Computer Mediated Communication and Social Anxiety: Are the Benefits of Disclosing Online Contingent on Disclosing Face-to-face

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Educational Psychology

In

SCHOOL AND CLINICAL CHILD PSYCHOLOGY

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Abstract

Young people with social anxiety are vulnerable to deficits in social connectedness and appraisals of their subjective wellbeing. Computer mediated communication (CMC) tools (e.g., text messaging, social networking sites) encourage interacting with friends, are ubiquitous in the lives of young people today, and have demonstrated some compensatory potential for those with social anxiety in the present CMC literature. However, the use of these technologies to supplement current intervention strategies for young people with social anxiety is currently overlooked. The present study explores the therapeutic potential of CMC by investigating whether self-disclosing using CMC affords benefits, in terms of social connectedness and subjective wellbeing, for young people with social anxiety; and whether the potential benefits are contingent on the level of intimate self-disclosure these young people are already engaging in less mediated form in the real world. A sample of 427 Canadian undergraduate students (aged 17-21 years old; M =19.22) self-reported their level of social anxiety, CMC self-disclosure, non-CMC (real-time, face-to-face) self-disclosure, feelings of social connectedness, and subjective wellbeing. Model 7 of the PROCESS macro for SPSS was used to test whether young people with social anxiety benefitted from CMC self-disclosure, in terms of social connectedness and subjective wellbeing, as a function of non-CMC self-disclosure. CMC self-disclosure was associated with increased feelings of social connectedness and thereby enhanced subjective wellbeing; however, these benefits were only conferred to those individuals who already reported comfort disclosing information in non-CMC modes, namely, largely face-to-face. Theoretical and clinical interpretations are discussed.

Keywords: Computer mediated communication, social anxiety, social connectedness, subjective wellbeing, self-disclosure, intervention

Preface

This thesis contains original work by Jessica J. Joseph. Given that the completion of this thesis required the completion of a research project, it should be noted that the research received ethics approval from the University of Alverta Research Ethics Board, Project Name “Computer Mediated Communication and Social Anxiety”, No. Pro00111325, July 5, 2021.

Dedication

To my father, Gerard Charles Joseph. This is a moment in my life where I particularly long for your presence. Please know that every ounce of your unconditional love, kindness, and acceptance, as well as the unparalleled lessons that you taught me, led to the completion of this project, and every ounce of success I achieve in my life. I love you. I miss you. I dedicate this to you. I know you would be proud.

Acknowledgements

I would like to begin by extending my sincerest thanks to my beautiful Family: Robyn, Mom, Dad, Julia, Robert, Ethan, Joel, Molly, Poet, Painter, Lilo, and May. I would also like to extend this thanks to two of my dearest friends, M and R. I could not have done any of this without all of your continued love, patience, and support.

To my 6 brilliant, kind, patient, and ever so helpful Master's colleagues—this year, and conducting a thesis during a global pandemic (i.e., COVID-19), has certainly been turbulent. I thank each of you for persevering through it with me, and for inspiring and teaching me along the way.

To my supervisor, Dr. Jacqueline Leighton. Thank you for your unconditional faith in me, and the lessons you have taught me—both in and outside of research. Your belief in me, and the support and guidance you have offered, allowed me to complete not only this project, but this entire degree. I am grateful to know you and have worked with you.

To Dr. Malinda Desjarlais, I thank you for access to the dataset that made the completion of this project possible. I also thank you for your continued support and encouragement.

To my thesis committee, Dr. Jacqueline Pei and Dr. Lia Daniels. I sincerely thank you for taking the time out of your busy schedules, during a global pandemic, to support me, read my work, attend my defense, and provide feedback. Thank you.

Table of Contents

List of Tables

Table Page

List of Figures

Figure Page

List of Appendices

Introduction

Social anxiety may be conceptualized as marked fear of engaging in social situations involving conversations with other people (American Psychiatric Association, 2013; Leary & Kowalski, 1997; Schneier et al., 2002). Clinically, social anxiety disorder affects between 8 and 13% of Canadians between the ages of 15 and 64 (Government of Canada, 2006). However, arguments have been made that these numbers underestimate the prevalence of people who suffer from social anxieties, given that such numbers neglect to include the experiences of young people with subclinical levels of social anxiety, who should also be considered (Schneier et al., 2002). Often, the fears associated with social anxiety include fear of public humiliation (Leary & Kowalski, 1995), as well as fear of appearing socially incompetent and thereby being rejected by peers (Clark & Wells, 1995). As a result, young people with social anxiety avoid social situations (Leary & Kowalski, 1997), withdraw from their social circles (Rubin & Burgess, 2001), and disclose less personal information when engaging in social exchanges face-to-face (Cuming & Rapee, 2010). Consