediction.

In addition, McManus et al., (2017) notes that students with cognitive impairments can be more susceptible to feeling isolated from the institution if their needs are not met; this means that if the basic psychological needs of students are not met, it could lead to feelings of estrangement. Therefore, the need for relatedness would also be unsatisfied, creating a perpetuating cycle of compromised cognitive wellness. To be clear, this is not an effect that would impact every student experiencing negative outcomes in cognitive wellness, but this certainly displays the possible additive and cyclic effects of these negative impacts if students live with a mental illness. Moreover, Chen & Jang (2010) find that fulfillment of one's basic psychological needs is the strongest positive predictor of learning outcomes in an e-learning setting. This elucidates that academic success is contingent upon cognitive wellness through the fulfillment of the basic psychological needs of students.

Stress Level

When students were asked if online classes are more stressful than in-person lectures, approximately 75.4% of our respondents agreed with this sentiment that online learning is more stressful (see Figure 3). We believe that stress is most directly linked to cognitive wellness in comparison to our other areas of well-being. As Yang et al., (2020) suggests in their study on the pandemic's effects on students, stress is linked to poor cognitive health outcomes, and this is punctuated by the use of resilience to mediate the negative mental effects of the COVID-19 pandemic. Stress was included as a research factor in this study due to an inherent lack of this investigative approach in the existing literature (Im & Kang, 2019). As Im & Kang's (2019) research shows, perceived stress is linked to increased motivation, which should consequently result in more academic satisfaction, participation, or achievement. However, the data from our study does not support that more stress may lead to positive learning outcomes—in fact, our results showed the exact opposite. Therefore, we can conclude that the increase in students' perceived stress is subsequently decreasing their overall cognitive wellness.

Moreover, Im & Kang (2019) theorize that decreased stress during home learning may be due to at-home testing being less stressful than in-person testing. Given that students expressed disdain for the shift to online education (see Figure 7) and the online proctoring that comes with online tests, we can conclude that students are in fact more stressed while engaging in online learning at home. As our results indicate, this negative effect could be prevented with the improvement of online education. In our results, a positive correlation ($r = .44$) (see Table 2) between stress and education quality was revealed, which would suggest that as stress increases, education quality diminishes. In turn, this also means that stress decreases as education quality improves; thus, enhanced online

learning can mediate the negative effects of stress on cognitive wellness. This is a significant finding as it touches on the collaboration between cognitive wellness and academics to achieve better well-being.

Identity Segregation

In order to capture the salience of identity in our research, respondents were asked to indicate the level of segregation between their identities. Consequently, most students (approximately 60.7%) communicated that their identities were less distinguished now than prior to the pandemic and online education. It is important to note that there was a substantial number of participants that did not provide a response (*N/A)* or chose *neutral* for this question (approximately 29.6%), possibly indicating confusion with identifying segregation between identities. Nonetheless, our data proves that the divide between identities is dissolving for most of our participants and this effect can lead to unique negative impacts on cognitive wellness.

Thoits (1983) states in their research that subjective commitment—the attached importance of each role—expands as identities continue to overlap. As a role becomes more important, this may require more time from students as a result, but the qualitative portion of our results indicates that students are already frustrated with the time-consuming nature of online learning. Additionally, student interpretations of identity salience are drastically shifting during these times. Our theory section highlights how understandings of time allocations and salient identities may change alongside role importance; the collaboration of these factors can result in negative outcomes. This helps us conclude that due to the increasing importance of their overlapping identities, students could potentially feel additional negative impacts on cognitive wellness.

Furthermore, there are added benefits to having segregated identities, such as the ability to amplify one's assets, advantages, and rewards. These additional benefits of segregated identities diminish when roles are non-segregated (Thoits, 1983). Thus, we can deduce that students with non-segregated identities are negatively impacted more as a result of online learning, adding to the overall negative effects on cognitive wellness.

Identity theory also guides the interpretation of this question in that it offers perspective as to why student identities are less segregated; the data suggests that the "student" identity has most likely become more salient, given that role distinction is becoming harder for students and identity theory states that salient identities can be enacted at any given time (Stryker & Burke, 2000). The added lack of spatial distinction to further distinguish identities has likely pushed the "student" identity to the forefront and blurred the line for when identity enactment should begin and end. These sudden changes to the student lifestyle have seemingly added stress to the lives of students given our research results that explicitly show increased stress due to online learning (see Figure 3) and show negative impacts across all four planes of well-being measured in our study.

Motivation

Initially, our study intended to observe motivation under cognitive wellness, though after considering that motivation may affect all four areas of well-being it was included as its own variable. In two separate questions, students were prompted to share if their motivation has been negatively affected by e-learning and if the source of their motivation is linked more to internal or external sources. Respondents mostly strongly agreed

(59.0%) (see Figure 12) that their motivation has been negatively affected and nearly half of our participants (approximately 47.5%) (see Figure 13) disagreed that they engage in internal motivation more than external motivation during online learning.

Lastly, motivation is also an important measurable variable because it serves as a theoretical basis for SDT. The data shows that students feel most encouraged to complete work due to extrinsic motivation—a facet of controlled motivation—meaning external pressures such as late penalties or receiving good grades (Deci & Ryan, 2008a). As discussed in the results, autonomous motivation, which uses intrinsic motivation, produces benefits like increased psychological well-being and enhanced academic performance that are not reflected by the use of controlled motivation (Deci & Ryan, 2008a). Thus, the increased controlled motivation discovered in our data could denote additional negative outcomes under cognitive wellness.

This finding (see Figure 13) would suggest that students are seemingly less engaged in the content since they feel less inclined to complete work with the goal of self-satisfaction. Our data exhibits this proposed decrease in engagement level through the observed minor positive relationship between cognitive wellness and engagement level. As previously stated, decreased engagement also signifies a lack of relatedness which indicates insufficient satisfaction of one's basic psychological needs. Therefore, a lack of motivation in students may point to unsatisfied basic psychological needs as well as decreased engagement levels, furthering the negative impacts online learning has had on students' cognitive wellness.

As these findings would suggest, the cognitive wellness of undergraduate students at McMaster University has decreased. This apparent change in cognitive wellness is observed in increased stress levels, struggling identity segregation, and increased mental fatigue. Furthermore, approximately 80.3% of participants answered that their cognitive wellness has not improved since beginning online learning, revealing how students perceive their cognitive wellness. Overall, our data points towards students experiencing negative outcomes under the area of well-being of cognitive wellness.

Physical Well-being

The effect of online learning due to the COVID-19 pandemic on physical well-being has been deemed to be overall negative, although positive aspects were also reflected from our research. To better understand the effects of online learning on physical well-being, similar to the previous section, references to BPNT will be beneficial. The psychological needs suggested by BPNT, including autonomy, competence, and relatedness, should be met in order to achieve positive cognitive well-being, which is further impacted by physical well-being (Van den Broeck et al., 2016). In addition, this theory of motivation in relation to the environment is closely related to our area of study, as the environments that students are familiar with learning in have drastically changed due to the COVID-19 pandemic. Moreover, it is worth mentioning that no theory in discussion can be fully and directly applied to physical well-being as this area of study can be deemed relatively new in relation to online learning. Regardless, we have included this measurement because of its determined importance to the subject at hand, which has been exhibited in showing statistically significant results to the overall well-being of students in online school.

Firstly, one of our questions that was designed to measure participants' physical well-being asks individuals to consider if they have been sick less during online school than when attending in-person classes (see Figure 4). Results to this question had slightly higher levels of dispersion, with approximately 55.0% of participants showing agreement that they have been sick less during online school in comparison to in-person classes. Although this does show a positive impact on physical well-being, these results may not be in direct relation to schooling. Furthermore, other factors that lead to sickness could have affected the participants and their responses, such as external pre-existing illnesses. This question poses a possible increase in physical well-being, but the number of participants who disagreed or remained neutral to this statement (approximately 45.0%) should be noted. Limitations for this question include the possible over-simplicity of its wording, as it does not specify or consider the severity of the sickness. In addition, participants may have grappled to recall the number of times they were sick last year in comparison to the present, which may have undermined the reliability of these results. Additionally, the COVID-19 pandemic has decreased human interaction and increased hygiene and sanitation practices, and these results may be influenced by this general shift in society. The effects of online learning on physical well-being is a relatively new subject of study and resources examining this subject are lacking both in our analysis and existing research. This area is identified as an understudied factor of online learning and although results to this question may be perceived as positive, further research needs to be conducted on the association between online learning and physical wellness.

Another question aimed to measure the effects of online learning on physical well-being asks whether participants' energy levels have decreased since beginning online classes compared to being enrolled in-person. Most participants *agree* or *strongly agree* with the statement, indicating that online schooling has a negative effect on participants' energy levels. This reduction in energy levels may be explained by the lack of social interactions and movement that would be present on campus or in the classroom.

Additional questions that demonstrated a negative effect on physical well-being ask participants whether they have experienced eye strain, neck/back strain, and headaches due to online classes (see Figure 5). When participants were asked if they have experienced these strains and headaches, most participants reported either *agree* or *strongly agree*, that they have experienced these declines in physical well-being. These results indicate a negative impact of online learning on physical well-being. We can interpret these results as being caused by several factors, the most plausible ones being a possible decrease in physical activity due to the pandemic, as well as increased time spent immobile on a computer screen. The possible eye strain and headaches experienced by most of our participants could be attributed to this increased amount of time spent on virtual screens, while the neck/back pain experienced may be attributed to the lack of physical activity participants would otherwise have when classes were in-person.

The overall themes observed from our results of the impacts of online learning on physical well-being are overwhelmingly negative, although some positive effects exist. It is significant to note that participants are not necessarily getting sick as much, however this can be attributed to the shortcomings of our question as well as participant isolation due to the current pandemic. Most of our participants have been experiencing negative effects on their physical health in terms of an increase in physical strains due to online

learning, including back strain, neck strain, eye strain, and headaches. This significant insight illuminates the need for further research on how to prevent such negative impacts on physical well-being in online schooling, along with possible solutions to aid students who have previously or are presently suffering from a decrease in physical well-being.

From our research, it can be proposed that the decrease in energy and increased eye strain that students experience can possibly be explained by the increase in workload and the amount of time spent on electronic devices for online school. In respect to literature, further research needs to be conducted on the effects online learning may have on physical well-being. However, our research may provide significant insight to the possible strains and effects that online learning poses on physical health, in addition to the possible effects that decreased physical health poses on well-being.

Interpersonal Relationships

As previously mentioned, the effects of online learning due to the COVID-19 pandemic on interpersonal well-being were negative overall. These results can be further interpreted by looking at some of the theories used to guide our research, as well as comparing our results to other literature on the topic of online learning. The theory that best aids in interpreting the results surrounding interpersonal relationships is BPNT. To interpret the effects on interpersonal relationships, we look at the concept of relatedness specifically as it refers to the "need to feel connected [...] that is, to love and care for others and to be loved and cared for by others" (Van den Broeck et al., 2016, p. 1199).

Additionally, relatedness can be used as another explanation for the negative effects on interpersonal well-being in terms of the meaning-making process within social interactions, as elaborated on in SI. Because most social interactions have moved from in-person to technological means of communication, the meaning-making processes within interactions have changed, which may cause participants to feel less connected to friends and family, therefore, resulting in the inability to fulfill relatedness needs.

The first question designed to measure interpersonal well-being asked about how often students reached out to faculty for assistance during online schooling. As mentioned in the results section, the responses did not significantly lean one way or another. However, the disparity of responses may reflect a need for a more accessible support system for students that emphasizes clarity, accessibility, and reliability during online courses. This would provide a more readily available outlet that holds a space for more connection and could lead to positive outcomes on interpersonal well-being. This is reflected in the literature as Fang et al. (2019) noted that when students engage with others within the context of online learning, their need for relatedness is fulfilled.

Moreover, we included a question asking students if they felt more connected to their family and friends during online classes compared to in-person classes (see Figure 6). Approximately 90.1% of participants disagreed, stating that they did not feel more connected to these relationships. The results of this question can provide insight into the effects of the pandemic more broadly, as online education has been a result of the pandemic and the need to isolate from others. Online education in an environment without COVID-19 – where seeing family and friends would be more accessible – may not have as negative of effects on students. However, online learning due to COVID-19 has served to make students feel disconnected and experience a decrease in relatedness to their loved ones; thus, leading to students' dissatisfaction with interpersonal relationships and

negative effects on their interpersonal well-being. As noted in the literature review, Vlachopoulos & Makri (2019) postulate that students feel isolated during distance education and their findings suggest that these feelings of isolation are significantly impacted by a lack of interaction via online learning. The additional feelings of isolation due to the pandemic suggest that the psychological need for relatedness is not being met, leading to a negative impact on students' interpersonal well-being.

Furthermore, we included a question asking if participants are communicating less with their friends and family during online classes in comparison to in-person classes and the overwhelming majority (approximately 91.8%) agreed with the statement. Interpersonal well-being refers to the daily interactions an individual has with others, and their quality, which is subjective. However, we interpret that the results of this question indicate another negative impact on interpersonal relationships, as it can be assumed that a depletion of social interaction overall means relatedness needs are not being properly met. Another explanation for the lack of communication can be related to our results that indicate participants are experiencing difficulty with identity segregation. This means that participants may be having difficulties prioritizing social identities over academic identities, therefore they may not be able to communicate as consistently as they would pre-online education. This leads to a decrease in well-being as well as potential negative effects on cognitive wellness.

Our data analysis displayed a statistically significant relationship between interpersonal well-being and cognitive well-being. Therefore, the negative impacts of online learning on interpersonal relationships may also lead to negative impacts on cognitive wellness, and vice versa. Moreover, the decrease in communication could be caused by multiple factors; one may be perceived stress due to an overwhelming workload, which was a common theme that emerged in the qualitative thematic analysis, leaving less time for meaningful communication with loved ones. Another reason could be due to the general effects of the pandemic; as many people find themselves with little to do, conversations become more repetitive, mundane, and unsatisfying, therefore causing the need for relatedness to be unmet.

The final quantitative question designed to measure the impacts of online learning on interpersonal well-being asks participants if being in online school has allowed them to increase the amount of time they spend with their family. Similar to the first question, the results did not significantly lean one way or the other. This leads to a possible limitation in our research as our question may lack clarity in this regard. The term 'family' can be quite ambiguous as some may interpret this as only immediate family, while others may consider extended family when answering this question. Therefore, it was difficult to determine overall how interpersonal well-being was affected in terms of how much time participants had been able to spend with their families.

Additionally, one of the common themes that emerged from our qualitative question provided some insights into the effects of online learning on interpersonal well-being. This question was intended to explore whether students had any recommendations for improvement of the delivery of online courses. One of the most prevalent themes was that content delivery should be more interactive or synchronous, as opposed to pre-recorded asynchronous lectures, which is the method that most professors have been using. As previously mentioned, interpersonal well-being does not only refer to the frequency and quality of interactions with those who are close to us, but the frequency

and quality of interactions that we have daily as well. Based on 37.8% of our participants suggesting more interactive content delivery as an improvement to be made to online learning, this may indicate that their need for relatedness is not being met as much as it was when students were able to attend classes in-person.

If students are restricted to online classes, it would be most beneficial to their well-being if virtual classes were conducted as similarly to in-person classes as possible. Moreover, this was reflected in the literature, specifically Vlachopoulos & Makri (2019) who explored how different types of interaction influence students' experience with online learning. The authors investigated three types of interactions: peer interaction, facilitator-learner interaction, and learner-content interaction. Vlachopoulos & Makri (2019) propose that in order to increase facilitator-learner interaction, students should be provided with frequent feedback, discussions, and continuous encouragement. Moreover, to enhance learner-content interaction, the learning process should be as interactive as possible (Vlachopoulos & Makri, 2019). In other words, the literature suggests that for an enhanced experience in participating in online education, the level of interaction between the students and their teachers should be maximal.

In summary, students are experiencing a disconnect with their friends and families as they have also been communicating with them less. Further, the findings of Vlachopoulos & Makri (2019) are aligned with our results in that they both suggest that students' online education experience and well-being will improve with as much interaction as possible. Moreover, we propose that interpersonal well-being was negatively affected by online learning due to COVID-19, caused ultimately by the psychological need of relatedness not being met. Due to relatedness needs not being met, we can assume that this will lead to further negative impacts on cognitive wellness alongside interpersonal well-being.

Academics

As McMaster's undergraduate students have transitioned their learning from in-person to online learning due to the COVID-19 pandemic, their academic well-being has been negatively impacted. As students are forced to complete all their academics at one location, at home, our study has revealed that education quality has declined, online schooling is more time consuming, and there is a need for improved delivery methods. To further interpret this study's findings, this section will follow the theoretical perspectives of SI, identity theory, SDT and BPNT.

As previously mentioned, our study for academic well-being focused on comparing learning experiences between online learning and in-person classes, students' preferences for content delivery, ability to stay on-task, time spent on completing schoolwork, education quality, academic achievement satisfaction, academic performance/grades, and engagement level. This section will discuss the broader significance of these findings including the qualitative results that suggest a desire for reduced workload and content, a more interactive content delivery method, a modified participation method, and dissatisfaction with anti-cheating software.

Preferences for Education Delivery

While measuring to determine preferences of the education delivery method, our study tested participants' engagement levels. Findings showed that most participants (85.2%) reported experiencing difficulty staying on-task while doing schoolwork compared to in-

person classes. Difficulty staying on-task might have a negative impact on participants' academics as participation and engagement levels are also closely connected with one's intrinsic motivation, a necessary element when completing online courses (Fang et al., 2019). Additionally, participants may have difficulty staying on-task completing schoolwork in their home environment due to competing identities that previously would not have been a problem pre-pandemic. For example, according to identity theory, since salient identities are central to the individual's identity, they may be enacted at any given time (Stryker & Burke, 2000). This could inhibit students from prioritizing their student identity as competing roles such as parent or caregiver may take precedence.

When asked if participants had any recommendations for improvement in the delivery of online courses, 37.8% recommended an interactive content delivery method (see Figure 11). Synchronous lectures over asynchronous lectures are one solution for interactive content delivery as synchronous lectures occur at a pre-set time every week, similar to how in-person classes would take place, while asynchronous lectures can be completed at the discretion of the student. This aligns with our results that show how most of our participants expressed a preference of traditional in-person lectures over online classes. Particularly, 68.9% of our participants preferred in-person lectures over online lectures (see Figure 7). While in-person lectures are not currently an option due to the COVID-19 pandemic, synchronous lectures are the closest to in-person learning in comparison to asynchronous. Synchronous lectures are beneficial for students as they can interact with professors and peers in real-time, and previous research shows that having a live instructor can help eliminate the barriers to communication that often arise in online education (Vlachopoulos & Makri, 2019). Asynchronous lectures, however, are a more inclusive method as participating in lectures at a predetermined time may be difficult for international students. As for learner-content interaction, this can be enhanced by providing clear instructions and having the learning process be as interactive as possible, which was also highlighted in the interpersonal relationships section (Vlachopoulos & Makri, 2019).

Some participants (8.1%) also recommended a modified participation method to improve the delivery of online courses (see Figure 11). While the results are not significant, they are worth noting as participants raised concerns of technical issues, accommodating international students and time consumption. Being graded for attendance-based participation adds cognitive strain onto international students as it may require them to adopt an unhealthy sleeping schedule to accommodate class attendance. Moreover, the potential for technical issues to arise also makes attendance-based participation challenging. In terms of class participation, some students believe that participation evaluations are time consuming, although this experience is subjective.

The data shows that engagement level and social interactions between students and/or facilitators greatly increases learners' participation (Cho & Cho, 2014; Fang et al., 2019). According to BPNT, autonomy is related to students' participation or engagement level in that it has a weak but positive relationship with an individual's engagement during online courses (Fang et al., 2019; Chen & Jang, 2010). Specifically, peer-to-peer interactions have been suggested to facilitate participation such as answering discussion questions to encourage collaboration on a voluntary basis (Vlachopoulos & Makri, 2019). While some participants might not enjoy participation in their online courses, it would be beneficial for students' engagement levels as it provides them with an opportunity to

engage in interaction with instructors and peers which is significant as all interactions have been heavily depleted due to the pandemic's stay at home order.

Time Consumption

The majority (65.6%*)* of participants perceived to spend more time completing schoolwork during online learning. These findings are aligned with the qualitative results where participants (62.2%) recommended a reduced workload including reduced course content for the improvement in the delivery of online courses (see Figure 11). If students are spending more time on their schoolwork and would like the quantity of the workload and course content to be reduced, this suggests more than half of the students are overwhelmed with their current workload. This might be due to the difficulty with the transition process between traditional in-person lectures and online learning. Due to the unexpected occurrence of the COVID-19 pandemic, students were forced to adjust their learning method in an urgent manner which was likely to create a higher level of stress and anxiety. It is necessary to take this into consideration when designing future online lectures and/or learning programs.

Education Quality

When testing for education quality, almost half of the participants (46.0%) perceived that the quality of online education has decreased compared to traditional in-person courses (see Figure 8). This is worth noting since the quality of course content is a valuable determinant of students' motivation levels (Im & Kang 2019). When motivation levels were tested, most participants felt their motivation levels were negatively affected by online classes, allowing us to conclude that motivation has been negatively impacted by online learning. This shows that our findings, the reported decrease in education quality paired with participants' lower motivation levels, aligns with Im & Kang's (2019) research. This is further supported as our results show motivation was statistically significant with education quality and education satisfaction, allowing us to further conclude that participants' decreased education quality and decreased motivation levels lead to decreased education satisfaction overall. Although it is important to note, results might also be due to extraneous variables such as the increased strain that the pandemic has had on the global community, which should be taken into consideration in further studies.

As the literature suggests, motivation is a salient measurable factor because it directly affects both in-person and online learning outcomes (Yeh et al., 2019; Chang et al., 2013). With the general negative impacts students have been experiencing, the results and literature point to a lack of motivation fueling the negative learning outcomes in students. Furthermore, students expressed that they were unimpressed with the quality of their online education, which raises the question: could this be the reason why students are less motivated? Considering how the literature supports the relationship between motivation and learning outcomes, it is clear that motivation plays a big role in the analysis of student well-being. Hence, it is probable that the general negative impacts of online learning experienced by McMaster students are, in part, due to waning motivation, or the increased amount of extrinsic motivation being used. Additionally, research by Im & Kang (2019) states that students' achievement goal orientation can affect motivation levels. Students expressed in the quantitative portion of the study that they are not putting in

more effort for online school, thus this could also reflect being less motivated for online school.

Academic Achievement Satisfaction

When surveyed on academic achievement satisfaction, the opinions of the participants were evenly distributed with a minor incline towards feeling dissatisfied with academic achievements since being in online school, compared to in-person classes (see Figure 9). Learning/academic satisfaction involves the level of joy and satisfaction students feel during their learning experience (Topala & Tomozii, 2014). Previous research by Im & Kang (2019) discloses that the most prominent determinant for academic achievement is learning satisfaction. Additionally, course satisfaction is also frequently connected to motivation (Chen & Jang, 2010). Dissatisfaction with academic achievements indicates that BPNT's three components of psychological needs are not being met (Fang et al., 2019). It is important to consider when discussing academic satisfaction, the possibility that students are not feeling contentment with their academic achievements due to the transition to online learning.

On the other hand, when asked if participants had any recommendations for improvement in the delivery of online courses, 8.1% recommended a different kind, or removal of anti-cheating software (see Figure 11). Although these results are insignificant, they are worth noting as participants reported concerns of privacy invasion. If students feel uncomfortable with proctoring technology, it may have implications on their academic satisfaction. We also know that a student's sense of satisfaction affects their level of motivation (Im & Kang, 2019) which is supported in our research as we had a statistically significant relationship between motivation and academic satisfaction. Motivation can also be affected by autonomy, however, we failed to measure this variable, so it would be beneficial for future research to focus on this area. Further online learning-related studies are suggested to examine whether there is a notable impact of anti-cheating software on students' well-being.

Academic Performance/Grades

Majority of participants (37.8%) reported that their academic performance/grades was unaffected by the switch to online learning, although for some students there was a decrease in academic performance (24.6%) and for some an increase (27.9%) (see Figure 10). Students' performance levels directly reflect their motivation levels, specifically the extrinsic motivation that comes from completing schoolwork for a grade reward, which is also mentioned in the literature review (Deci & Ryan, 2008a). Our data shows that almost half of our participants reported an increase in using extrinsic motivation (47.5%) (see Figure 13). Another factor influencing students' motivation levels is achievement goal orientation (Im & Kang, 2019). Since achievement goal orientation is the main factor affecting the individual's decision of how and why they should participate in specific learning activities, students might be reluctant to go above and beyond in virtual learning assessments due to decreased levels of motivation, or rather, increased levels of extrinsic motivation (Im & Kang, 2019).

Furthermore, students would be more likely to experience difficulty achieving academically while learning online if their psychological needs of autonomy, competence and relatedness are not met (Van den Broeck et al., 2016). For online learning to be

comparable to in-person lectures, more effort needs to be devoted towards education quality and improvement by instructors and/or the institution. Our data reflects that most of our participants were either neutral or satisfied with their academic achievements since online learning and their performance had been similar since online learning compared with the past. This could in part be due to the worsened education quality of online learning and the need for improvement.

To conclude, academic-related measures appear to be one of the crucial determinants that contribute to the negative impact of online learning on McMaster's undergraduate students' well-being, especially cognitive wellness. This section highlighted the following academic themes: preferences for education delivery, time consumption, education quality, academic achievement satisfaction and academic performance/grades.

Conclusion

Overall, the effects of online learning due to the COVID-19 pandemic on the well-being of undergraduate students at McMaster University have been overwhelmingly negative. The impacts of switching to online learning during the COVID-19 pandemic have been explored as they pertain to each facet of well-being: cognitive, physical, interpersonal, and academic. Firstly, the cognitive wellness of students has been negatively affected by the unexpected change to online learning. The results of our questions measuring cognitive wellness evidently display struggles with identity segregation, lack of motivation, increased stress levels, and mental fatigue. Additionally, most students perceived having unimproved cognitive wellness. BPNT guided us in finding a link between cognitive wellness and academic success, also highlighting a significant relationship found in our results that allows us to conclude that improved online learning mediates the negative effects of online learning. Using SDT and identity theory, we discovered that the non-segregation of identities observed in the student population could have additional negative implications on cognitive wellness.

Further, the effects of online learning resulted in a decrease in physical well-being among our participants. Although the results show our participants have been sick less during online school in comparison to in-person classes, this may be attributed to the over simplicity of this question or difficulties with recall undermining the reliability of this question. Regardless of these factors, most of our participants indicated a decrease in physical well-being, as demonstrated by most of our participants experiencing physical strains due to online learning (eye strain, neck/back strain & headaches). Through the perspective of BPNT, we examined physical well-being in connection to cognitive well-being, and discussed the lack of direct connection between the discussed theories, the literature, and physical well-being.

To continue, the effects of online learning due to COVID-19 on interpersonal relationships and well-being have been overall negative. In general, students are feeling less connected to peers, friends, and family. Moreover, most of our participants supposed that they are communicating less with others including peers, friends, and family, which we argue may be due to perceived stress, as well as isolation and the mundane lifestyle caused by the pandemic. We use BPNT to further explain these results, as the decrease in interpersonal well-being can be explained by the psychological need for relatedness not being met due to the constraints of online education due to the pandemic.

Furthermore, since transitioning from in-person classes to online learning, students' academics at McMaster University have been negatively impacted overall. Students are having more difficulty staying on task, spending more time completing online schoolwork, reporting decreased motivation levels, decreased education quality, and decreased overall education satisfaction. Additionally, we found that students ultimately prefer traditional in-person classes to online classes. Online learning during the COVID-19 pandemic has had a negative impact on overall levels of motivation, including an increase in the use of extrinsic motivation. We conclude that lower levels of motivation lead to worse well-being among students in our sample. SDT and BPNT were used as frameworks guiding this area of study to determine the types of motivation being utilized by students and the impact that these have on well-being. The increase in controlled motivation observed in our data denotes additional negative outcomes under the categories of cognitive wellness and academics.

Limitations

Despite our study being very relevant to the current moment in time and yielding some significant results, there were limitations to our research. Three main limitations were identified as a lack of generalizability, issues with the survey questions, and a failure to properly measure autonomy and competence. Additionally, we found that some relationships between variables were statistically significant, but these findings are limited by the reality that just because there is a significant relationship does not mean there are real effects between variables. For example, our significant relationship between gender and interpersonal relationships was discounted due to the small sample of male participants, since it is not representative of the male undergraduate population at McMaster University.

The theme of lacking generalizability is apparent across our findings and in our research. Overall, our sample was skewed to represent the perspectives and experiences of female fourth year students who are twenty-one years of age in an undergraduate program at McMaster University in one of the following faculties: Social Sciences, Science, DeGroote School of Business or Health Sciences. The size of our sample also served as a limitation. With only 61 participants, it is difficult to generalize these results to even the general population of undergraduate students at McMaster University, let alone the general population of undergraduate students in Canada. The confinements of completing this research within the post-secondary institution of McMaster University also undermines the generalizability of our results to the larger population. Though, understanding the first-hand experiences of these students is still valuable and significant as it provides useful insights into this area of research and its impacts on well-being.

Secondly, there were a few issues with some of the questions in our survey. For example, some questions yielded seemingly random results as they did not significantly lean one way or the other. One question that was meant to measure interpersonal well-being was asking about time spent with family, while the other was meant to measure physical well-being and was asking if participants have been sick less than the previous year. In both cases, the terms "family" and "sick" are quite ambiguous, therefore participants may have interpreted the questions differently, which may explain the irregular results. Moreover, we failed to properly measure the effects of disability on well-being with the additional barrier of online education as the results had many *neutral*

responses and non-responses (*N/A*). We believe this was due to the possibility that most participants may not experience disabilities, therefore, did not feel comfortable answering this question. Furthermore, the way in which some of the questions were worded to avoid bias made it difficult, at times, to determine the direction and strength of correlations during data analysis.

Lastly, our research failed to adequately measure the psychological need for autonomy and competence. In our initial plan for our survey, we intended to include measures for autonomy and competence, but during data analysis we determined that our measures were not sufficient to measure our predictions. Our speculation for autonomy stated that an increase in this variable would also improve the cognitive wellness of students, and the competence speculation expressed the same relationship should occur. After analyzing our survey results, we noticed that our measures for these variables did not accurately reflect the effects of these factors. As a result of this discrepancy, our predictions on autonomy and competence were not able to be proven or disproven.

Future Recommendations

Lastly, our recommendations for future research primarily fall into three areas. Firstly, including a generalizable sample size to ensure the validity and reliability of the research as well as the ability to conduct hypothesis testing. This may be done by including an evenly distributed diverse sample and conducting similar research in various settings, since the sample for the current study is based on undergraduate students at McMaster University. Secondly, physical health is rarely addressed in online learning-related research. Since a limited amount of literature currently outlines the impacts of online learning on physical health, future research should include physical health as a measure in online learning studies. Finally, there is still an existing gap in disability-related research on the impacts of online-learning; therefore, more research needs to be done in the future to fulfill this need in related studies.

More accurate measures for autonomy and competence should also be included in future research to explore them as determinants of students' wellness during online learning. Further, some statistically significant relationships, such as those between motivation and students' cognitive wellness, are suggested to be further examined and strengthened in later studies as well. In summary, the future of online learning research should include a generalizable sample in terms of size and diversity. It should also address and strengthen the shortcomings and findings of this study in terms of physical health, disability-related research, autonomy, competence, and the relationship between motivation and students' cognitive wellness.

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The Influence of Social Media on Undergraduate Students' Perceptions of Reality: *Through the Theoretical Perspective of Groupthink*

Titi Huynh[1], Kristen Kostuch[1], Mya Martorano[1], Olivia McMurray[1], and Victoria Scimeca[1]

Abstract

Most literature places heavy emphasis on social media user's agency over the interactions they have on various websites. However, many do not acknowledge the way social media platforms have been curated to influence user's daily life and perceptions of reality. Within our study, the way social media platforms impede individuals' perspectives of reality has proven to shift this agency and how one's perception of reality is impeded through the psychological longingness to conform and associate with specific groups, as well as groupthink. We conducted an online anonymous survey through Limesurvey that consisted of 20-30 open and closed ended questions. Our research aimed to gain an understanding of how undergraduate students conform to a certain behaviour through social media. We found that social media does have an impact on how undergraduate students perceive reality. This can be seen through portrayals of body image and self-inadequacy. With increased social media use, we found that individuals are more likely to engage in groupthink. We have concluded that social media is extremely pervasive in our behaviours and the construction of individual ideologies. Thus, proving our hypothesis that undergraduate students find themselves following social media trends, norms, and beliefs available to them through online networking sites.

Introduction

Social media has grown to play a major role in today's society. Individuals rely on social media within several facets of their life. Some of those facets include the news, reviews on products and services, and interaction with others on a social platform. Because of this reliance, the topic of social media is an extremely complex and interesting topic to study. Our group was very eager to study how exactly social media has influence on daily life and their perception of these realities outside of social media. Our research is focused on how social media platforms can impede an individual's perception of reality and their thought processes to conform and associate themselves within different social groups. The demographic of interest is Undergraduate students at McMaster University.

The purpose of our study is to explore the way social media has an effect on our decision to conform on social media and in real life, along with the explanation behind the groups that we choose to associate with online and in reality. It is essential to find out who, what, when, why and how social media curation contributes to our false sense of

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[1] Undergraduate Student, Honours Social Psychology Program, Faculty of Social Sciences, McMaster University, Hamilton, Ontario, Canada.

reality in order to help our readers understand the extent to which groups have influence on our individual behaviour. We address many different perspectives surrounding the topic. First, we present the theories that we will use as our framework for our research. Next, we state the problem that our research addresses directly, the purpose of conducting this research, as well as a list of our research questions. The following section includes our literature review in an effort to demonstrate what research has been completed on this topic as the gaps within previous research is revealed. Succeeding the literature review is the methodology of our research and an outline of the steps taken during our research process. We then move into possible limitations that could have occurred through the conducting of our research and significant insights that our research provides.

Statement of the Problem and Purpose of the Research

The recognized problem that has led us to our research is that our world is becoming increasingly more divided due to the overdependence of social media and is subsequently creating a hypersensitive and segregated society.

The purpose of this research is to further understand how our innate desire to socialize is used as a tool on social media platforms to reinforce a false sense of reality, which is increasingly dividing individuals not only in the virtual world, but in all aspects of social life.

Literature Review

With the lucrative advances in technology and the current situation we are facing with COVID-19, there appears to be a dependence on using our devices, whether it is for academic, work, or leisure purposes. With such high engagement, our devices and online personas are now a large part of our lives. As such, it is intriguing to observe how social media plays an influential role in our everyday lives, in terms of shaping our sense of reality, beliefs and behaviours. Accordingly, our research is focused on how social media platforms can impact an individual's behaviours, both in-person and online, and views on reality. The purpose of the study is to learn more about how social media is impacting our opinions and views on societal issues and norms, through the groupthink perspective. This literature review aims to view the current research present on social media, the influence on behaviours, as well as how it may promote more divided beliefs and values. The findings of the literature review will be done with an objective view and will be utilized to either support or contradict our research.

Social Media

Social media is a topic of growing interest as it is incorporated into numerous facets of daily life for the majority of the world population (Perrin, 2015). For instance, a study on social media usage between the years of 2005-2015 discovered that approximately 65% of American adults are now engaging with social networking sites (Perrin, 2015, p. 2). This dramatic spike in usage is responsible for affecting global communication, politics, parenting, stress levels and dating habits (Perrin, 2015). Additionally, a study on the development of community through avenues such as social media was researched (Gruzd & Haythornthwaite, 2013). The conclusions drawn from this study outlined the significance that a few core people have in forming a sustainable online network due to their own connections (Gruzd & Haythornthwaite, 2013). Social media has also been

explored for its ability to predict the onset of mental illnesses, specifically depression (Choudhury et al., 2013). The logic of social media, in terms of how it has altered human interaction, has also been identified as a concern (Dijck & Poell, 2013). It is understood that social media has deeply rooted itself into the routines of its users, changing the logic of how one functions (Dijck & Poell, 2013).

All these research study findings reiterate that social media is a diverse area of discussion that can be linked to multiple societal components. The sources presented are interconnected in the understanding that social media is a growing source of communication and information for individuals. On the contrary, they differ by using micro and macro frameworks depending on whether or not the focus of the study is sociological or psychological. Social media has explored the areas of mental health, interpersonal relations, prominence, and global affectability. However, the focus of how social media affects one's behaviour and perceptions from the lens of a group perspective, such as groupthink, has not yet been considered. Therefore, the development of this area of study can be further elaborated on. The significance of one's actions subconsciously affecting another due to group conformity is a gap in the research that should be studied.

It has been found that as technologies advance, social media's relevance also increases as well. The impact that social media can have on an individual's ability to interact with others in the physical world is being hindered by an increased virtual presence (Perrin, 2015). It has also been discovered that social media has many positive impacts but also can be linked with just as many negative ones. The positives include, global communications, convenience to knowledge, and overall accessibility. On the contrary, the negatives of social media recognize a decline in interpersonal skills, isolation and an increased level of stress and mental health concerns (Choudhury et al., 2013). Moreover, social media is a fluid topic that is responsible for a variety of human occurrences and patterns (Dijck & Poell, 2013).

Groupthink

Groupthink is the theoretical perspective that understands the significance of group conformity and the subsequent actions that an individual may take in order to be psychologically and physically consistent within a certain group (Janis, 1971). This theory has been utilized in the field of economics to understand willful blindness regarding groups and markets (Bénabou, 2013). Within this area of study, hierarchies within groups and institutions are recognized as playing a major impact on groupthink (Bénabou, 2013). A study was also conducted on groupthink in a government setting (Hart, 1990). This research identified that policy failure is often caused by groupthink as it creates errors in decisions pertaining to a group (Hart, 1990). Similarly, groupthink has been linked as a cause for unethical behaviour within various organizations (Sims, 1992). Symptoms of groupthink, such as arrogance and loyalty, have been connected to this notion of unethical behaviour (Sims, 1992). A study conducted on foreign policymaking can be recognized to have influence by groupthink (Hart et al., 1997), It is identified that political group dynamics are greatly affected by the need for cohesion, thus, enacting groupthink (Hart et al., 1997).

The literature is extremely similar in its approach to groupthink and recognizes group conformity as a negative solution. It can be identified that in political and economic based

situations where decisions have to be made, groupthink is seen as a method that is highly disapproved. The literature varies as well depending on the conclusions that are drawn as a result of groupthink. For instance, a foreign-policy decision being affected by groupthink alters the lives of numerous individuals rather than a smaller macro decision, such as a specific business organization. Subsequently, groupthink has been examined in fields where decisions are crucial to the success of a company or larger organization, such as a country, but has limited research conducted on the impact of everyday choices being affected by group influence. Although the decisions that are being made are not as crucial, they are still important to study as individual behaviours are greatly influenced by groupthink.

The theory of groupthink is becoming increasingly relevant as individuals are wanting to avoid confrontation, conflicts, or debate. This can be recognized when groups are in the physical presence of others, rather than through virtual communications. It has not yet been thoroughly researched how groupthink links to an individuals' social media presence and then translates into daily life. Instead, groupthink is understood from the perspective of larger corporations where their choices greatly affect others. Furthermore, groupthink is a framework that is emerging in many facets of societal interactions and understanding its benefits and consequences is crucial if one's goal is to avoid this effect.

Societal Norms and Beliefs

Social media has become one of the biggest platforms that influence societal norms and beliefs within individuals. Our opinions and behaviours on many topics, such as political views, can be heavily influenced by social media. For instance, research that was conducted by Valenzuela (2013) looked at the several ways that social media has an influence on our collective actions and behaviours by providing us with information and news on political topics that aren't available to us daily. This study examined three different mechanisms which included information, expression, and activism, that social media including Facebook, Twitter and YouTube have an influence on the increased political activity online (Valenzuela, 2013). Information on topics such as political views has become so easily accessible to anyone that has access to a computer or phone that has an internet connection. Due to social media being so easily accessed, this has led us to depend on these platforms as our primary new sources for information (Bail, 2018). Individuals are constantly using these platforms as a space to express their opinions, find their beliefs and values, and to join in communications with others that either have or do not have the same opinions and views as they do. This was especially true within Valenzuela's (2013) study finding which indicated that the more frequent use of social media platforms within individuals, the more individuals would use social media for information, opinion expression, and joining social causes. These findings suggest that the more an individual uses a social media platform, the more likely they are to depend on social media for everything in their daily life.

Similarly, Bail's (2018) work on opposing views on social media had some interesting insights and findings. Bail's (2018) study addressed the mounting concern of social media sites and their influences on political polarization through the creation of "echo chambers," which can hold individuals from opposing views about current political events that are taking place (Bail, 2018). This study conducted an experiment, through a survey, that

created virtual contact between members of society and opinion leaders from opposing political parties on social media platforms (Bail, 2018). Bail's (2018) study aimed to change political ideologies and collected information about other political attitudes, use of social, and demographics. Having easy contact with different opinion leaders or parties' members can have a heavy influence on the opinions and views of certain parties and topics.

Information that individuals find on social media can be mobilized and used in many different ways. Lemert (1981) argued that mobilizing information can occur in three different forms: identificational, locational, and tactical (Valenzuela, 2013). These forms can cue individuals to act and express attitudes in a certain way through social media. Bail's (2018) study is relevant to those cues as his survey found that democrats online had exhibited slightly more liberal attitudes post treatment that had influences on the increasing size of level of compliance, whereas, treated republicans had exhibited substantially conservative views posttreatment (Bail, 2018). These findings show that after completing the survey, these parties had changed and exhibited different behaviours and attitudes online than they did in person.

Although both Bail (2018) and Valenzuela (2013) studies have shown that social media has some influence on individuals' political views and behaviours online, both studies have some limitations and gaps in their research. For both studies, it is unknown whether the findings are generalizable or applicable to other populations within social media platforms (Bail, 2018). Behaviours and attitudes on social media can vary depending on the platform and topic, therefore, these findings may not apply to other topics than political views online. Another limitation that each study faces is that political behaviour is a slippery concept to grasp (Valenzuela, 2013). Political behaviour and views can vary from person to person, therefore, it is difficult to estimate how every individual is going to view the same topic. A gap in Bail (2018) and Valenzuela (2013) research was the potential bleed-over between the different social media activities. An individual can have one behaviour or action on a certain social media platform that can bleed over into another social media platform.

Social media continues to grow as a platform for information and expression between individuals online. Individuals use these platforms as a way of expressing their opinions, sharing the information they know and gain information on certain topics, and to join groups and conversations about different topics online. The influence that social media has on an individual can vary from person to person and can have a different effect on their behaviours and actions that they demonstrate online and in everyday daily life.

Groupthink Impacting Behaviours

Groupthink involves a form of conformity and cohesion and can affect how people behave. Forsyth (2020) explains that groupthink creates groups who have similar attitudes, creating pressures to conform. Because groups tend to weed out those that disagree with their ideas, they become firm in their similar ideals that have developed regardless if they may seem ridiculous, they are reasonable to them (Forsyth, 2020; Valenzuela, 2013). Once members feel like they have found a community, they will engage in more opinion expression and with others who agree with them in their group and their behaviours are validated (Forsyth, 2020 and Valenzuela, 2013).

Djafarova & Rushworth (2017) investigated how behaviour can be impacted due to groupthink through purchasing habits. Celebrities have a large impact on people's beliefs and ways of thinking, which can lead to various behaviours being performed collectively by the members of their following (Djafarova, & Rushworth, 2017; Forsyth, 2020; Valenzuela, 2013). Djafarova & Rushworth's (2017) article discusses how celebrities use the groupthink behaviours of their followers to influence their ideas surrounding what products to buy. Those that have lower self-esteem and less of a voice are more likely to follow those who do, feeling a need to conform to the shared beliefs and attitudes because of the strong influence of the leader (Djafarova, & Rushworth, 2017; Forsyth, 2020).

Political leaders can influence what social causes groups speak about; celebrities can influence what products to purchase or company to endorse; and any other strong leader, famous or not, can influence the group to engage in similar behaviours (Djafarova, & Rushworth, 2017; Forsyth, 2020; Valenzuela, 2013). The norms and behaviours that are seen as reasonable are created by these leaders, and they should be the ones held accountable if the actions turn out to be harmful or irrational (Forsyth, 2020).

When a member of another group, or even one within the group, exhibits behaviours that are different from that of the group, they are shunned or ridiculed (Forsyth, 2020). The article by Forsyth (2020) explains this through the current anti-mask protesters and groups during the COVID-19 Pandemic. Their behaviours of refusing to wear a mask are supported by their shared idea that they are protecting their rights and the masks do not actually protect them from any harm. Although this, according to general knowledge and science, is proven to be false, their behaviours are fortified through their support within their group of people who share the same ideas (Forsyth, 2020). This signals groupthink for many reasons, but specifically that they are not thinking clearly and are acting as if they are the ones who are correct (Forsyth, 2020).

Groups allow people to find others who share their own ideas, leading to engaging in behaviours pertaining to those ideas. The findings from these research studies demonstrate how people who belong to a group are susceptible to conforming and enacting on the behaviours that the group believes are reasonable.

Groupthink and Social Media

Due to major technological advances, one's ability to communicate with others is easier than ever before. Regardless of location, people can spontaneously connect with millions of others and interact through their personal devices, websites, and virtual communities. Despite the countless advantages of this technological advancement, a few shortcomings exist. Since one's ability to access groups is relatively easy, users contribute to the issue of groupthink more frequently today than in the past. Groupthink is a term which refers to the progression of a group to make incorrect decisions, or false claims based on each group member's tendency to conform to what they consider the group's beliefs/values to be (Kanthawong et al., 2011). Currently, there is limited research regarding groupthink within modern social media platforms, however, previous literature does consider its effects.

According to Kanthawong et al. (2011), online social networking sites target users with specific characteristics and group them based on similarity, allowing users to find others who have similar beliefs and follow similar pages/accounts. In doing this, groupthink symptoms are more likely to occur, therefore increasing the possibility of groupthink

developing. These symptoms include the illusion of invulnerability, rationalization, morality, stereotypical thinking, mind guards, self-censorship, the illusion of unanimity as well as the tendency to call out members of the group with unpopular opinions (Kanthawong et al., 2011). Kanthawong et al. (2011) acknowledged groupthink and its existence within social media platforms, however, the research only scratches the surface of this relationship as it analyzes groupthink exclusively from a macro-perspective, mentioning solely political and government examples of groupthink occurrences. Researching the occurrence of groupthink from a micro-level is important as the progression of groupthink occurs in a bottom-up direction. Failure to indicate the presence of groupthink on a micro-level implies ignorance towards how groupthink originated in the first place. However, modern research on social media has touched upon specific symptoms of groupthink at a micro-level.

For instance, a study conducted by Tsikerdekis (2013) considered the effects of unanimity on an online webpage called "Wikipedia". Within this study, Tsikerdekis (2013) discovered that anonymity, as well as perceived anonymity, correlates with an individual's likelihood of conforming. In other words, anonymous individuals are less likely to conform than those whose identity is visible alongside their posts. Due to this, a relationship between personal risk and conformity appears to exist. Therefore, it is appropriate to suggest the contrary, that an individual whose identity is known is exposed to a higher level of personal risk and thus more likely to conform to the group. Although Tsikerdekis (2013) does not directly mention groupthink, his research can be applied to the theory as the foundation of the theory is present on both micro and macro levels. His findings can also help further understand the extent to which groupthink occurs on social media platforms, which were created specifically for group interaction (Tsikerdekis, 2013). Wikipedia's main purpose is to spread past information, if symptoms of groupthink are seen to be present in such a setting, taking this research and applying it to modern platforms whose purpose is to create groups, further understanding of how groupthink affects individual perception can be explained.

McKeever (2008) investigates the methods used to outline groupthink, challenges their validity, and seeks to uncover deficits that exist when groupthink is present. McKeever (2008) argues that social media sites, such as Facebook, provide accuracy within the analysis of groupthink as social networking sites are not governed under the same laws as the traditional social organizations used in the past to study groupthink. In saying this, McKeever (2008) uses social networking sites as a means to tackle groupthink, attempting to piece together a clinical measurement for its progression using a bottom-up approach. Additionally, McKeever (2008) recognizes that the existence of groupthink within social media platforms not only impacts individuals while using social media, but also when the social media is not necessarily present. The thoughts and beliefs that are created on these platforms are generalized to influence our everyday lives.

Generally, most research approaches groupthink with an "either-or" attitude, which is not effective in determining preventative measures. Moving forward, research must acknowledge the relationship that exists between micro-level, individualistic progressions of groupthink and macro-level, societal progressions of groupthink within the context of social media in order to tackle the growing issue of groupthink in society today.

Limitations in Existing Literature

Research within the field of social media and groupthink is quite extensive, especially now with the heavy dependence on the digital space, however, there are still gaps within the research. Within the field of social media, there seems to be a lack of focus on the mezzo level perspectives and how social media acts as a larger institution that has an influential role in individuals. Research has been focused primarily on micro and/or macro level perspectives exclusively. This lack of exploration within the mezzo level is constricting the research being done on social media, as it does not look at the holistic influence social media has. Regarding the literature on groupthink, several studies are biased and have marked groupthink as a negative theory (Dijck & Poell, 2013). This may also be the reality of the theory, as it has only been studied within negative situations, however, there should still be an exploration of how groupthink can be utilized in a positive situation. For example, having more research done on groupthink in advocacy work.

The field between social media and groupthink is a fairly new field of research, there is still a lot to explore. Overall, there are common gaps within the literature, such as the impact on everyday behaviours, the focus within the age group of Millennials to Gen Alpha, and lastly, a more in-depth connection between groupthink and social media. Modern-day research has focused on groupthink in situations, such as political situations, mental health, consumerism habits, etc., however, there is no focus on everyday behaviours and thoughts. As social media is so readily available, and there is an increase in engagement and usage, it would be important to see how these platforms are affecting our day-to-day behaviours, outside of certain situations. It is the Millennials who were the first generation to be exposed and fostered social media at an impressionable age. Due to this fact, it would be important to see how social media potentially impacts the values and beliefs of Millennials to Gen Alpha, as they have been the most exposed to social media. Lastly, as there is a lack of research on how impactful social media platforms are, there are gaps in detailed research on groupthink and online platforms. As current research has shown, groupthink is influential on individuals in-person behaviours, however, not much is known surrounding online behaviour. The question of online conformity, and how platforms can elevate polarizing views is not well-studied. As such, this is why we are conducting our research, to fill these gaps. Looking to further understand how our innate desire to socialize is used as a tool on social media platforms to reinforce a false sense of reality which is increasingly dividing individuals not only in the virtual world, but in all aspects of social life.

Summary

With the rise of social media in our society, there has been a large fascination within the field of digital space. Studies have shown that there has been a recent spike in using social media, and this increased use has been affecting multiple facets. Facets such as global communication, politics, stress levels and dating habits (Perrin, 2015). With the advancement of technology, social media's relevance is increasing and does not seem to be disappearing anytime soon.

Alongside this knowledge, it is important to view how these platforms are impacting various societal components. When looking at individuals' behaviours, the theory of groupthink is prevalent. Originated by Irving L. Janis, 1982 research has recognized groupthink and group conformity as a negative solution. Research has stated that utilizing

groupthink in certain situations can be seen as highly disapproving and even considered unethical behaviour. For example, using groupthink in foreign-policy decisions, as these settlements impact numerous lives, having them altered by groupthink is disreputable. As such, the literature has concluded that groupthink is a very influential and powerful tool to persuade and shape individuals into conforming to group norms. There is a broad range of research applying groupthink to various situations, such as consumerism habits, mental health/wellbeing, and new current contexts such as COVID-19. With that being said, there seems to be a large fascination within the political field, and how political leaders may use groupthink to influence individuals to favour their views. Furthermore, leaders are trying to advertise social media as an accurate source of information, which has been known as another form of bias and conforming behaviour.

As research has concluded the powerful impact groupthink has on individuals and their beliefs and values, it was only a matter of time when the research was going to connect groupthink to social media. Present research looking at online group behaviours, the influence of anonymity and how social media algorithms are programmed in a way to reinforce your beliefs; making confined and like-minded communities. Overall, the research within this field is quite extensive and is constantly growing, however, there are still gaps. For instance, the lack of research on social media's impact on day-to-day behaviours, not directing the research towards Millennials - Gen Alpha, and inadequate detailed research on groupthink and social media. As such, looking to research how social media influences undergraduate students' perceptions of reality, through a groupthink perspective, is a study that can help advance future research.

Theory

The chosen theoretical framework that is the main focus of our study is groupthink. Groupthink is the result of flawed thinking within a group setting where individuals fail to make decisions based on their own logic and instead conform to alternative methods of action (Delamater & Collett, 2019, p. 517; Janis, 1971). In other words, members of the group disregard the exploration and critical analysis of other thought processes out of fear that they might disrupt the homogeneity and harmony of the group (Delamater & Collett, 2019). It is often concluded that when groupthink is identified in a group setting, the end result is generally a poor decision (Delamater & Collett, 2019).

Within the framework of groupthink, there are various symptoms that can be studied as the cause for this phenomenon. Belongingness and majority are two significant ideologies that are focused on within our study. Belongingness is the desire that individuals search for in terms of group membership (Delamater & Collett, 2019, p. 126). It is often recognized that an individual will do whatever is necessary to achieve this sensation within the in-group. Similarly, majority focuses on the size of the group. Depending on this factor, the need for group members to be a part of the larger majority of people is desired. Group members will seek to conform to the norms of the group and avoid any encounter with isolation.

Additional concepts that are addressed are group norms, conformity and influence. Norms are defined as an informal rule that individuals within a group are expected to follow in particular circumstances (Delamater & Collett, 2019). It is often established within group settings what the norms are and how they will regulate the functionality of

the group and their activities (Delamater & Collett, 2019). Subsequently, the adherence to group norms results in conformity (Delamater & Collett, 2019). Conformity within a group setting is the result of individual members feeling dependent on the majority for validation regarding their own understanding of the social world and their opinions (Delamater & Collett, 2019).

Furthermore, the theoretical framework of groupthink and group norms plays an important factor in understanding how social media impacts the perceptions, actions and behaviours of society. Subsequently, these theories assist in recognizing how undergraduate students are impacted by social media in their everyday exchanges.

There are specific types of influence that are analyzed in our paper, including informational influence and normative influence. Informational influence is when group members accept information given to them by others at face value and do not question its validity (Delamater & Collett, 2019, p, 485; Sheriff, 1935). This type of influence commonly occurs when members are faced with uncertainty or they are attempting to find a solution for an unfamiliar problem (Delamater & Collett, 2019). A prime example of informational influence is when an individual is in an uncertain situation, they often look towards others who might be seen as experts in that area to see how they should proceed without appearing outside of the norm (Delamater & Collett, 2019). Unlike informational influence, normative influence plays a key role in conformity. Normative influence is when an individual conforms to the norms held by others within a group setting, with the intentions of receiving the social rewards or avoiding punishments that are dependent on meeting certain expectations (Asch, 1951; Delamater & Collett, 2019, p. 484). A significant reward in normative influence is being accepted and favoured by others (Delamater & Collett, 2019). It has been observed that normative influence has a greater impact when members respond without anonymity (Delamater & Collett, 2019).

When observing behaviors and values people inhibit, the need to conform to a group or a societal norm tends to be a large driving factor. There are a lot of overlapping concepts within conformity and groupthink, however, conformity has specific sub-theories which observe certain situations or environments. One of those being the concept of the majority influence created by Asch (1951), and information influence, coined by Sheriff (1935). Within our study, we focus on the concept of the majority influence from Asch (1951; 1956) and the concept of informational influence from Sheriff (1935).

Research by Asch (1951), through his conformity experiment, observed the effect of normative influence on individuals in a group setting. The key principles within majority influence, according to Asch (1951), refer to people conforming to group behavior for many reasons; wanting to fit in with the group (normative influence) and belief that the group is better informed than they are (informational influence). These principles are reasonings and explanations on why individuals may feel inclined to conform to a group. After Asch's experiment in 1951, he furthered his experiments and looked at how the size of the majority played a role in conformity. In his later study, when there were around 3-4 confederates present, the participants would conform, as the majority of the group were all saying the same thing. It seemed as though the size of the group played a role in the likelihood of conforming. Asch (1956) concluded that the bigger the majority group, the higher the likelihood people conformed but only up to a certain point. If the group ended up getting too large (5+) the size may not be as influential, but would still influence individuals to conform.

Before Asch's (1951; 1956) work, Sheriff (1935) researched conformity and social influence. Sheriff (1935), however, focused primarily on Informational Influence. According to Sheriff (1935), there are three key principles of informational influence that demonstrates how people conform in group settings. Firstly, when people lack knowledge, they look for guidance within the group. Secondly, when a person is in an ambiguous situation, they socially compare their behaviour to the group. Lastly, internalization often occurs when a person accepts the views of the groups and adopts them as an individual. These key principles emphasize that in situations where there may be differing levels of knowledge and there seems to be shared thoughts, the individual will be likely to conform to the group, especially if the individual is the sole individual with a differing view. It is also important to note that within Sheriff's experiment, if there was at least one other individual who stated an opposing answer to the group, individuals were more likely to stay consistent with their thoughts and beliefs.

When studying and analyzing group behaviors and interactions, Irving L. Janis' (1971) theory on groupthink brings forward the reasoning and root causes for why groups may act or think a certain way. According to Janis (1971), there are eight key principles: invulnerability, rationale, morality, stereotypes, pressure, self-censorship, unanimity, and mind guards. These key principles provide root causes and reasoning behind group behavior and thoughts.

Invulnerability refers to an illusion that provides some degree of reassurance about obvious dangers, which leads individuals to become over-optimistic (Janis, 1971). Therefore preventing them to respond to clear warnings of danger, which can cause irrational and risky behaviors. *Rationale,* according to Janis (1971) goes hand in hand with invulnerability as it shows how groups will ignore warning signs and other forms of negative feedback that may lead members to reconsider their past decisions. This enforces group members to share unanimous thoughts. *Morality* investigates how members of the group will unquestioningly believe and inhabit the groups' morals and values (Janis, 1971). This controlling ideology leads the members to ignore their personal ethics and morals. Within intergroup relations, there are *stereotypes* that portray outgroups as evil, which makes negotiations unattainable (Janis, 1971). This stereotypical ideology forces negative assumptions regarding the outgroup, and therefore enforces passive behaviors. Groupthink exists based on collective group behaviors and ideologies, and they maintain this collective unilateral thinking by enforcing pressure*.* According to Janis (1971), *pressure* refers to the leader's force on any member who is momentarily expressing doubts about the shared and collective group views and beliefs.

Furthermore, leaders will encourage *self-censorship* to avoid deviating from the collective beliefs (Janis, 1971). This minimizes unique and differing views within the group to maintain cohesion. Unanimity is a key part of groupthink, as group leaders want to express the same ideologies within the group. This urge for cohesion stems from the principle of unanimity. Unanimity is present once self-censorship has been put in place, as silent members are assumed to be in accord with what the group leader is saying. Lastly, the final principle, according to Janis (1971) is the concept of *mind guards*. This principle is put in place to protect the leaders and members from opposing views and information that may contradict or question their shared values and beliefs. Groups who

experience groupthink will try and omit contradictions as much as possible, as they want to maintain unanimity and cohesion in order to portray strength and high power.

The theory of Maslow's (1958) hierarchy of needs is a psychological theory that can aid in explaining "why" individuals partake in groupthink. Within this theory, there is an acknowledgement of fundamental psychological needs which must be fulfilled in order to reach our unique and individual potential (Maslow, 1958; Poston, 2009). Therefore, this theory recognizes social relationships as fundamental in reaching individual potential. The hierarchy begins with basic physiological needs such as food, water, warmth, and rest (Maslow, 1958; Poston, 2009). Following physiological needs, is safety needs (Maslow, 1958; Poston, B., 2009). The middle tier is where the psychological needs exist. These psychological needs include *belonginess and love needs* which is comprised of intimate relationships and friendships (Maslow, 1958; Poston, 2009). Following is one's longing to feel accomplished, which exists within esteem needs (Maslow, 1958; Poston, 2009). The top tier is where self-actualization exists, which indicates that an individual has reached their full potential (Maslow, 1958; Poston, 2009). Within the context of this study, the focus is on Maslow's psychological needs of hierarchy.

Belonging needs are vital in reaching one's full potential and are constantly observable in everyday life. Its presence can increasingly be seen on social media platforms as it is more accessible than ever as constant interaction with others is encouraged. According to Maslow, when this stage begins, socialization becomes a priority to the individual (Maslow, 1958; Poston, 2009). This sense to belong is felt through every stage in life and is focused on the desire to build relationships with others. This desire for relationships includes romantic relationship, mutual friendship and even a longing to have a family, depending on which stage of life one is going through (Maslow, 1958; Poston, 2009). For example, young children need to feel an emotional connection with parents and as teenagers, this connection switches to long for a more socially active peer group (Maslow, 1958; Poston, 2009). Anything that is reinforced, encouraged, or recognized by these social groups determine which type of group the individual internalizes themselves to be (Maslow, 1958; Poston, 2009). As adults, affiliation occurs based on whether or not one is accepted by a group and is influenced by several factors. These factors include education level, family, neighbourhood, and schools (Maslow, 1958; Poston, 2009). Within today's day and age, social media is integrated within each and every one of these factors, which not only influence belongingness but can also affect one's esteem needs (Maslow, 1958; Poston, 2009).

According to Maslow's theory (1958), there are two levels of self-esteem. The first being low-level esteem, which includes individuals who do not see themselves as adequately as they should, and high-level self-esteem where individuals have self-respect and like who they are (Maslow, 1958; Poston, 2009). Individuals within this lower level may not like themselves very much and appear to be critical towards themselves (Maslow, 1958; Poston, 2009). Because of this, an individual with low-level self-esteem may constantly attempt to seek validation and acceptance from the external environment, such as from others within their social life (Maslow, 1958; Poston, 2009). Within this concept, an overlap can be observed between the two psychological needs. Both belongingness and esteem needs can require confirmation from others and are needed to reach one's full potential. With this, the importance of these needs is realised and a

parallel can be drawn between one's social environment, their interpretation of the social environment, and self-adequacy.

Although in the past there has been controversy over the existence of universal psychological needs, human's innate need for competence, autonomy, and relatedness have recently been recognized to play a significant role in attaining psychological and physical well-being (Deci & Ryan 1985, 2000). Current social movement towards psychological health and wellbeing have reinforced its existence. Self-determination theory (SDT) is a theory created in relation to these three universal psychological needs. It proposes that people's interpersonal environments and their individual differences will affect their ability to fulfil their psychological needs (Deci & Ryan, 2000). If these psychological needs are satisfied, an individual can become more identified, integrated, and intrinsically motivated within their life (Deci & Ryan, 2000). This constant interaction with the social environment is either supporting or spoiling their basic psychological needs, which in turn influences their motivation, cognition, and wellbeing (Deci & Ryan, 2000).

Social environment is a key aspect of SDT for many reasons, one being the ability to satisfy or dissatisfy our basic psychological needs. According to SDT, positive feedback enhances intrinsic motivation (Deci et al., 1999). This concept is important when analyzing user perception within social media platforms as many platforms use "likes" as a form of positive feedback. Social media users look towards these "likes" as a type of extrinsic motivation. Thus, according to this theory, social media has the power to influence one's mood, behaviour, and beliefs.

As stated previously, external feedback that affirms competence when accompanied by a sense of autonomy enhances intrinsic motivation (Deci et al., 1999). Therefore, social environments that are preventing the fulfillment of basic needs will lead to either controlled motivation or amotivation. When individuals partake in activities based on the motivation of a tangible reward, their behaviour, over time, becomes contingent on the reward (Deci et al., 1999). Due to this, the source of motivation shifts from internal to external (Deci et al., 1999). This externalization of motivation is internalized, as people naturally consider the values and behaviours that are important to others within their social environment (Deci et al., 1999). However, this can lead people to accept beliefs that are encouraged by their social world, regardless of whether or not these beliefs are correct.

On the contrary, people who are rejecting or controlling will impair internalization, leaving people controlled by external or introjected regulatory processes (Deci et al., 1999). If this is the case, three facilitating factors exist. Firstly, a rationale for the requested behaviour must be given (Deci et al., 1999). This is because the individual has not internalized the beliefs within their social environment. Therefore, they need a logical explanation to behave in a way that they would not normally behave in. Secondly, an acknowledgement of how the behaviour would make others feel (Deci et al., 1999). If the individual believes the requested behaviour will make others feel badly, and the behaviour is seen to be morally wrong, they will not conform to the behaviour. Lastly, by emphasizing the behaviour as a choice (Deci et al., 1999). All three of these factors contribute to internalization of extrinsic motivation and contribute to the likelihood of an individual accepting the values and behaviours being imposed on them.

Theoreticians

Irving Janis, the theorist of groupthink, is a Yale social psychologist who studied at the Chicago School (Calisphere, 2011). His first studies focused on an individual's decision-making regarding topics such as dieting and smoking, before moving on to the theory he is best known for today, groupthink (Calisphere, 2011). Janis (1991) found that groupthink could explain events such as political disasters and tragic decisions that had been made in the past by groups of people (Janis, 1991). The theory itself was derived from the Challenger Shuttle launch tragedy in 1983 (Janis, 1991). Janis (1991) argued that those who died on the Challenger did not make poor decisions on their own, rather they were subjects of groupthink.

We are also looking at belongingness from Abraham Maslow's (1958) hierarchy of needs. He began his research journey when he discovered his interest in psychology and moved to Wisconsin and studied at the University of Wisconsin (Poston, 2009, p. 348). In the 1930's, he had earned his BA, MA, and Ph.D., and then moved to New York and taught full time at Brooklyn College (Poston, 2009, p. 348,). When serving as chair of the Psychology Department at Brandies in 1951-1961, he met Kurt Goldstein (Poston, 2009, p. 348). Goldstein's development of self-actualization directly inspired Maslow to pursue the idea of humanistic psychology (Poston, 2009, p. 348). His creation of the hierarchy of needs came from his observations and studying of monkey's interactions (Poston, 2009, p. 348). Maslow's approach was directed towards helping people achieve positive outcomes and to be their best selves (GoodTherapy, 2011).

Solomon Asch, whose work we are looking at regarding conformity, was an influential 20th-century psychologist (GoodTherapy, 2011). He received his master's degree and his Ph.D. at Columbia University where he was a mentee of Max Wertheimer (GoodTherapy, 2011). This mentorship influenced his ideas surrounding the gestalt ways of thinking, association, and perception (GoodTherapy, 2011). Asch eventually went on to receive the Fellow of the American Academy of Arts and Science title, which is very prestigious (GoodTherapy, 2011). Asch's contributions to the field of psychology were significant, especially during the 1950s. His studies were impactful to psychology and social psychology while some thought his ideas surrounding impression formation, conformity, and prestige were decidedly controversial (GoodTherapy, 2011). His work involving conformity was a direct inspiration for another well-known psychologist, Stanley Milgram, whose Ph.D. he oversaw (GoodTherapy, 2011). Asch was known for viewing humans as complex creatures and not choosing to look at one aspect of psychology (GoodTherapy, 2011). His studies are still used today and have done a lot for the field.

The last theory we will be looking at, also under conformity, informational influence, was theorized by Muzafer Sheriff. Sheriff was born in Turkey, where he received the majority of his education (Kayaoğlu et al., 2014). After graduation from International College and Istanbul University, he moved to the United States where he attended Harvard University for his master's degree and Ph.D. (Kayaoğlu et al., 2014). He attended school during the great depression, which influenced his ideas surrounding prestige-suggestion (Kayaoğlu et al., 2014). With the supervision of and influence of Gordon Allport, this was his master's thesis (Kayaoğlu et al., 2014). Between his two degrees, Sheriff traveled to Berlin and experienced Nazism come to fruition; much like Asch, he too wanted to study gestalt principles of social perception (Kayaoğlu et al., 2014). Sheriff

was bold in what he stood up for, publicly opposing anti-fascist camps at his university and a discrimination case targeted toward a Jewish student (Kayaoğlu et al., 2014). His social psychological theory focused on the idea that thoughts, goals, and desires are not innate; they are formed in societal functions (Kayaoğlu et al., 2014). He observed that change needs to be from the greater structures, not simply from education (Kayaoğlu et al., 2014).

Another theorist whose theory we will be looking at is Edward L. Deci. He is a macro sociologist who is interested in human motivation; it is through this that he developed self-determination theory (University of Rochester, n.d.). Deci has a Ph.D. from Carnegie-Mellon University and remains as professor emeritus at the University of Rochester (University of Rochester, n.d.). He applies self-determination theory to a multitude of areas, such as mental health, parenting, work, etc. (University of Rochester, n.d.).

Methodology

Our research question is quantitatively based and focuses on gaining an understanding of social experiences on social media and how people conform to a certain norm that is present amongst a desired or dominant group, for example, groupthink (Janis, 1991). Specifically, our research question is *how does social media influence undergraduate student's perceptions of reality?* The research was approved by the McMaster Research Ethics Board (MREB#: 0327). We conducted an online anonymous survey using the McMaster Research Ethics Board approved platform Limesurvey. This survey consisted of approximately 20-30 questions that were a combination of open and closed ended questions. The participants were not required to answer all questions of the survey, and no penalty was made if questions were skipped. Participants' informed consent was not assumed until they pressed submit at the end of the survey. The survey was conducted anonymously, therefore the student investigators were not able to identify any of the participants and be able to correlate the participants to their survey responses.

The psychological risk was very low in this study. The potential risk included feelings of embarrassment, demeanor, and stress by the participant. These feelings may be experienced due to topics such as political views, certain values, behaviours, etc. However, these potential risks posed no risks greater than those in everyday life. Although there were potential psychological risks, the participation in our study was optional and participants could withdraw at any time before survey submission. Once the participants agreed to complete the survey, they provided implied consent.

The social risks were very low in this study. Participants may have experienced feelings of discomfort or anxiety with having their survey answers being released. These risks are no greater than everyday activities. To minimize and manage these risks, we maintained optional participation, therefore participants could withdraw if they chose to. Alongside optional participation, we ensured that no names or identifiable information was associated with any of the surveys or survey data, therefore the data was un-identifiable to each participant. Once the survey data was collected, everything was stored within a secure OneDrive account that was only accessed by student investigators.

In addition, participants had the ability to skip any question(s) that they did not wish to answer or felt uncomfortable answering. There was also the contact information of the Student Wellness Centre in the letter of information and at the beginning of the survey as

a resource that participants could access if they felt the need to talk about anything that came up within the survey.

Due to the current situation with COVID-19, recruiting participants was challenging, as it was done solely online, and this may have limited the amount of outreach we received. As such, we reached out to numerous McMaster clubs and services to promote and share our survey, in hopes of reaching our target participant count. Besides potential limitations within recruitment, another issue that could have arisen was collecting a non-representative sample. Due to the fact that this thesis project was mandatory within the Honours Social Psychology Program, it was probable that a lot of Social Psychology students would have been involved in filling out the survey. As Social Psychology students are more aware that surveys were being conducted, there may have been an overrepresentation from students in the Social Psychology Program in comparison to other programs at McMaster. With this potential bias, we recruited through various McMaster clubs and societies, in an effort to get a well-rounded and representative sample. Lastly, during the formation of the survey and data analysis phase, there may have been limitations with wanting to analyze behaviours. Due to the nature of surveys, there was a limitation in what type of questions we could ask in order to understand and analyze their online behaviours. This being one of the reasonings in which we also looked at the participants' perceptions of their behaviours.

After conducting our survey, we began to collect and aggregate the data. This process entailed identifying the themes that were common among the various survey answers, as well as identifying key trends. These steps were crucial during the data analysis phase as it aided us in uploading our data into Excel, which was the next step. Excel is a software that was utilized to map and present the trends within our data. Establishing our key themes and trends prior to uploading our data to Excel induced ease of use with utilizing and navigating Excel. Once we uploaded the data into Excel, we were able to determine whether our hypothesis was proven correct or incorrect. The final step within data analysis was to compose all of our findings and write a report to summarize our entire study.

Through our research, we asked questions apart of 3 sections, their social media preference, perceptions on social media's influence on individuals' behaviours, and perceptions on social media being a tool in sharing information. Asking these questions allowed for the participants to provide their input and views on social media, but also assisted us in achieving our goal of seeking how social media impacts our thoughts and behaviours. Having a mixture of open-ended questions, closed-ended questions, and utilizing Likert Scales widened the input we received from participants. A limitation with utilizing online surveys was the type of questions we could ask, in order to get enough input regarding behaviours and perceptions. As such, asking various types of questions hopefully increased the amount of information and insight provided by participants.

Results

Our research examined (n=53) undergraduate students from McMaster University; 1st year (9.43%), 2nd year (16.98%), 3rd year (16.98%), 4th year (49.06%), and 5th year or higher (7.55%) were surveyed. The students' faculties varied, with the majority being a part of the faculty of Social Sciences (66.04%). Faculties that were also present in our survey demographics included Science (20.75%), Humanities (9.43%), and Health Sciences (5.66%). The participants were overwhelmingly female identifying (88.67%) with

the remaining of responses identifying as male (7.55%). It is for this reason that many of our conclusions were made with female identity and experiences in mind. Our respondents identified with the following ethnicities, in order of prevalence; White/Caucasian (67.92%), South Asian/Asian (9.43%), Indian (7.55%), Middle Eastern (5.66%), Indigenous (1.89%), and other (1.89%).

Intentions of Social Media

There were noteworthy results in gathering the intentions of participant interactions on social media and 56.60% (n=30) stated that they sometimes are likely to be an active user through posting and the creation of content. This is extremely interesting as there tends to be a strong passive intent when using social media among our participants. In question 5, participants were asked, "why do you spend more time on this platform? Please select all that apply." It was found that majority of participants, (n=43) used their preferred social media as it was the most entertaining platform. This was an interesting finding as it emphasized agency amongst the participants as they were not dependent on other individuals for their decision. The next most common response, (n=41) was because it was easy to use. This is understandable as many individuals would not likely engage in an overchallenging platform. Interdependence comes into play as (n=35) respondents said they spend more time on the specific social media due to friends and family usage. Many individuals, (n=33) said that there is a lot of information that is able to be accessed. A decent number of participants said that they used the platform for the ability to connect with others (n=25), escape from reality (n=20) and connect with certain celebrities and public figures (n=20). The remaining responses were low and not many participants used their selected social media platform for seeking friendship relationships (n=5), wanting to take on a new sense of identity (n=3), seeking romantic relationships (n=1) and other intentions (n=2).

## Intentions of Social Media Significant Trends

The results found that majority of participants engage with social media platforms (81.13%) because of the entertainment value it provides. This statistic raises the question of whether or not individuals engage with the same social media platforms as their friends or peer groups in order to discuss the entertaining content or is it simply a solo preference. Also, the question can be asked if peers have an influence on the platforms an individual uses or is there a sense of agency and independence among users? Moreover, this directly correlates to participants' responses in question 7 that asks, "do you often spend time mindlessly scrolling through your social media" where 84.91% (n=45) said yes. These two questions link together the idea that individuals on social media engage with certain platforms because of the content and the ability to see multiple posts, photos or videos in a small amount of time. Additionally, the results of question 8 come into correlation as (n=45) answered either very unlikely (n=4), unlikely (n=11) or sometimes (n=30) to the question, "how likely are you to be creating content (posting/commenting/sharing) on your social media?". It can safely be assumed that the intentions of many social media users are simply to be a passive user and engage with others' content rather the creation of original posts. This poses questions on what drives users to interact on a platform with original content versus nonoriginal content? All of

these findings and questions raised could be room for future research to be conducted. Potentially, having a majority of our participants identify as female (96.23%) impacted the responses as they hold a different outlook on how to interact with social media.

Figure 1 depicts the responses from question 5 of our survey, "why do you spend more time on this platform?" In question 4 of the survey, participants were asked about their social media preference, thus question 5 was designed as a follow up, building upon the previous response. It is evident that there is a wide range of responses and participants varied in their social media intentions when deciding on a platform to use most often. Majority of participants emphasized their chosen social media platform because it was entertaining (81.13%) and easy to use (77.36%). On the other hand, intentions of using social media to seek romantic relationships (1.89%) were not as prominent. Moreover, Figure 1 is able to gather the intentions of social media usage among undergraduate students at McMaster University.

Figure 1
Why do you spend more time on this platform?
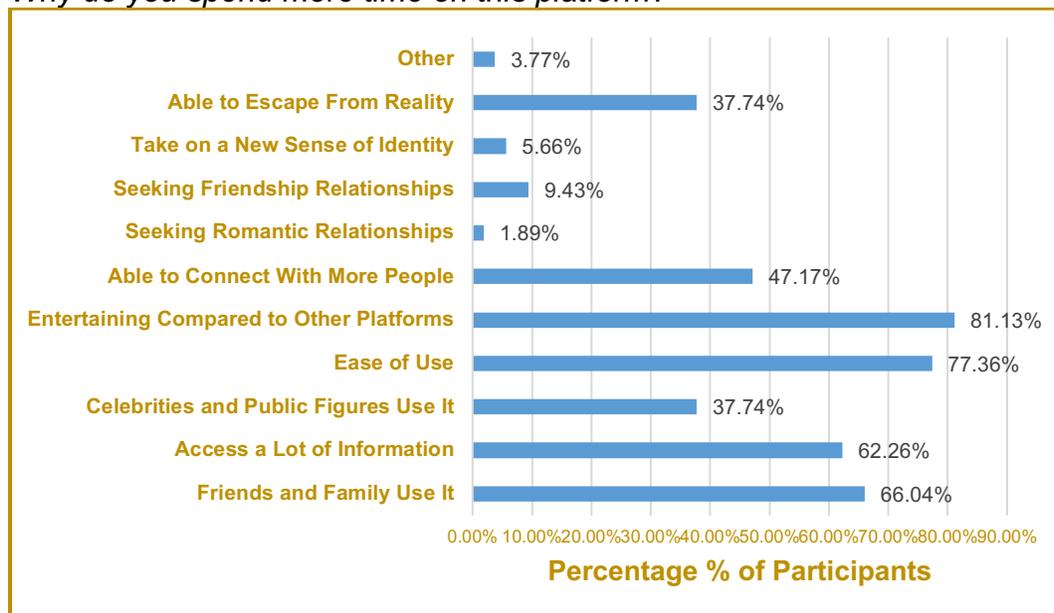
Awareness of False Perception

In question 15, participants were asked whether or not they believe that information shared on social media accurately portrays reality. Overall, of (n=53) participants, 90.57% of participants agreed that social media does not accurately portray reality as seen in Figure 2. While online platforms do not seem to allow individuals to feel as though they can express themselves honestly, it is clear that they acknowledge that what they see is not true to what is really going on in one's life. This statistic is significant as despite the acknowledgment of these false realities, according to question 7, 83% of participants still spend between 2-5+ hours on social media sites daily. In question 12, participants were asked in an open-ended question how groups and pages on social media influence individuals' behaviour. These findings were interesting as five dominant themes emerged. These themes included false self-portrayals, conformity, polarization and bias information, the role of social media in forming opinions and beliefs, and unrealistic

Figure 2
Does Social Media Accurately Portray Reality?
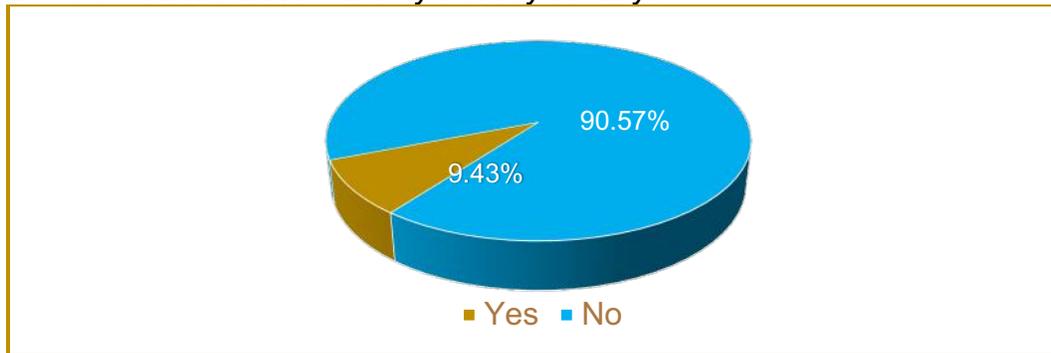
perceptions of beauty standards. According to our findings, unrealistic perception of beauty and image was mentioned by 43% of participants, whereas conformity was mentioned by 40% of participants. Bias information was mentioned by 21% of participants and fake portrayals of self was mentioned by 17%. Lastly, forming personal beliefs and opinions was only mentioned by 9% of participants. Therefore indicating that participants were more consciously aware of the perceptions of beauty, image, and conformity, when using social media. However, participants were asked in question 11 whether or not they behave differently on social media versus in real life. A significant proportion of individuals (n=34) do not believe they contribute or behave in a way that is influenced by these false perceptions. Out of the individuals who admitted that they behave differently (n=19), three common themes were perceived within the follow-up question asking why they behave differently. The first theme being the desire to present themselves better, secondly presenting oneself in a way they believe is socially desirable, and lastly, showcasing positive parts of their lives only. Based on these themes, it is evident that social media users are aware of other's perceptions of them, thus impacting their online behaviour. Participants were asked in question 1 which social media platform was their favourite. Out of (n=53) participants, 47.17% thought of Instagram as their favourite platform, followed by TikTok with 32.08%, Twitter with 20.75%, 9.43% chose 'other'. It is also significant to note that out of (n=53) participants, 47 identified as female. Thus, an unintended gender bias may exist.

Awareness of False Perception Significant Trends

Within these statistics, it would be more than appropriate to suggest that despite the awareness that social media skews perception on more than just a visual level, many participants still feel the need to engage with and use social media platforms. It would also be appropriate to note the likelihood of participants basing these understandings of social media platforms on the platform they mentioned to be their favourite. For example, 43% of participants mentioned unrealistic perceptions of beauty standards and 47.1% of participants said Instagram is their favourite platform. Due to the platform being primarily visual and pictorial, a correlation between favourite platform and the type of false perception being experienced could exist. To further explain this possible correlation, the question of whether or not the false perception of specifically body image would be a significant influence if Twitter, a platform that is primarily text, was the majority of

participant's favourite platform? A second possible correlation could exist between the type of false perception participants are experiencing and their gender, a correlation that could not be confirmed due to our unintentional, but possibly existent gender bias. These findings could open the door for future research in discussing the extent to which favourite and most frequently used platforms dictate the 'theme' of the false perceptions participants are experiencing.
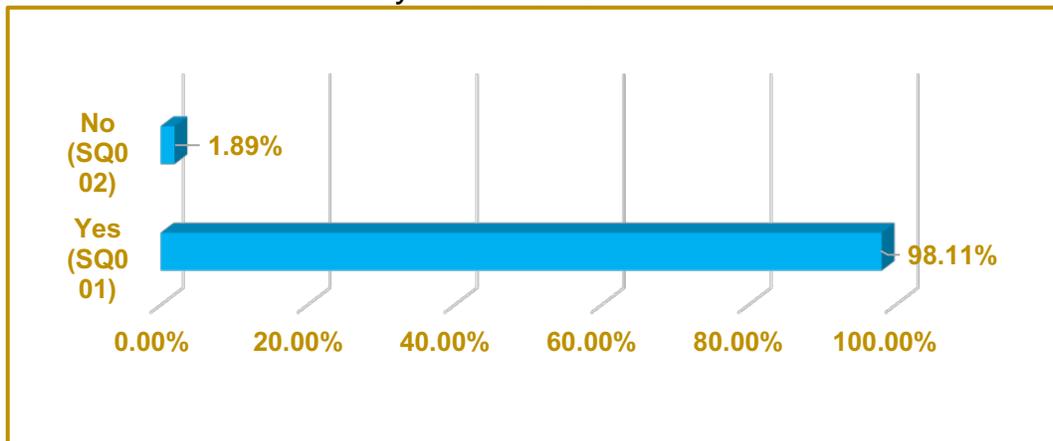
Biases/Shared Beliefs

We asked our participants in question 17 if they believed that there were biases on social media. In total, (n=52) participants indicated that they believe that there are biases within social media. Therefore, (n=1) participant believed that there were no biases on social media. This was unexpected, as majority of participants were open about noting that there is a bias present on social media. We had anticipated some sort of denial or embarrassment in regard to perceiving a bias, as they would then be at fault for being influenced by such biases. Nonetheless, although there was only one participant who noted there were no bias, it was still a notable response.

Figure 3 illustrates our participants' responses when asked if they believe there are any prejudices in social media platforms. As shown, 98.11% of participants believe that there is some kind of biases that can be found on social media, whereas 1.89% of participants believe that there are no biases at all on social media.

In question 18, we asked participants if they believe that individual beliefs and values are often shared on social media. From the participants that responded to this question (n=53), majority of participants (n=46) answered yes, that they believed it is often shared online, whereas only a few participants (n=7) answered no, that they do not believe beliefs and values are shared online. In terms of which social media platform they believed was commonly used when openly sharing their beliefs and values online, in question 19, Twitter was the most popular (n=34), Facebook following close behind as the second most common (n=32), Instagram was the third common (n=15), and TikTok reported as the less common (n=13) used social media platform. Lastly, n=1 participant indicated other, they believed that YouTube was the most used platform for openly sharing beliefs and values online.

Figure 3
Do You Think There Are Any Biases On Social Media?

Biases/Shared Beliefs Significant Trends

Throughout our research, there were many significant trends that we found based on participants' answers. The first interesting trend identified was most participants (98.11%) indicated that they believed there were biases on social media. We found this interesting because based on the responses we received in question 14, most participants (67.92%) indicated that they believed social media had a strong influence on their behaviours between individuals. We also found that a small percentage of participants (33.96%) noted that social media had some influence on their behaviours. The majority of participants (88.68%) indicated the reason why they believed social media influenced their behaviours was based on setting standards and norms, wanting to compare themselves to others and be liked by them, formulate opinions on what is happening in the world, etc. This further posed the question of whether social media has an influence on the biases they have on social media and in reality?

Another interesting trend that was noted was that in question 18, a high percentage of participants (86.79%) indicated that they believed individuals often shared their beliefs and values on social media. This was interesting due to the responses we received in questions 15 and 16. In question 15, participants were asked if they think social media is a good way to share information, about half of the participants (49.06%) noted that they believed it was a good source for information, a quarter of participants (26.42%) noted that they believed it is a fantastic source and lastly, the other quarter of participants (24.53%) noted that it does not do a good job of sharing information. With this information, we can see a discrepancy in responses from question 15, 16, and 18. With a high number of participants believing social media is a good source of information in question 15, whereas several participants do not see social media as a good source of information in question 18. Moreover, in question 16, many of the participants (90.57%) noted that shared information on social media does not accurately portray reality. Therefore, this poses the question as to why do individuals openly share their beliefs and values online, if they do not believe that it is an accurate portrayal of reality?

A high number of participants (64.15%) indicated in question 19 that Twitter was the most used social media platform to openly share beliefs and values, with Facebook (60.38%) following closely behind. This did not surprise us as Twitter and Facebook have always been viewed as expressive social media platforms. The answer that did come as a surprise was that only one participant (1.89%) indicated that YouTube was the most commonly used platform. This was surprising because YouTube had always been viewed as a platform for laughter and enjoyment, we did not think that it would be seen as a platform for openly sharing beliefs and values. Therefore, this posed more questions based on whether shared beliefs and values can be expressed online in different ways. In reference to YouTube, there is no word count, therefore creating the ability to openly express your beliefs and values with no limitations in a verbal video. Whereas on Twitter and Facebook, you do have a word count limitation and it may be hard to put what you want to say into a post. Based on all the information we have gathered, there is still a lot of future research to be done on biases and shared beliefs.

Figure 4 depicts the percentage of participants that believe individuals do or do not share their beliefs and values openly online. This figure explains the responses that we received from participants, in which a high percentage (86.79%) of participants believed

Figure 4
Do You Think Individuals' Beliefs And Values Are Often Shared on Social Media?
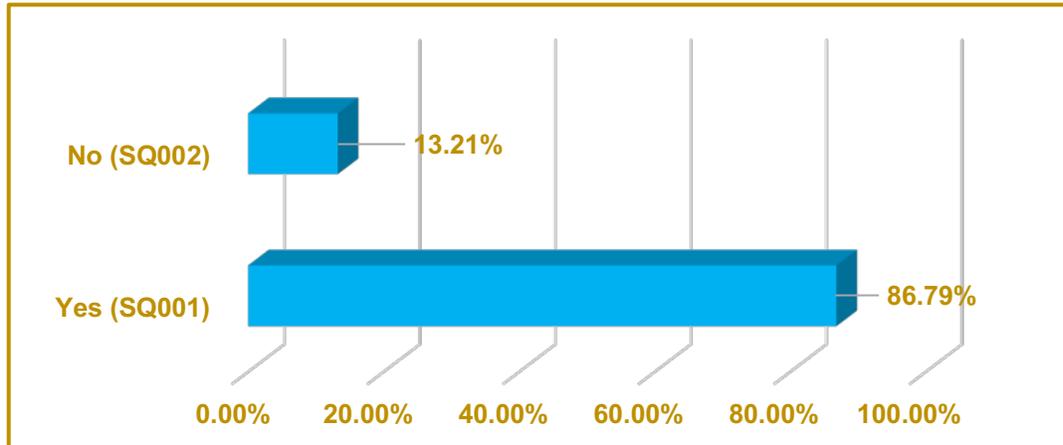
individuals do share their values and beliefs openly on their social media platforms, as well as a low percentage (13.21%) that said they do not believe individuals openly share their values and beliefs.

Online Communities

In total, only 24 participants stated that they were part of an online community, thus, most participants (n=28) were not. This came as a surprise for our study, as we had expected many of the participants to have been part of some type of online group or community due to academics. Participants were asked in question 20 which groups or communities they were a part of and why. Out of the 22 that had responded, school, clubs, or extracurriculars were the main reasons for being part of the communities and groups they had memberships to (n=11 participants). Leisure and entertainment were the next highest reasonings (n=6), and then gaining resources or self-help intentions was closely followed (n=5). In terms of how they found these groups, majority of them (n=14) stated that they heard from someone else, either through a friend, colleague, or an influencer they follow. Few participants (n=3) had also noted that they were part of the groups due to personal interest/research, and lastly, the remaining participants (n=3) noted that it was due to the social media's algorithm or automatic incorporation.

Online Communities Significant Trends

As majority of participants (52.83%) had noted that they were *not* part of an online group or community, this was an interesting trend we noticed. Due to the responses in question 20, the main reason for membership was for school or extracurricular reasonings. All the participants that participated were undergraduate McMaster students, thus, all being part of the same school institution. This poses the question of why some students join these groups and clubs, and why not. Are there specific students who are being targeted to join these groups, or is this an issue of accessibility? Participants were asked in question 21 about how they found out about these groups and majority (70%) of them stated through other people. This varied from people within their immediate circle of friends and family, to artists and influencers they follow from a far. With this information, it raised more questions on why most of our participants were not part of online groups.

However, it is important to acknowledge the small sample size we had received, thus these findings are not generalizable and only represent a fraction of the McMaster community. All in all, there is room for future research.

It is also important to note how participants utilize online communities or groups as a resource/support tool. Some participants noted that they would join mental health support groups, therapy meme groups, or even some medical disorder support groups. They also indicated how they had a positive interaction and involvement within these groups, as they felt the groups provided a welcoming and empowering space. Lastly, joining groups and communities for leisure and entertainment reasons. Some examples would be local dog groups within the GTA, or groups for their specific culture or religion. Participants had noted that these groups allowed them to connect with other people who had similar interests to them.

Figure 5 depicts common themes that arose in participants' responses with regards to online groups' influence on individuals' behaviours. The responses all fall in the same vein of not being fully authentic online. The high percentage of conformity (40.43%) portrays that individuals feel the need to comply with norms depicted online. This insinuates the presence of groupthink and the potential sense of mandatory conformity. As most respondents identified as female, it is not surprising that there was the highest number of responses containing unrealistic perceptions of beauty/self/body and comparisons (42.56%). These findings demonstrate that online platforms do not always allow for honest portrayals of individuals and it even alters how individuals behave online. In regard to memberships within groups, these groups may sustain these types of norms and standards, thus creating a suffocating environment to adhere to.

Figure 5
How Online Groups and Communities Influence Individual's Behaviour
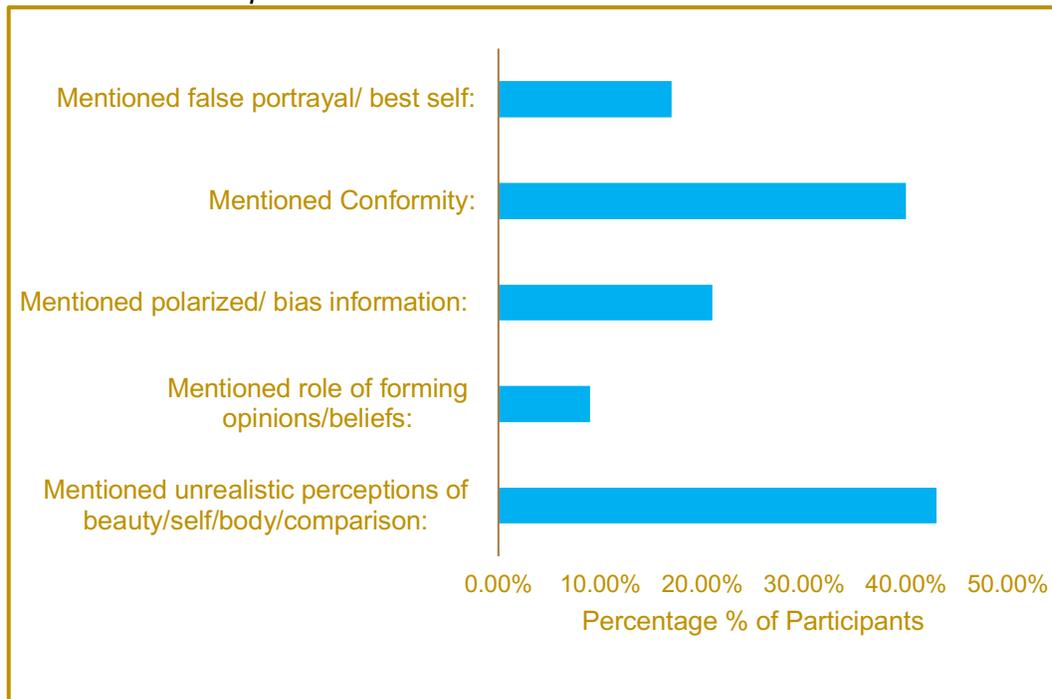
Discussion

Intentions of Social Media

As discussed in the results section, it was mentioned that 81.13% (n=43) of participants used their favourite social media platform because of the entertainment value it provided. It is important to note that this study was conducted during the COVID-19 pandemic where other forms of in-person entertainment had been limited or completely shut down. Thus, the increase in social media usage solely for entertainment purposes may be slightly inflated. Moreover, the entertainment value of social media is a primary reason for its use. For future research, the definition of entertainment should have been discussed and specified, as there is a wide range of reasons why someone would find their specific platform engaging. One individual might prioritize the ability to watch amusing content as their main form of social media entertainment and another user might value keeping up with current fashion trends through advertisements as the most enjoyable form of entertainment. Regardless, as referenced in the literature review, social media usage as a whole has dramatically increased and is affecting communication, political views, parenting habits, individual stress levels and dating behaviours (Perrin, 2015). Therefore, the intentions of social media are widespread, ambiguous, and individualized for each user.

The intentions a user has on social media also may not be as conscious as one believes, as these platforms have the ability to consume large portions of time and cognitive energy. As mentioned in the literature review, online social networking sites have specific, targeted features that understand users' interests in order to bring people together who have similar beliefs (Kanthawong et al., 2011). Therefore, the concept of groupthink is being enforced without the awareness of the user. Kanthawong et al. (2011) studied symptoms such as the illusion of invulnerability, rationalization, morality, stereotypical thinking, mind guards, self-censorship, unanimity and the tendency to call out members of the group with unpopular opinions. These findings directly correlate to our research as 84.91% (n=45) stated that they spend time mindlessly scrolling through social media. Through this mindless scrolling, our participants 37.74% (n=20) recognized that their intention on social media were attributed to it being an escape from reality. As users are engaging on social media as an escape, they are consumed with numerous advertisements, images and content directly relating to their interests. This could lead to assumptions as well as a groupthink mentality of conformity. For instance, if an individual is only showed content that is of interest to them and fits their beliefs, they will begin to believe that they are correct and discourage the opinion of others. In a study conducted on Wikipedia and groupthink, it was discovered that anonymity associates with an individual's likeliness of conforming (Tiskerdekis, 2013). Social media provides the option for anonymity and as participants specified about using platforms as an escape from reality, questions can be raised about the power of subliminal groupthink.

Significant results were also found as 66.04% (n=35) of participants said they spend more time on a specific platform because friends and family use it. Qualitative responses were gathered in regard to question 2 that asked, "why is this your favourite social media platform?" The intentions were clear and there were a large majority of participants that mentioned to some degree, having access to friends and family was important, as well as keeping up with acquaintances through social media. One respondent said the following in response to question 2, "It's easy and I like to see what my friends post. Makes me feel

like I am in the know." It is evident that connection is extremely important even if it is not through direct interaction but rather knowing that people are alright through their posts. A study conducted on social media concluded that there is the ability to create sustainable online networks and connections with strangers, friends or family (Gruzd & Haythornthwaite, 2013). This research can be linked with ours as it emphasizes the need for group assembly and maintenance of human connection with those in our immediate lives, as well as strangers or celebrities. A decent number of participants in our study, 37.74% (n=20) used specific platforms as they could interact with celebrities and public figures of interest. This figure reiterates Gruzd & Haythornthwaite's (2013) findings and our own that a major intent of social media is for that interaction with others and staying in touch with those who might not be able to be present in one's physical life. In direct relation, 47.17% (n=25) of participants emphasized the intention of connecting with others as a reason for social media use.

Awareness of False Perception
   The extent of participants' awareness of the false perceptions social media imposes has been proven to be significant as 92.57% of participants acknowledge such to be true. The influence of false/unattainable beauty standards was a frequented example of such, with just under half of participants mentioning it within their responses to our open-ended question regarding such perception's influence on behaviour. However, despite participants' awareness of these false perceptions, 64.15% do not think their behaviour is directly influenced by them. Could this be the reason why individuals still interact with the false realities that exist on social media platforms? Could these ideals be influencing their behaviour subconsciously? Such questions can be analyzed through previous psychological theories such as Maslow's theory of self-esteem (1958) within the context of Maslow's hierarchy of needs, as well as the social psychological theory of normative influence. It is important to note that such conclusions cannot be drawn indefinitely, but such theories may open the door for future researchers to do so.
   According to Maslow (1958), there are two levels of self-esteem that could potentially explain why individuals acknowledge false realities that social media imposes but act otherwise. The first being low-level self-esteem and the second being high-level self-esteem (Maslow, 1958). Within the context of the study, three main outcomes of behaviour exist following one's acknowledgement of the false perceptions that social media suggests. Participants either allow or reject such realities to influence their behaviour, or they do not believe such realities influence their behaviour, but their behaviour suggest otherwise.
   Within the categorization of low self-esteem, it is theorized that individuals view themselves inadequately (Poston, 2009). As a result of this negative self-perception, individuals who fall into this category frequently seek validation and acceptance from external environments (Maslow, 1958; Poston, 2009). Participants within the study who acknowledged their awareness of such perceptions and do let such realities influence their behaviour (n=34) may be subject to having lower levels of self-esteem. Despite their acknowledgement of these false idealizations, participants still allow these unrealistic perceptions to be their standards. The external environment in which the participants were seeking validation from would be the social media platforms they identify to be most

salient in their lives. On the contrary, individuals with high level self-esteem generally have more self-respect and view themselves more highly (Maslow, 1958). Therefore, there exists a possibility that despite acknowledgement of the false perceptions, they are still able to refrain from allowing such perceptions to influence behaviour. Yet, the possibility that individuals with high-level esteem may be influenced subconsciously may still exist. To further understand the possible relationship between self-esteem and influence of false perceptions, please refer to Figure 6. Figure 6 explains the possible overlap between individual self-esteem and the extent of potential influence it may have on individual behaviour. In theory, this correlation could exist, however future research is needed to confirm such relationship.

    Normative influence plays a significant role in conformity to biases/shared beliefs and values online and can help explain the correlation between participant awareness of the false perceptions that exist on social media platforms from a social psychological perspective, as opposed to the psychological theory suggested above. Normative influence is defined as a person that conforms to the standards maintained by others in a group setting with the intent of obtaining social rewards or escaping penalties that are based on fulfilling those requirements (Delamater & Collett, 2019). Individuals online will use normative influence to conform to the trends, behaviours, and beliefs that their online groups disclose to stay part of the in-group, regardless of whether or not they are able to acknowledge these norms to be attainable. Normative influence and self-esteem are intertwined, as acceptance and favouritism by others is a major reward that both

Figure 6
Venn Diagram
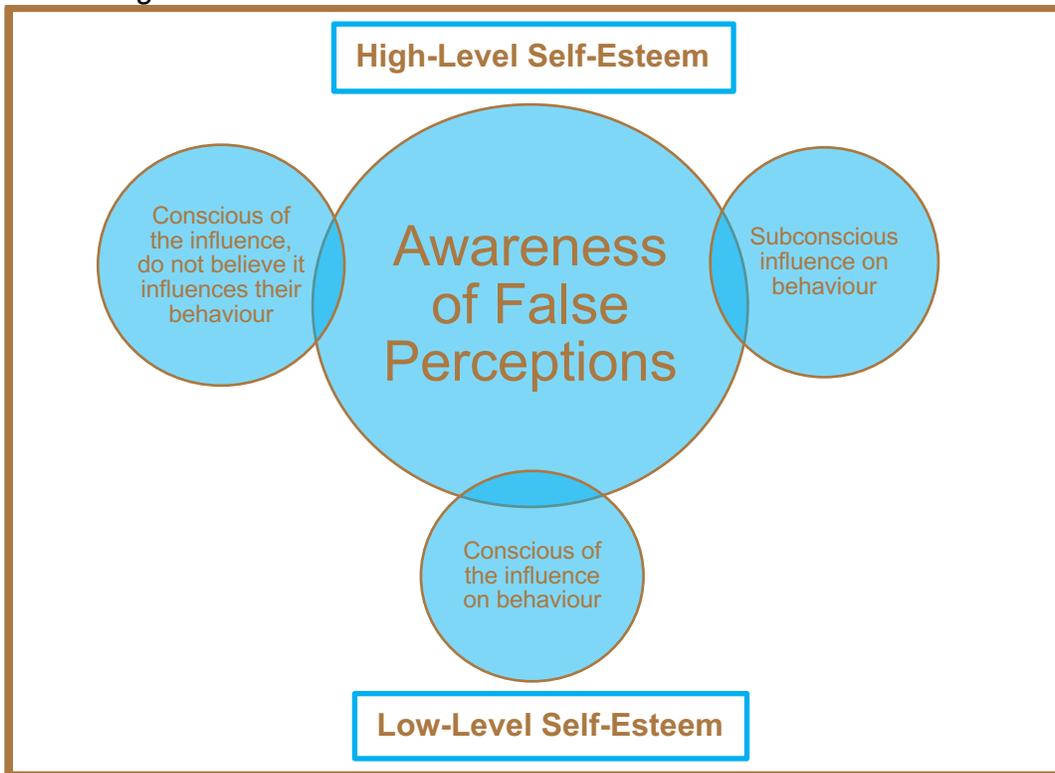
normative influence and level of self-esteem can dictate to the extent of which the individual wishes to accept and conform (Delamater & Collett, 2019). Perfumi et al. (2019) examined online normative influence by replicating Asch's original conformity experiment conducted in 1951. They found that the dynamics that can arise in online environments, where various channels exist, allow users to communicate with known and unknown people under various degrees of anonymity to learn the preferred conformed behaviour (Perfumi et al., 2019). This aligns with our findings as many participants noted that social media influences their self-portrayals and beauty standards to a great extent.

Biases/Shared Beliefs

As discussed in the results section, majority of participants (98.11%) indicated that they believe there are biases on social media, along with a high percentage of participants (86.79%) indicating that they believe individuals often share their beliefs and values on social media. It is important to note that participants did have a preference on what social media platform they utilized most for sharing their biases/shared beliefs and values. This was interesting to examine which social media platforms are most preferred and which ones are not. Based on the existing literature that has been presented on biases/shared beliefs and values, our results are consistent with what other researchers have learned. It is also important to note that social media has been used to shape and influence our behaviours, which in turn affects our biases/shared beliefs and values in reality. With that in mind, the key themes that arise from the current literature include belongingness and group norms.

Belongingness has been widely examined by many scholars. Delamater & Collett (2019) have noted that belongingness is the desire that an individual must be a part of a specific social group. Individuals will do anything to be a part of that in-group and willing to conform to the wants and needs of the group to feel as if they belong to that in-group.

Belongingness is one of the stages of Maslow's (1958) hierarchy of needs. When this stage begins, socialization becomes a priority for the individual (Maslow, 1958; Poston, 2009). This sense of belonging is incorporated at all stages of life and is centred around the desire that individuals form strong bonds and connections with others. These desired relationships are going to depend on the life stage you are in and can include romantic, friendships, and family connections (Maslow, 1958; Poston, 2009).

The sense of belonging that individuals have on social media sites has become more visible and more available than ever. Social media platforms encourage frequent social and romantic contact with others. James et al. (2017) notes that individuals have a difficult time resisting the desire to use social media as a source for relationships and connecting with others. An individual requires daily social interaction with the in-group that the individual associates with. This implies that as one's sense of belonging to an online social community rises, so does the need for daily social contact with that group (James et al., 2017). This literature connects with our findings, as many participants noted that their behaviour was influenced by social media due to their needs to meet the social standards, wanting to be like the people they saw online and the desire to fit in and participate in the latest trends. The participants changed their behaviours online in order to belong and fit in with the individuals they saw online. Participants noted that they wanted to behave in a way that everyone else was because if they did not, they would look weird and stand

out from everyone else. If they did not conform, this would affect their sense of belongingness and would make them feel as if they were missing out or left out.

With respect to group norms, Delamater & Collett (2019) have noted that group norms are what the behaviours and actions of a group are and how they will govern the group's functionality and activities. Group norms and belongingness are similar in some respects. They are both conforming to the groups' values, beliefs, and behaviours. Group norms online play a significant role in determining the effects social media has on individuals' biases/shared beliefs and values. As discussed earlier, most participants noted that social media was a good source of information for daily life, trends, and opinions. As Valenzuela (2013) highlights, social media platforms like Twitter, Facebook, and YouTube influence our collective actions by providing us knowledge and news of global political issues. They found that individuals who used those platforms more frequently had an influence on their beliefs, values, and behaviours (Valenzuela, 2013).

This aligns with our findings as many participants indicated that social media does have an influence on encouraging similar behaviours, beliefs and values online. This indicates that individuals will change their beliefs, values and behaviours online if it does not align with the group norms that are set online. This also aligns with our findings on participants most commonly used social media platforms for openly sharing beliefs and values. Valenzuela (2013) notes in his article that those platforms had a strong influence in increasing beliefs and values expressed online. Our study found a similar correlation as our participants indicated that the two most commonly used social media platforms were Twitter and Facebook. However, we did not find that YouTube was a commonly used platform that had influence on sharing beliefs and values.

Online Communities

As discussed in the Results section, the majority (52.83%) of participants stated that they were not part of an online community or group. However, it is important to acknowledge that the main reasoning or intention for those who were part of a group was for school or extracurricular purposes. As all of our participants were undergraduate students at McMaster University, this was an interesting finding. Based on the literature that is present regarding online communities and groups, our findings align with what other scholars have found. However, our sample size was small, therefore, our findings are not generalizable to the undergraduate McMaster community. It is important to state the little research present regarding school related online communities, nonetheless, online communities and groups are not solely for school purposes, as seen in our study. They can be used as a resource of information, or for leisure and entertainment purposes. With that being said, based on the literature that is present, the main themes that emerge are homogeneity, group memberships, and individual dynamics within the groups.

Scholars have noted that it is common for group members to have homogenous behaviours and interests (Hui & Buchegger, 2009; Mikal et al., 2014; Templeton et al., 2012). The homogenous behaviour and interests can either stem from online group leaders, for example the creator of the group or the administrator (Templeton et al., 2012), or from individuals trying to connect with those who are similar to them (Hui & Buchegger, 2009; Mikal et al., 2014). In terms of the role of the group leader, they can promote homogenous behaviours due to enforcing group norms or rules for the members to abide too.

On the other hand, they can select certain individuals who already abide by these rules and norms and target them to join the group. Templeton et al. (2012) makes note of the Attraction - Selection - Attrition (ASA) theory, where the functionality of an organization or group is at the extent of trait similarity, or homogeneity among members. Therefore acknowledging the superiority of the group leader on group dynamics and group memberships. On another note, as Hui & Buchegger (2009) stated, users can choose to create or join groups based on common interests, hobbies, political stands or religions. Thus providing the individual agency to select online groups and communities that already align with their interests or values.

This aligned with our findings, as some participants noted that they were specifically looking for groups that were directly tied to specific topics or issues, thus maintaining the group homogeneity. Joining groups or communities that already align with your personal morals will continue the group homogeneity. However, when joining a group that may not be based on a single issue or cause, group norms and behaviours are still presented. As Mikal et al. (2014) studied, individuals modify their behaviour within groups, in order to create a supportive environment within the community. By using the same language, involving the same use of common terms, and similar humour, it will create an expectation for other users to support and create similar content.

With regard to group membership, similarly to homogeneity, individuals will most likely join an online community or group based on their personal interests and values (Hui & Buchegger, 2009). Thus, utilizing the ASA theory (Templeton et al., 2012) to select individuals who share similar values and interests will increase group membership. The ASA theory poses questions to our findings, as the majority of our participants were not part of an online group or community. As the most prominent reasoning was due to school or extracurriculars, it was interesting that the majority of the participants were not a part of general McMaster acceptance groups. These groups tend to be quite popular and often encouraged to be joined. The neglect or hesitancy in joining these online groups was not within the scope of our study, however, would be an important direction for further research.

Secondly, within our findings, the majority (70%) of those who were part of an online community were referred to join by a friend. This correlates with the results of Hui & Buchegger's (2009) study, as they resulted in a link between online and offline friendships, in relation to online group membership. They have noted that the dominant usage pattern is to connect with friends, family, and acquaintances, which then "reinforces structural dimensions of peer social worlds that exist in schools" (p. 53). Another important finding was the sense of feeling left out if the individual did not join an online group or community that their friend suggested (Hui & Buchegger, 2009). Highlighting the aspect of inclusion and belongingness with their peers, both online and offline, is something that challenges our findings. If this sense of inclusion was prominent or impactful, then we suggest our findings would have included more memberships within our participants. The sample that was being studied was younger American teenagers, thus, the sample from our study was older and may not value inclusivity as highly, however, it is still something to acknowledge.

Lastly, as seen within Templeton et al. (2012) study, the stated purpose for the groups was "learning", which the authors noted "may provide insight as to the "type" of person

who may naturally gravitate to the medium" (p. 661). This correlates with our study, as the most prominent reasoning for online membership was for school purposes. This also provides questions on the low membership within our sample, as school is completely online due to COVID-19, thus higher membership was expected.

Once included in an online community group, there are specific norms and behaviours the members need to follow. As noted by Mikal et al. (2014) individuals do end up learning the generally accepted rules and shift to behaviour that is reflected with their group identity. Instead of maintaining their individual identity, they take on the identity of the group.

Within Nimrod's (2012) study, she also studied the life cycle of individual behaviour within an online mental health support group. These research findings were inspired from Kim's (2000) findings as they suggested a five-phase membership life cycle. Membership phases beginning as "visitors" or "lurkers," then moving up to "novice," then "regulars," then "leaders," and lastly "elders" (Kim, 2000). Based on the members of the mental health support group, similar phases were established and were labeled as, "distressed newcomers," then either became a "passive follower" or "active help receiver" (Nimrod, 2012). Both of these phases then proceeded to "relieved survivors," and then the member either became an "active help provider" or a "moving on quitter". Based on the labels alone, it is apparent that at each phase, there are varying levels of involvement within these communities, and based on your contributions will determine which phase you end up within.

Although individuals' behaviours were outside of the scope of our study, this research highlights the individual dynamics within the overall group dynamic. It is interesting to note that even within the membership phases, the last potential phase of "moving-on quitters" has a negative connotation to it. Implying that leaving the online group signifies you giving up on the community, or even giving up on trying to help your mental health. Having these phases worded in ways that favour continuous membership hints at the consequences of group memberships, along with how homogeneity can be maintained in this way.

With online groups becoming more prevalent within our lives, it was an important aspect to highlight and research within our study. As seen both in the literature and our findings, group memberships can be quite influential to individuals' behaviours and identities. All this relates back to the theory of groupthink. To reiterate, groupthink is the theoretical perspective that understands the significance of group conformity and the subsequent actions that an individual may take in order to be psychologically and physically consistent within a certain group (Janis, 1971). As the literature states, homogeneity, group memberships, and individual dynamics are all factors at play within groupthink. Maintaining homogeneity within group behaviour, but also within recruiting specific types of individuals, can warrant groupthink. Trying to erase and mask over the diverse and unique qualities of individuals reinforces unilateral thinking, which can often lead to irrational and problematic decisions to be made; as seen with groupthink.

Potentially this unilateral and homogenous behaviour was the reason why the majority of our participants were not part of any online groups or communities. They wanted to maintain unique and diverse viewpoints from others. With all that being said, within our findings, the majority of participants who maintained membership within groups was mainly due to friends/family or others inviting them to join these groups. Therefore, individuals who were already similar in some ways or another conducted the recruiting,

thus encouraging further homogeny. The homogeneity may have also been a factor of a sense of inclusion. Utilizing those connections of sharing similar values or beliefs to incite group membership, to not be left out and to stay 'up to date' with all of the new trends, ideas, beliefs and information. Although our participants did not elaborate further on their memberships and their experiences within these groups or communities, the findings still presented meaningful insight into the impacts social media has on our lives and perceptions.

Conclusion

With social media being such a salient aspect of our lives and becoming increasingly more with each day, we decided to look at how various social media sites affect group ideology and behaviours using user-generated content. The articles compiled for our research state that social media content does affect individuals, creating an environment where cohesive groups can form and thrive. With increased use, there comes various risks, one of which includes individuals falling victim to groupthink. After collecting our background research, we expected to see some trends in our research that were similar to those in the previously analyzed literature. The current literature does not contain a whole lot of information regarding our specific topic, however, it provided insight into how it might relate to our proposed hypothesis. We hypothesized that undergraduate students using social media find themselves following the trends, norms, and beliefs that are widely available to them through online networking sites. Through this, we can see how pervasive social media is in our interactions, behaviours, and ideologies.

Limitations

While conducting our research, there were limitations that our group encountered. One limitation that we discovered was the current situation within COVID-19. Due to this global occurrence, we understood that there may be limited recruitment. COVID-19 was very serious and may have posed complications for individuals to participate in our study. Another limitation we faced was our participant's connection and access to the Internet. Some participants might have had a bad internet connection and may have chose not to participate due to this factor, or some participants may not have access to the Internet within their home. This limitation would be significant as all our research was collected online.

Another limitation we encountered was having a small sample size. This hindered our study as the results we concluded are not generalizable to the general population of all undergraduate students. The last limitation that we found was not having the participant's reply to our recruitment email. When the recruitment email was sent out, we only had a few replies from McMaster organizations and clubs. We believe an aspect that may have contributed to this was due to factors in individuals' lives such as school, work, and the weight of COVID-19. Moreover, it may have been a busy time in individuals' lives, and they may have felt that they did not have the time to complete our survey.

Implications for Future Research

Our findings confirmed our hypothesis that individuals act differently on social media, thus impacting their perceptions of reality, however, our results also raised a few

questions that we were not able to research. We found that most participants were not part of an online community, which goes against our theory of people partaking in groupthink due to online communities. Future research should look at the consequences of groupthink and how it could actually deter individuals from joining groups or communities. Our research was conducted during a pandemic, however we did not include COVID-19 as a factor in our research. With this in mind, future literature should look into how COVID-19 has changed how people use online sources and how it has affected online usage. It should examine trends within a pandemic world and how it affects people's usage post pandemic.

Significant Insights

Conducting research to evaluate the impact of social media use on individual perception of reality provides comprehension of the phenomenon of groupthink and its implications. These implications include a false sense of invulnerability, rationality, morality, and unanimity, which can become dangerous if individuals begin to behave accordingly. Research on this topic from a micro perspective can be utilized to create awareness of the effects of overuse and reliance on social media platforms. Through the analysis of everyday interactions, individuals would be able to understand the importance of interacting with others who think differently. Recognizing the false sense of invulnerability that exists when individuals spend large amounts of time on social media would allow individuals to view context in the actual world rationally and provide them with clarity to respond appropriately. Therefore, the prevention of real-life consequences to virtual actions is becoming increasingly more common in everyday life.

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Undergraduate Students' Experiences and Perceptions of Subjective Well-Being during a Global Pandemic in an Online World

Catherine French[1], Kobika Kirubhakaran[1], Mehr Mahmood[1], Kelsey Reinink[1], and Bailey Stegenga[1]

Abstract

This quantitative study focuses on how the COVID-19 pandemic has affected undergraduate students' perceptions of their subjective well-being as well as what it means to live the 'good life'. For this research, we examined how the various online and offline leisure activities participants engaged in may have altered these perceptions. This is better understood by using the theoretical lens of symbolic interactionism and its focus on the meaning-making process. By using an online survey, we collected responses from 19 undergraduate students from McMaster University. According to our findings, undergraduate students spent more time online during the pandemic than they had previously. Responses indicated that offline leisure activities were better able to enhance subjective well-being than online leisure activities. Perceptions of the 'good life' were also most often perceived as correlated with spending time with friends and/or family. This research may provide insight into the ways current university environments and social support services can be improved within the unique context of a global pandemic.

Introduction

Topic

Understanding how people experience and make sense of the world they live in is an area of research that often looks over well-being as its major component. The topic this study explores draws on the concept of subjective well-being (SWB) as it relates to the current unique circumstances of the global COVID-19 pandemic. We followed up on undergraduate students' SWB during this time to understand how their engagement in self-isolation from the outside world and the use of online technology affected them and their idea of what it meant to live the 'good life'. In the past year, many were forced to set aside plans for the future and adjust to these unprecedented circumstances. There also appears to be a recent increase in the emphasis placed on the importance of maintaining one's mental health and well-being. This paper will look into greater detail of how SWB is a factor in measuring where students' perceptions of their life's satisfaction trails.

Social Psychological Context

Ed Diener's (1984) article states SWB takes this idea of "how and why people experience their lives in positive ways" (p. 542). SWB as a focus in our study will

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[1] Undergraduate Student, Honours Social Psychology Program, Faculty of Social Sciences, McMaster University, Hamilton, Ontario, Canada.

concentrate in response to "determine what is the 'good life' (Diener, 1984, p. 543). There are three hallmarks in this area of study that Diener (1984, p. 543) uses to explain SWB: "It is subjective [in which it is based on] the experience of the individual, it provides a positive measure, and measures […] all aspects of a person's life" (Diener, 1984, p. 544). There are also three components found within SWB: "life satisfaction judgments, positive affect, and negative affect" (Diener, 1984, p. 547). Both aspects take into consideration the trait of happiness. As indicated in the article, it is important to include a comparison of life satisfaction with happiness and well-being. Although we look at the level of contentment in one's life during this pandemic, we are also considering their importance of social contact. Diener (1984, pp. 566-567) explains that one's SWB is not solely dependent on social contact or social participation as it is not the only component that progresses happiness. However, as every individual needs these contacts to survive and function in the world we live in today, it does play an effective role in a positive SWB (Diener, 1984, pp. 556-557). You do not need to be an extrovert to be happy but, although it is uncertain, it could be a reason in which they are more sociable in social settings than introverts (Diener, 1984, p. 557).

Statement of The Problem

We are interested in how the COVID-19 pandemic has changed McMaster undergraduate students' ideas of what it was like to live the 'good life' and if people have felt their SWB has changed. Our focus is to explore the types of leisure activities undergraduate students partake in and how it affects their well-being.

Purpose

This topic was chosen as a focus in our thesis project to allow readers to understand and consider the sociological and psychological components of well-being. Our motivation in conducting this research follows from this idea of looking at how others may have spent their time at home during this lockdown. Many may have been laid off from work as non-essential companies shut down or remained closed to stop the spread of the virus. Others may have faced restrictions in meeting their loved ones. There is also the stress of shopping for essentials like food, water, medicines, toiletries, and cleaning supplies, while also ensuring that they are being healthy and safe, or even having enough money to buy these essentials. A variety of factors are reflected on to understand the experiences of well-being during this time.

Although we focused on leisure activities and their preference for online or offline activities, we also hoped to acquire an understanding of how social media has played a role in their positive or negative SWB. It is very easy to get caught up online with how others live their lives. During this time of the pandemic, many use online formats to communicate or stay connected with family and friends. We wanted to consider others' experiences while being in 'lockdown' and how each individual coped and managed their mental well-being. "Have you approached others in person during this time?" "Have they taken a series of offline leisure activities to help pass time?" "Has the greater use of the online world been overwhelming and affecting their well-being?" These are some of the questions we hoped to learn more about from our participants. An online component may allow the individuals to practice isolation, however, some may not find an overall satisfaction within these restrictions of social distancing. We hoped to learn what

mediating factors affect SWB to its greatest extent. We understand that there are different perspectives involved. We hoped to take into consideration each individual's anonymous response to provide a solution in how they can manage their well-being if they are not able to do so themselves.

Outline of Paper

In this paper, we begin with the literature review that gives a general overview of what research has been done in the area of SWB and leisure, as well as the effects of online affiliation.   We then propose our theory on how using the lens of a symbolic interactionist perspective will play a role in conducting this research. We discuss how symbolic interactionism has structured our research on SWB and its contribution to the online world during this global pandemic. Using a micro-level of analysis, we recognize each participant's personal definition of leisure activity and what it means to live a 'good life'. In this section, we explain symbolic interactionism and Blumer's (1969) premises. In the methodology section, we have stated the research questions and outlined the stages of our data collection and data analysis. The methodology section will also discuss potential ethical issues, and potential challenges we faced during the completion of this project. We then present our results using graphs to show what was gathered from our questionnaires. This is followed by a discussion section where we analyze and interpret the findings presented. We provide a broader significance in linking our results to our theory and for any previous research that may have been conducted in our area of study. Next, we discuss any limitations to our study. The paper concludes by sharing some potential significant insights and our final remarks about the study.

Literature Review

There is a plethora of research available regarding studies done on SWB. This literature review summarizes some of this research and relates it to what we hope to find in our research. Some of the topics that are discussed are how leisure enhances and diminishes SWB, the relationship between SWB and affiliation, and how gaps in this research have shaped our study.

SWB and Leisure

Multiple research studies have shown that leisure activities promote SWB. Macchia & Whillans (2019) conducted cross-national data analyses between 97 countries from 1989-2016 and found that "countries that valued leisure over work showed greater national life satisfaction" (p. 3). Newman et al. (2014) conducted a study about psychological factors that promote SWB and found that "people greatly value leisure and most likely believe it will promote their well-being" (p. 556). Even amongst a more specific population, such as college students, King et al. (2020) said that students at a U.S college reported high "SWB scores when they were engaged in active leisure" (p. 112). From these research studies, we can conclude that leisure activities and SWB correlate. But whether it is a positive correlation or a negative one depends on the activity itself. Newman et al. (2014) quoted other studies listing certain activities that say SWB positively correlates with leisure. These activities include visiting family and friends, sports, playing games, watching television, and more (Newman et al., 2014). Some very recent studies done during the COVID-19 pandemic also say that spending time in nature, walking, and supportive

interpersonal interactions enhance well-being (Lades et al., 2020). Positive affect was greatest when spending time outdoors and pursuing physical activity (Lades et al., 2020). Brand et al. (2020) conducted a cross-national survey during the pandemic looking at exercise and SWB and concluded that physical activity and exercising frequently promote a better mood.

Leisure activities can help individuals protect themselves from the negative effects of a crisis. During the 2008 financial crisis, Macchia & Whillans (2019) found that people who "valued leisure more than work reported higher life satisfaction" (p. 5). This could have been because people who were more financially secure prioritized their time and spent money on time-saving services to help protect themselves from stress (Macchia & Whillans, 2019). The COVID-19 pandemic was a cause for a lot of stress for many individuals. Various online purchase and delivery services became popular as people did not want to step outside of their homes. To lower the negative effects of stress, people instead spent money to prioritize their time during this crisis which could have affected their SWB.

However, not everyone is financially secure to protect themselves from stress using money. This is where the term subjective becomes very important. Leisure activities are prone to subjectivity, and this plays a role in whether or not some leisure activities promote well-being or decrease it. Newman et al. (2014) defined subjective leisure as activities where the "individuals perceive themselves to be engaging in leisure; and leisure broadly covers activities or time that are construed as leisure by individuals" (p. 557). An example of this includes an activity such as exercise that might not promote SWB because some people may not see exercise as leisure.

SWB and Affiliation

Most activities listed in the sections above are activities that can be done in groups. Newman et al. (2014) found that "social affiliation may be the strongest predictor, or perhaps the most consistent predictor of SWB, across various contexts" (p. 569). This can be because social activities encourage positive emotions and inhibit negative ones (Newman et al., 2014). Previous research has also found that "leisure time with friends increases immediate well-being, while leisure time with a spouse increases global well-being" (Newman et al., 2014, p. 569). In contradiction to this, when Lades et al. (2020) conducted their study during the pandemic, they found "reduced emotional well-being levels during interactions with one's spouse or partner" (p. 7). They concluded that this could have been because of adapting to new routines at home. However, there is more evidence that tells us social affiliation overall has positive effects on well-being. For example, if we look at Maslow's work, his "hierarchy of needs argues that affiliation (termed belongingness and love at the middle level) is necessary at various stages for an individual's well-being." (Newman et al., 2014, p. 563). Moreover, Macchia & Whillans (2019) found that "people who value leisure more than work likely spend more time socializing" (p. 6).

If we look more specifically at a population, King et al. (2020) found similar results in their study on U.S. college students who reported higher SWB when they were with others. They also found that "students with social networks or support appeared to be better adjusted, less lonely, and happier" (King et al., 2020, p. 108). Agbaria & Bdier (2020) conducted a study about internet addiction and social support amongst Israeli-

Palestinian college students in Israel. They found that "social support was a protective factor against internet addiction" (Agbaria & Bdier, 2020, p. 1). Previous research has also stated that "social relationships may help adolescents and young adults function as helpers and supporters, enhancing their self-esteem and making them feel as though they have something to contribute to society" (Agbara & Bdier, 2020, p. 1). This increases their autonomy, which Newman et al. (2014) found is a psychological mechanism to increase SWB. In sum, SWB and leisure activities can show a positive correlation because these activities provide individuals with opportunities to experience positive emotions and experiences, protects people from negative effects of stress, and promotes multiple psychological needs that enhance well-being (King et al., 2020; Macchia & Whillans, 2019; Newman et al., 2014).

Online Affiliations and SWB

Social affiliations can be made offline and online. Social networking sites (SNS) allow individuals to stay connected to people across the world. Sabatini & Sarracino (2017) conducted a study in Italy about the relationship between online networks and SWB and found that "the main reason for joining a network is the strengthening of individual social capital" (p. 458). An individual's social capital can enhance their well-being by providing them with a sense of belonging to a social group. Pang (2018) conducted a study to explore the relationship between an SNS called WeChat and SWB among overseas Chinese college students studying abroad in Germany. WeChat is similar to WhatsApp in the North American context. Apps like these are a part of some individual's daily lives that allow people to stay connected with friends and family and share pictures, videos, and more. Their study found similar results to previous research that said, "social networks can influence individuals' subjective well-being development by enhancing positive perceived social support'' (Pang, 2018, p. 2150). This study found that WeChat provides users a "way of receiving emotional support from other contacts, enhancing the feeling of belonging" (Pang, 2018, p. 2153). SNS allow people to "stay in touch with both loosely and closely tied people" (Pang, 2018, p. 2153). SNS can influence individuals' perceptions "of social integration, bonding relationships, and bridge relationships, which subsequently enhance their sense of subjective well-being" (Pang, 2018, p. 2153). However, this perception could also adversely affect SWB regarding social trust (Sabatini & Sarracino, 2017). Some people value the time and social affiliations made online, while others do not.

SWB the Online Affiliation and Leisure

SWB and leisure activities can also have a negative correlation. For example, while being alone, engaging in social media use reduces emotional well-being (Lades et al., 2020). During the COVID-19 pandemic, schools and non-essential businesses closed to help stop the spread of the virus. People had to self-isolate at home either by themselves or with family members. School and work moved online, and there was more frequent internet usage. The study conducted by Lades et al. (2020) in Ireland found that "social media use and informing oneself about COVID-19 [were] both associated with elevated levels of negative affect" (p. 7). Their research findings matched previous research that says, "Internet addiction appears to be significantly associated with lower levels of SWB" (Agbaria & Bdier, 2020, p. 1). Moreover, Sabatini & Sarracino (2017) found that "online

social networks stimulate social comparisons in a way that may be detrimental for self-esteem and life satisfaction" (p. 460). This is contradictory to what Pang (2018) found in his study that said, "spent on social media would consequently lead to better subjective well-being" (p. 2154). In sum, SNS have both a positive and negative correlation with SWB similar to leisure and SWB.

One of the areas where there is a gap in this research is how social distancing affects SWB. During social distancing, it is hard to get together with people in person. Research says that leisure time spent with others enhances SWB most effectively. Sabatini & Sarracino (2017) found that "SNS also has a positive impact on well-being because it increases the probability of face-to-face interactions" (p. 475). But what happens when we cannot be with each other face-to-face? We turn to SNS to help us stay connected, which provides us with some, but very limited, face-to-face contact. There may be some who feel this contact is sufficient. This is where the term 'subjective' is important again. There are two contradicting arguments made by researchers about how spending time online can affect SWB. Some research says it enhances well-being, while other research says it has negative consequences.

No research has been done about specifying this online time as leisure time in a world where we cannot get together face-to-face. Research needs to be done on the idea of bringing together online and offline leisure activities and SWB. During the COVID-19 pandemic, time spent on leisure activities and online could have also affected people's perceptions about living the 'good life'. No research has been conducted on whether or not people's perceptions about living the 'good life' have changed or not during a global pandemic. This could be affected by many factors including leisure activities and time spent online. The research is also lacking in studies done in Canada about leisure and SWB. Also, most of the research is done with a psychological perspective in mind. Symbolic interactionism, which is more sociological, has rarely been used to study this topic.

Theory

For our research, we adopted a more micro-level framework by using the lens of symbolic interactionism. We chose this method due to the subjective nature of the theory and how it approaches individual experiences and connections, as opposed to broader social foundations. By using symbolic interactionism as a framework for analysis, we were able to form a better understanding of how students spent their time while in self-isolation, and how they were able to make sense of the world they were living in during this unexpected and unusual situation. This theory was the best approach to our topic as we looked at SWB, leisure, and life satisfaction, all of which can be open to individual interpretation.

Symbolic interactionism has its origins in the early 20th century through academics such as George Herbert Mead, Charles Cooley, Erving Goffman, and Herbert Blumer. As the name suggests, the underlying focus of this theory is on social symbols. These symbols can range from the use of verbal or physical language to objects, or any type of stimuli that carries meaning within a cultural framework (Charmaz et al., 2019). Similarly, symbolic interactionism works to show how the creation of the world we live in, as well as our understanding of it, is a constant process that is formed through interactions and the meanings that we construct from them (Meltzer et al., 2015). During the pandemic and its subsequent social distancing guidelines, undergraduate students have been removed

from their regular daily activities and instead have been asked to spend much of their time at home. The use of symbolic interactionism during our research gave us a frame of reference for analyzing how students have managed to adapt to their new circumstances. Our study looked at how changing socialization and leisure structures influenced the SWB of undergraduate participants.

The emphasis on meaning-making within symbolic interactionism is one of the primary tenets behind the theory. This framework claims that through communication or interaction with their surroundings, individuals create an understanding of their experiences (Meltzer et al., 2015). These meanings are then able to be modified through further interactive processes, as individuals are able to consistently negotiate how they view the world when their circumstances change (Charmaz et al., 2019). Symbolic interactionism also works to connect individual experiences with the greater social context. This theory argues that people as individuals are products of exchanges with the broader societal framework in which they are situated and in turn, society is created by the small-scale interactions of its citizens (Meltzer et al., 2015). Symbolic interactionism is a constant give-and-take between society as a whole and individual actors.

Undergraduate students are constantly interpreting using these meaning-making processes. Ideas about their environment are not stagnant, as academic studies allow for a consistent flow of new information through classes or interpersonal discussions. This is especially true in the current global climate with the incorporation of COVID-19 protocols into daily life. Our research was able to use a symbolic interactionist perspective to better understand how undergraduate students have interpreted the unprecedented external situations that they are facing. The study we conducted looks at how undergraduate students have interpreted the unprecedented external situations that they are facing, and whether or not they have created new meaning from these processes.

Herbert Blumer

Within symbolic interactionism, several tenets work to explain social phenomena. One of the founding scholars within the field, Herbert Blumer (1969), is noted as the person that originally coined the term symbolic interactionism within the field of social psychology. In his works, Blumer (1969, as cited in Charmaz et al., 2019) noted three premises within symbolic interactionism that better clarified social phenomena. Firstly, he argued that individuals react to things based on the significance that those objects carry for them (Blumer, 1969, as cited in Charmaz et al., 2019). This can help to explain the experiences of the undergraduate participants in our research in several ways. For example, individuals participate in leisure activities based on their interpretation of this concept. Each person has a different definition of what constitutes leisure, from reading to physical activity or sport. The fluidity of symbolic interactionism helped us to interpret the information that was given by each participant, as these definitions are socially constructed through individual experience (Blumer, 1969, as cited in Charmaz et al., 2019).

For his second premise, Blumer (1969, as cited in Charmaz et al., 2019) stated that an important factor of the meaning-making process within society is how we interact and infer context through our peers. Due to the changes in socialization capabilities with regards to recent social distancing bylaws, there have been significant fluctuations in the way we interact with each other. Communication methods within social structures have

been altered within the last year to prioritize online or technologically interactive meetings over in-person contact. This raised questions as to the impacts of increased isolation on McMaster's undergraduate community. Through the use of symbolic interactionism, our research was able to provide data to better comprehend how the changes in interpersonal communication have affected this demographic, and how modifications to social interactions have impacted overall SWB.

Finally, Blumer (1969, as cited in Charmaz et al., 2019) argued that individuals play a significant role in creating their own lives by being able to interpret the meanings that they encounter and make their own judgments. An example of this is how undergraduate students are able to form a personal understanding of the pandemic and how it affects them individually. This is consistent with the works of Stryker (1987) who contended that individuals are capable actors in making their own decisions about their lives, regardless of the societal structures already in place. Using this premise, we were able to see how undergraduate students are interpreting the new meanings associated with the pandemic and how this is affecting their life satisfaction.

The use of symbolic interactionism helps to mitigate a formal understanding of a subjective social phenomenon. This theory emphasizes symbols, meaning, and interpretations within daily life. By using the three premises laid out by Blumer (1969, as cited in Charmaz et al., 2019), our research works to better comprehend the lived experiences of undergraduate students at McMaster. Symbolic interactionism was a useful tool for our research as it helped us to navigate the adaptations and interpretations that arose in student life during the ongoing COVID-19 pandemic. It was specifically useful within our research at helping to understand participants' definitions of leisure, life satisfaction, and well-being, as well as how these meanings have changed over time.

Methodology

Our research used a quantitatively based research methodology with a focus on the effects of different types of leisure activities on undergraduates' well-being and perceptions of the 'good life'. We wanted to know what kinds of leisure activities undergraduate students partook in during the COVID-19 pandemic, and how it affected their SWB. Also, how did students' perceptions about living the 'good life' change during the pandemic? We used an online anonymous survey, hosted on the McMaster Research Ethics Board approved LimeSurvey to conduct our research.

Ethical Concerns

Eliminating the risk of any ethical issues is always a priority of any research study. For our particular research, there were several potential ethical issues that were noted. Firstly, it must be noted that investigators had peer-to-peer relationships with each other, as well as with participants, which could have potentially created a conflict of interest. A social risk was the loss of privacy if participants did not have a private space to fill out the survey. To minimize this risk, participants were able to take the survey at any time and place of their choosing. A psychological risk of our study included unwanted self-realization for the participant. The survey questions could have brought up unwanted feelings surrounding difficult experiences the participants may have had during COVID-19. We managed this risk by informing the participants they could take the survey at the time and place of their choosing. Participants could skip questions if desired, as well as choose to stop the

survey at any time or not submit their completed survey. We also put maximum effort into ensuring that our survey questions were worded correctly to minimize psychological and social risks. The contacts of support services were provided for students to make use of if needed. It must also be noted that using an anonymous online survey reduced some of the social and psychological risks, as there was no identifiable information that could be linked to the individual. The research conducted posed no risks greater than those in everyday life.

Another ethical issue is informed consent. Informed consent is complete understanding from the participants that they understand what they are getting involved in and are voluntarily providing information. Being informed is crucial in ensuring no deception is involved in the research. With our research project, by completing and submitting the survey, consent was implied. A letter of information detailing the research project was distributed so that participants were fully informed on what they were getting involved in. Additionally, in terms of participation, the decision to be involved was entirely up to the individual as our recruitment was solely based on volunteers. Questions were designed for minimal risk to participants to prevent harm. The survey was only to be completed by those 18 years or older. Throughout the research, we did not come across any gatekeepers for this research project. We took into consideration that our participants were all over 18 years old, implying that parents and guardians were not potential gatekeepers.

Steps in the Research Process

Our research process spanned over eight months, beginning mid-September and concluding at the end of March. With lockdown protocols that enabled many students to turn to online learning formats as schools remained closed, group meetings were also held virtually. Every week, we met to discuss each stage of our project. First, we identified a relevant topic that we were interested in. This was a decision made very much within the context of the current global situation. We focused on the impact that online and offline leisure activities have on students' SWB in light of the ongoing COVID-19 pandemic. We wanted to understand how the various ways people spent their time, both online and offline, affected individuals' views of what it meant to live the 'good life' and whether this had changed during the pandemic.

Generally, there are not a lot of resources and studies available on this topic because the subject is so recent and there is much research that has to be done on it. While there are studies conducted on the impact of leisure and online activities on individuals' SWB, few were written in relation to COVID-19. This new context may provide important insight into SWB that previous research lacks. We also wanted to look at individuals' perceptions of the 'good life' in relation to these activities, which appears to be a topic that is also not well-researched.

Based on our literature review we developed an area of interest with three research questions. We predicted that students' ideas of living the 'good life' and perceptions of SWB will have been negatively impacted by the increased isolation caused by the pandemic, regardless of an increased time for leisure. With this in mind, we then determined appropriate, clear, and concise questions to ask subjects to gain the information we were seeking and to ensure questions posed the least amount of risk possible to participants. These questions asked for socio-demographic information as

well as research-related data. As a group, we submitted our Ethics Proposal on October 19, 2020, and after several rounds of revisions, the research was approved by the McMaster Research Ethics Board (MREB#: 0327) on November 16, 2020.

The next step was to gather the data we needed. The plan was to recruit a minimum of 20 anonymous participants to complete the online survey. The optimum number of participants was 75. All group members were involved in the recruitment of participants. We used various clubs and organizations within McMaster University to recruit participants for the study. These included the DeGroote Business Society, Engineering Society, Humanities Society, Science Society, Social Sciences Society, McMaster Life Sciences, Class of 2022, Class of 2023, Social Psychology Society, PNB Society, Health and Aging Society, Sociology Society, Human Behaviour Society, Anthropology Society, and the Political Science Association. Recruitment took place using emails to group leaders to request posting permission. Once this was obtained, we shared the recruitment poster with their group members. Participants accessed the link to the survey through this poster. The survey was 25 questions long and took approximately 15 minutes. We met weekly to review data and plan for oncoming results. This included checking the number of anonymous responses that came forward and designing a layout for the final paper.

Data Analysis

We began data analysis on February 12, 2021, after we expired our survey. We began analyzing our data using LimeSurvey and Microsoft Excel. We tried to use PSPP, a software similar to the Statistical Package for the Social Sciences (SPSS). However, we found it more comfortable using Excel for data analysis and to create our graphs. We first used the graphs provided by LimeSurvey to briefly analyze our data and interpret some of our findings. We then transferred all our data to an Excel spreadsheet and began running descriptive tests. We used a Microsoft word document to keep track of all our variables and variable codes. The first tests we ran were for our sociodemographic variables. These variables included age, gender, race/ethnicity, year of study, and faculty. We used Excel formulas to find the mean, median, and mode of our sociodemographic variables, as well as frequencies. Following this, we looked at the variables which applied more specifically to our study and determined what could be compared. We conducted crosstabs on Excel to identify any relationships between some of our variables. For our qualitative data, we used descriptive coding using Excel and Word. A Word document was used to keep track of common themes found within qualitative answers and Excel was used to run descriptive tests. The final step in data analysis was creating bar graphs and pie charts in Excel for the results section of the final paper.

Summary of Section

In sum, this research project was carefully designed to abide by all the rules mentioned in the MREB protocol to eliminate risks. This included how we formulated our questions in our survey, as well as informing all potential participants about the minimal risks involved before they agreed to participate. Once the survey was complete, we sent it out to our recruitment groups and started gathering and analyzing our results. We began our final paper on March 19, 2021 and divided the discussion and results section into different themes: offline leisure, online leisure, living the 'good life', and changes in SWB.

Results

Demographics

The sample size for this study was 19 McMaster undergraduate students (n=19). For the sociodemographic portion of the survey, participants answered questions based on age, gender, race/ethnicity, year of study, and faculty.

Age

Participants needed to be 18 year of age or older to partake in our study. 21.05% (n=4) were 19 years old, 31.57% (n=6) were 20 years old, 10.52% (n=2) were 21 years old, 15.78% (n=3) were 22 years old, 5.26% (n=1) was 23 years old, and 15.78% (n=3) were 25 and up.

Gender and Race/Ethnicity

We asked our participants to self-identify in terms of gender and race/ethnicity. All our participants identified as female. 26.31% (n=5) identified as South Asian, 63.15% (n=12) identified as Caucasian, and 5.26% (n=1) identified as mixed race.

Year of Study

5. 26% (n=1) of our participants were in their 1st year of study, 26.31% (n=5) were in their 2nd year, 26.31% (n=5) were in their 2nd year, 26.31% (n=5) were in their 3rd year, 5.27% (n=1) was in her 5th year, and 10.52% (n=2) were returning students.

Faculty

Our participants came from all the faculties at McMaster. The majority of them (n=8) were from the Social Sciences faculty (42.10%). 10.52% (n=2) were from Business, 10.52% (n=2) were from Engineering, 21.05% (n=4) were from humanities, and 10.52% (n=2) were from the sciences.

At Home During Isolation

In addition to these demographic questions in this section of our survey, we also asked our participants who they were living with during the period of isolation which was more related to our study. A significant portion, 84.21% (n=16), of our participants said they were living with their family.

Lifestyle Changes During the Pandemic

In Figure 1, participants were presented with the statement "my lifestyle had to change during the COVID-19 Pandemic," 63.15% (n=12) of our participants strongly agreed with this statement while 31.57% (n=6) agreed, and 5.26% (n=1) disagreed. These findings suggest that overall, the majority of our participants were taken out of their regular day-to-day lifestyle routine and had to adapt to new changes during the pandemic.

As shown in Figure 2, participants were presented with the statement "I lost my job due to the COVID-19 pandemic." 73.68% (n=14) said that they did not lose their job, and 15.78% (n=3) did. They were also given the statement "I worried about finances at least at one point during the COVID-19 pandemic." 84.21% (n=16) said that they were worried about finances at least at one point during the pandemic. Our results found that although

Figure 1

My lifestyle had to change during the COVID-19 pandemic
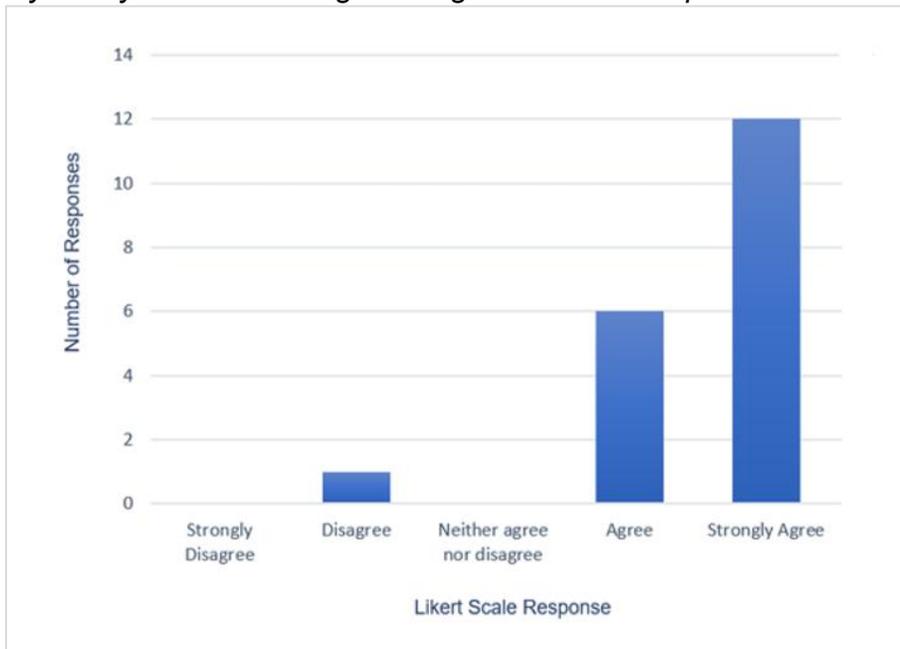
most of our participants did not lose their job due to COVID-19, the majority of them were still worried about finances at least at one point during the pandemic (57.89%).
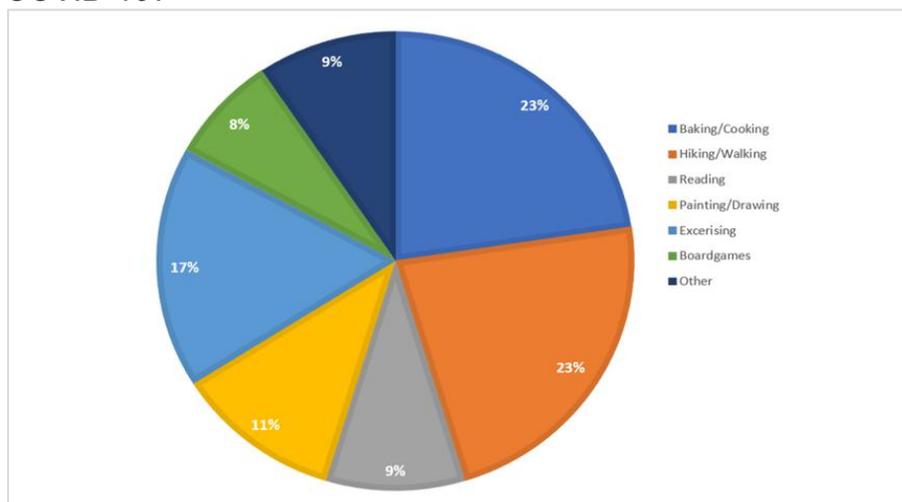
Figure 2

Job and Finances
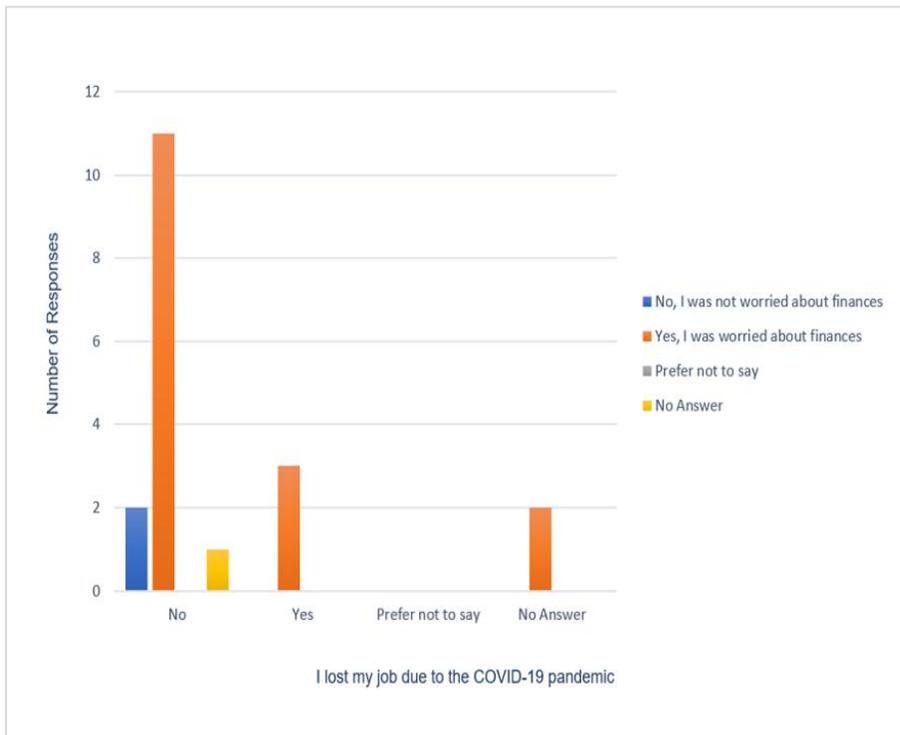
Leisure Activities
Offline Leisure

Figures 3 and 4 both show how we defined offline leisure activities as activities that do not require the use of the internet. We asked participants to list a few offline activities they engaged in during the lock-down months of the pandemic. The two most common answers cited by our participants were hiking/walking (23%) and cooking/baking (23%). Some other activities included exercising (17%), painting/drawing (11%), reading (9%), board games (8%), and other (9%). Participants were then asked to rate how they felt after engaging in the offline activities that they listed. 68.42% (n=13) of them said that they felt good, 26.31% (n=5) said that they felt excellent, while 5.26% (n=1) said they felt fair. Results show that participants had overwhelmingly positive feelings following participation in offline leisure activities.
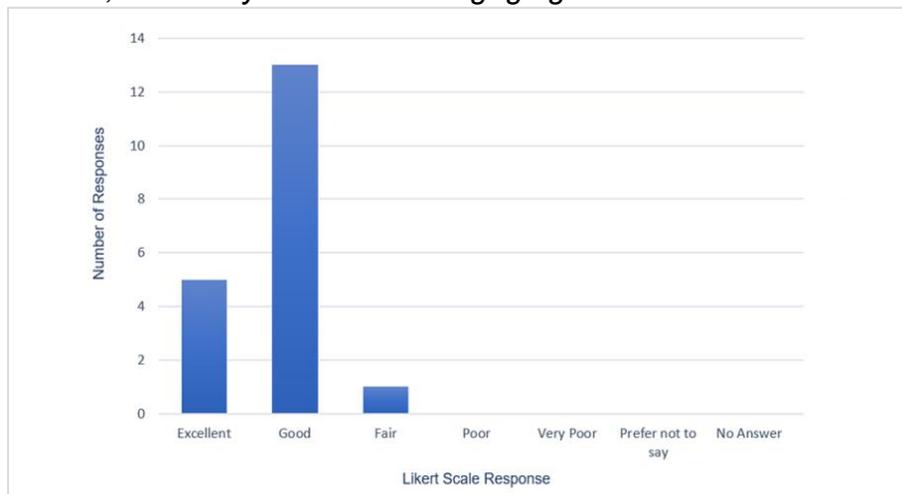
Figure 3
What sorts of offline leisure activities did you enjoy doing during the lock-down months of COVID-19?
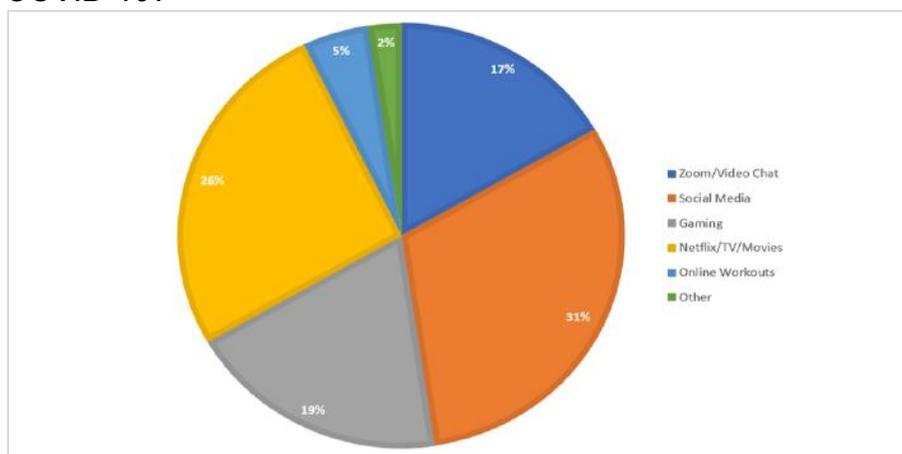

Figure 4
*Overall, how did you feel after engaging in these offline leisure activities?*

Online Leisure

   In figures 5 and 6, we defined online leisure activities as activities that require the use of the internet. We asked participants to list a few online activities they engaged in during the lock-down months of the pandemic. The most common answer cited by 13 of our participants was using some form of social media (26%). Some other activities included watching Netflix/movies/TV-shows (26%), online gaming (19%), Zoom/video chats (17%), online workouts (5%), and other (2%). Participants were then asked to rate how they felt after engaging in the online activities that they listed. 52.63% (n=10) of them said that they felt good, 21.05% (n=4) said that they felt fair, 10.52% (n=2) said they felt excellent, 10.52% (n=2) said they felt poor and 5.26% (n=1) said they felt very poor. Our results show that while the majority experienced positive feelings following participation in online leisure activities, there is an increase in those who indicate experiencing negative feelings. By comparing Figure 4 and Figure 6, we can say that online leisure activities can improve one's mood, but not to the same extent that offline leisure activities do.
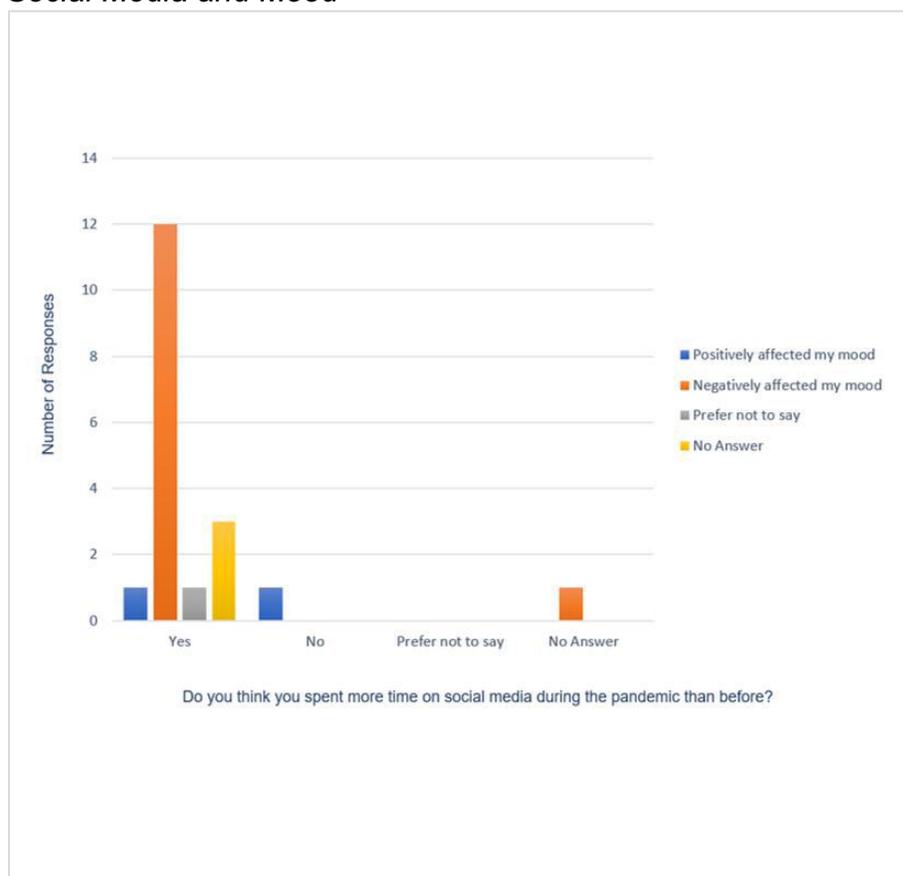
Figure 5
What sorts of online leisure activities did you enjoy doing during the lock-down months of COVID-19?

Figure 6
Overall, how did you feel after engaging in these online leisure activities?
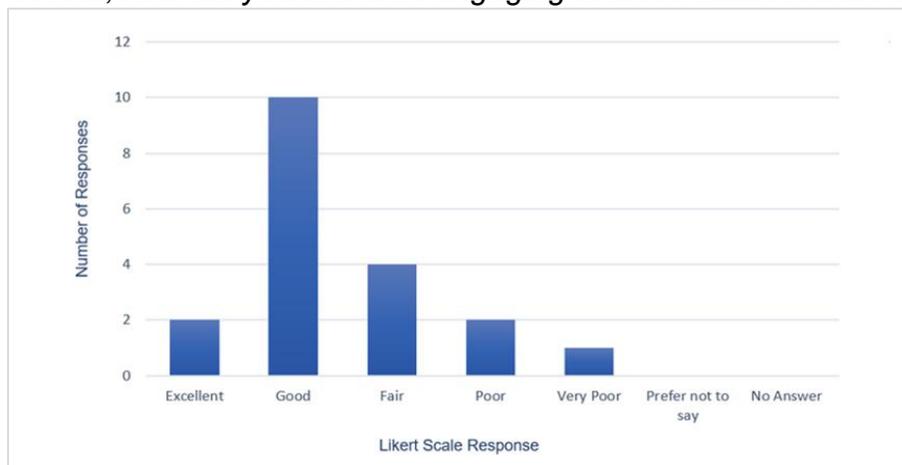
Figure 7
Social Media and Mood

In Figure 7, participants were asked "Do you think you spent more time on social media during the pandemic than before," followed by the question "Do you think increased time on social media positively or negatively affects your mood?" This graph compares the answers to these questions. Results show that 89.47% (n=17), which is almost all our participants, spent more time on social media during the pandemic. These results also show that the majority of the participants who said yes, also reported that increased time on social media negatively affected their mood (63.15%).

The 'Good Life'

Recall that 84.21% (n=16) of our participants said they were living with their family during the period of isolation. Prior to this, participants were asked "In your opinion, what is the most important requirement for living a 'good life'?" as seen in Figure 8. Participants were only allowed to choose one option. A significant portion said that the most important requirement was family (47%). Other options included friends (21%), others (16%), money (11%), and a successful career (5%). Some responses under the "other" option included "healthy mental well-being and state" and "overall happiness." None of our participants choose the social media option. This is significant to our findings from Figure 7.

Figure 8

In your opinion, what is the most important requirement for living a 'good life'?
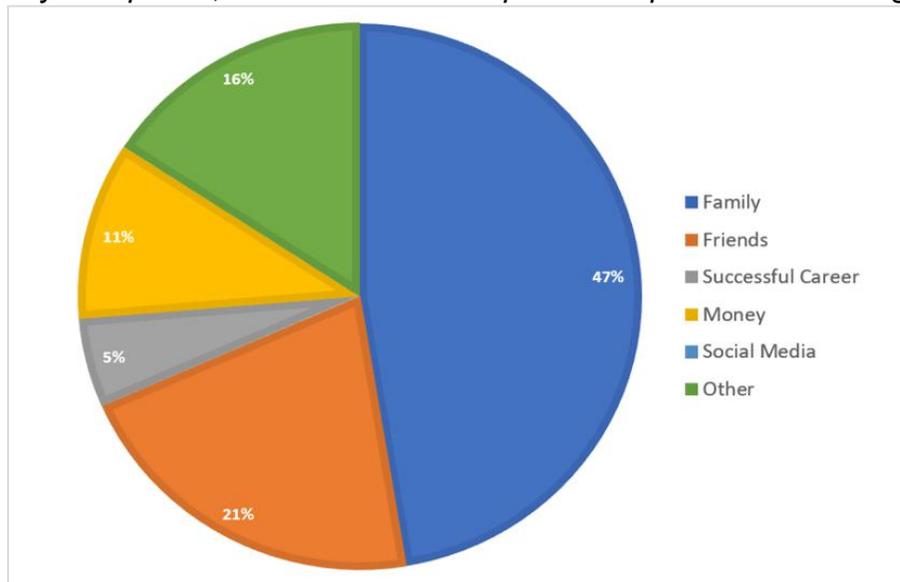
Participants were presented with the statement "What it means to live a 'good life' is entirely subjective." 68.42% (n=13) of our participants agreed with this statement and 26.31% (n=5) strongly agreed. This explains the result that we found in the opened ended question "Has your perception of what it means to live a 'good life' been altered since the COVID-19 pandemic began?" Some of our participants indicated that their perceptions did change. One of our participants said "COVID-19 definitely changed my perspective on school and focused more of my happiness and fulfillment on my relationships with family members and friends." Another one responded with:

I believe it definitely has. I have realized that going out, spending money, drinking/partying is not what a 'good life' must entail. I think who you surround yourself with is the most important thing. While the pandemic has definitely taken its toll on my mental health, being around people who keep you grounded, make you smile, etc. is the most important thing.

Some of our participants said that their perceptions about the 'good life' did not change. For example, one answer stated "No. I have always understood that having my friends in my life was part of living a good life. Seeing them less due to the pandemic just reinforces what I already believed." Another participant said "Not really. I've always believed that so long as you have good people around you who love and care for you that good things will come. This just changed the way we did things together." These results show that everyone has their own definition of what it means to live a 'good life'. Our participants' perceptions of living the 'good life' were based on their individual preferences on what was important to them.

Discussion

Lifestyle Changes

The COVID-19 pandemic has negatively affected many people over the past year, the impact, for the most part, appearing to transcend demographic and environmental

differences. Many have faced challenges, including rigid social restrictions, financial struggles, the loss of a job, among many others which all contribute to the unique experiences of each individual. A symbolic interactionist would recognize the importance of these environmental, life-altering changes, as they have the power to impact an individual's meaning-making process, in turn affecting their overall SWB (Charmaz et al., 2019). As shown in Figure 1, when presented with the statement, "my lifestyle had to change during the COVID-19 Pandemic," 94% indicated it did, with 63% strongly agreeing. Thus, there is no question that almost all of our participants were impacted by the pandemic in significant ways, and this may have been found in various aspects of their lives. This most likely included their time spent in leisure activities. In Figure 2, we discovered that when presented with the statement "I lost my job due to the COVID-19 pandemic," approximately 74% did not lose their jobs. However, although our participants may not have lost their jobs, there was still a worry of managing their finances or making ends meet. Slightly over 84% of our participants reported that they were worried about their finances at least once during the pandemic. Further questioning may have been beneficial to determine whether these responses were due to only being temporarily laid off due to lockdown restrictions and closures of non-essential businesses, rather than being fired. It also must be noted that it could be that our target population is more likely than the general population to worry about their finances, as they are younger and are likely concerned about payment of school-related expenses.

Nevertheless, there are various other explanations for why there is a worry about finances with the current context of the ongoing pandemic, as well as implications for how leisure activities are experienced. For one, there is the possibility that as a result of lockdown restrictions that many had to endure, there may have been an increase in online spending due to more time spent at home and possibly added stress. This may have contributed to financial worries. Additionally, according to Macchia & Whillans (2019), the prioritization of leisure is positively associated with life satisfaction, though this is often only possible for the financially secure. Therefore, based on the consideration that the majority of our participants either have worried or continue to worry about financial matters, this may impact their ability to take the time or pay the expenses necessary to participate in leisure activities. This is an important background to further assumptions about how they might reap any potential benefits from both online and offline activities.

Online Leisure Activities

The experiences of online leisure activities and the positive or negative impact they may have are more pertinent than ever during the COVID-19 pandemic. For this research, we have defined online leisure activities as activities that require the use of the internet. When asked to list types of leisure activities that our participants enjoyed doing during the lock-down months of COVID-19, responses indicated that most were participating in social media (26%) as well as Netflix/TV/movies (26%). Other responses included Zoom/video chats (17%), online workouts (5%), and other (2%). These results revealed participation in a wide variety of online leisure activities. There are several important factors to take into account that impact the way these activities are experienced. Firstly, the way one views a particular online activity affects their desire to participate, as well as their enjoyment of that activity. According to Blumer (1969) and the symbolic interaction theory, individuals respond to things based on the meaning those objects carry, implying

that it will vary from person to person. While there is evidence of much online use during the pandemic, the large range of activities presented in these responses indicates diversity in preference for ways to enjoy one's time online. Most respondents regard the use of social media and viewing of movies and television as leisure and gain some measure of enjoyment from it. When asked to indicate how they felt before engagement in these online activities, more than 50% of participants responded with feeling either 'excellent' or 'good'. These responses are to be expected, as there is a general assumption that leisure activities of any kind, whether online or offline, are performed to increase positive feelings (Newman et al., 2014). However, almost 40% of respondents indicated feeling either 'fair', 'poor' or 'very poor'. These results provide evidence of both neutral and negative feelings following participation in online leisure activities. Building upon this, when asked whether they spent more time on social media during the pandemic, a significant majority (89.3%) said they did. Furthermore, 63.14% of those who responded 'yes' additionally reported that this increased time spent using social media had a negative impact on their mood. This is consistent with the research conducted by Lades et al. (2020), which provided evidence that social media use was correlated with increased negative affect. It is also important to note that according to these results, engagement in leisure activities does not always have a positive impact on one's mood.

Perhaps the nature of these online activities is another important factor that impacts whether or not one gains positive affect from these pursuits. According to Lades et al. (2020), spending time outdoors as well as engaging in physical activities is most significantly associated with an increase in positive feelings. However, only a small portion of participants (5%) indicated engaging in physical activities associated with online use, particularly online workouts. This is likely due to the lack of perception of this type of activity as leisure. Additionally, the level of social interaction involved in the activity may have impacted how positively the individual felt after. According to Newman et al. (2014), social activities work to improve one's mood as well as protect from negative feelings. Some examples of activities respondents gave that either are, or have the potential to be socially interactive, are social media, video games, and especially video chatting. The social aspect of these online activities likely contributed to the reports of positive feelings following these activities. It would be consistent with research done by Pang (2018), which revealed that social networks can influence a person's SWB by increasing their perception of social support. The reports of negative moods however may be evidence of the fact that a person's SWB does not entirely depend on their levels of social engagement (Diener, 1984). This evidence of the adverse effects social media can have is consistent with a substantial amount of research suggesting that it may decrease levels of social trust, and overall lower levels of SWB (Sabatini & Sarracino, 2017; Agbaria & Bdier, 2020).

What is clear in our findings is that the COVID-19 pandemic has significantly impacted the way people spend their time, causing people to resort to doing many things online that were previously done in person. What we found is that, especially in the online world, people engage in leisure activities that may not be beneficial for their long-term physical and mental health. It appears that the isolation associated with the pandemic has only exacerbated these issues. Since there is evidence that supports many positive aspects of online activities, we cannot dismiss them altogether. Nevertheless, a decrease of reliance on them and incorporation with more offline leisure activities participation may

work to improve individuals' SWB, particularly within the context of the COVID-19 pandemic.

Offline Leisure Activities

The effects of offline leisure activities during the COVID-19 pandemic was another one of the major interests of our research. For our research, offline leisure activities were defined as activities that were completed without the use of the Internet, for example, exercise, baking, painting, and more. Participants were asked to list the types of offline activities they more enjoyed participating in, and responses indicated that baking and cooking were the most common answers, as well as hiking and walking. Both of these responses represented 23%, followed by exercising (17%) and painting and drawing (11%). Responses also included activities like reading (9%), other (9%), and board games (8%). Participants were also asked about how they felt after engaging in offline leisure activities, and the most common answer was 'good' (68.42%), and the second most common answer was excellent (26.31%).

When comparing participants' feelings after engaging in online activities and offline activities, no participants said they felt 'poor' or 'very poor', whereas after online leisure activities 40% of participants indicated feeling either 'fair', 'poor' or 'very poor'. These results show that the majority of participants felt positive after partaking in offline leisure activities.

Our research findings are consistent with previous research, showing that participants' moods and feelings were positively affected by offline activities more so than online activities. This is likely due to the fact that internet use is correlated with increased negative affect (Lades et al., 2020). Consistent with a study conducted by Newman et al. (2016), there is a correlation between SWB and leisure activities. More specifically, during the COVID-19 pandemic, research shows that spending time in nature and outdoor activities like walking are also associated with an enhanced sense of well-being (Lades et al., 2020). Furthermore, positive affect was found to be greatest when participants spent time outdoors or performed physical activities to exercise (Lades et al., 2020). Another study conducted by Brand et al. (2020) reinforces these findings saying that SWB is increased when physical activity and exercise are frequently performed. These results imply that greater emphasis should be placed on participation in offline activities, as opposed to online activities, to increase positive mood during a pandemic.

In addition to this, the types of offline activities may determine how participants feel after performing the activity. For example, hiking may cause participants to feel better than playing a board game. The higher number of participation in activities that required more physical exertion, namely hiking, walking, and exercising, may have contributed to the increase in positive mood responses. Therefore, it may be useful to examine mood responses to specific types of leisure activities. Another factor that could be further investigated is whether these activities were performed with other individuals, friends, or family. Activities performed with family or friends could affect mood or feelings differently than activities performed alone.

The 'Good Life'

Another important focus of our study was individual perceptions of what it meant to live the 'good life', and how they have changed over time within the context of the COVID-19

pandemic. One way that our research helps to build on existing literature is through a focus on the perceptions of well-being through the personal reflections of our respondents. 94.73% of participants were in agreement that what it means to live the 'good life' is entirely subjective. These perceptions, as defined through symbolic interactionism, are products of the meaning-making processes that we encounter through our daily interactions (Meltzer et al., 2015). Each person creates their own interpretation of what makes a positive impact within their social reality. Within our study, participants were given the opportunity to give their explanations as to what they considered to be the single most important factor to a well-lived life. The majority of respondents noted that either family (47%) or friends (21%) were the most important, with money (11%) and career (5%) coming in behind them. This result is consistent with the current literature, such as the findings by Newman et al. (2014), who discussed how social interaction with others helps to positively affect SWB and improve overall mood. This aspect of our research shows the importance that individuals place on their social systems and how this affects their perceptions of whether or not they are living the 'good life'.

An analysis of the quantitative data collected within our study aided in answering our research question: "How did students' perceptions about living the 'good life' change following the effects of the COVID-19 pandemic?" The data suggests that the recent changes in social structure following the lockdown orders produced substantial effects on individuals' attitudes towards what constitutes a well-lived life. A significant portion of participants reported a new or increased emphasis on the importance of family or friends in defining what they would consider the 'good life'. This observation by our participants is supported by external research, which shows that the influence of a support system can help to promote SWB (Pang, 2018, p. 2150). For those participants that reported a perception change, the COVID-19 pandemic helped them to learn to prioritize family and friendships over other aspects of their lives. For those who reported a belief in the importance of social relationships but whose perceptions did not change, the COVID-19 pandemic acted as a way to solidify their views. These responses are consistent with previous research that suggests people are happier and have higher SWB when surrounded by others (King et al., 2020). The lockdown protocols and subsequent isolation that stemmed from the pandemic have created added stress in many people's lives over the last year. Our data suggests that people were more inclined to attribute social relationships as being an aspect of the 'good life' during this time, even when the ability to interact within these relationships has been made difficult.

While interpersonal connection was seen as a primary factor in building the 'good life', participants did not directly attribute social media use as a facilitator for it. This finding is in contrast to research conducted by Pang (2018), who found that social media use was a positive indicator of SWB. Our research found that the majority of respondents (89.47%) were going online and using social media more during lockdown months, and part of this was to communicate with family and friends online. However, the same percentage (89.47%) reported missing getting together with friends and family in person during the pandemic. When compared to the importance that participants placed on the need for social relationships, this shows a prioritization of in-person interaction in students' perceptions of the 'good life'. This is consistent with previous literature that found social media use was linked to poor self-esteem and lowered well-being (Sabatini & Sarracino, 2017; Lades et al., 2020). These findings show that communication in an online world is

not equivalent to in-person interactions, and in turn is not perceived by students to be a significant factor in SWB. Our data shows that during the stress of the pandemic people are using social media more, but it is not working as a strong enough tool to mitigate the need for regular interpersonal communication. It is important to note that this finding is preliminary and correlative, as the scope of our study does not allow for a more in-depth discussion of this topic. These findings could be due to a lack of access to technology to communicate or other spurious factors. Future research is recommended to better understand the impact of permanent distance and social media on individuals during the pandemic.

Conclusion

Summary of Results and Findings

In conclusion, the pandemic has been shown to have greatly affected people's lifestyles. There has been an increase in financial strain and career insecurity, as well as a shift in the ways people can communicate with their loved ones. Undergraduate students are found to have spent more time online during the pandemic than they had previously, participating in a variety of activities that differed between individuals. When asked to self-report their feelings surrounding their perceived well-being following leisure participation, students indicated that their mood was negatively impacted following social media use or online leisure activities. In contrast, students reported more positive moods following offline leisure activities. These positive perceptions of well-being also extended to social relationships, as family and friends were found to be the most important aspect of what it means to live a 'good life'. Time spent with others and participation in offline activities is both introduced or reinforced as effective ways to enhance well-being among undergraduate students as a result of the pandemic. Similarly, our data suggests that time spent with family plays an important role in participants' mood and perceptions of the 'good life' during the COVID-19 pandemic. Most of the existing academic research does not address perceptions of well-being and the 'good life' as it relates to a global pandemic, and our research works to fill this gap.

Limitations

With any research study, there will be limitations and weaknesses that prevent any analysis to be explored to its full extent. With the restrictions of conducting in-person data from COVID-19, we were limited to solely focus on online resources and media to collect our research records. We were not able to conduct in-person interviews to gather information. This may have accounted for the reduction in our sample size, as there was a possibility of not having enough participants to gather a respective proportion in statistics and to understand the research focus. As mentioned already, our participants consisted of all female respondents. We were unable to gather a male perspective, and we are unsure if this plays an effect in our findings. We are also presented with focusing on the events from the recent pandemic to guide our study, which limited us from finding any previous peer-reviewed or published scholarly articles to use in guidance of the subject. Also, people may not remember their perceptions from a couple of months ago; a recall of memory may be one other limitation.

Additionally, there are limitations in regards to issues resulting from gathering information due to distress in an individual's personal experiences. Although it is

anonymous, they may have a hard time reporting their input. There is room to ensure that we have achieved all aspects of our research study. However, we are aware that some limitations will slow or prevent this progression.

Significant Insights or Contributions

A significant insight our research project has provided is how undergraduate spent their time effectively to enhance well-being. Our research findings suggest that participants were in a better mood after engaging in offline activities rather than online activities and provides us with an understanding of how undergraduate students spend their time. Some of the activities that effectively promote SWB and activities that negatively contribute to their SWB. Being an undergraduate student is stressful, and there is the added stress that comes with living through a global pandemic. Recognizing the correlations between offline leisure activities and positive feelings may provide insight into both individual and university changes that can be made to improve students' experiences during the pandemic. Our research could be useful for the university's social support services in providing students with information about leisure activities to enhance SWB.

Concluding Thoughts/Statements

Based on the results of our research, we can conclude that within the context of the COVID-19 pandemic, offline leisure activities are better able to enhance mood than are online leisure activities among undergraduate students. Additionally, leisure activities that were performed in the company of family or friends were more likely to increase the individual's SWB. While everyone has a different perception of the 'good life', the majority indicated that family and friends were a significant factor in this concept. We understand that our sample size was small and not generalizable, yet it was important because it provided us with valuable insight into how students spent their leisure time during the pandemic. We hope that future research can expand on what we have learned from our study, and in turn, help to provide valuable insights for the application of future university policy that may aid in alleviating student stress.

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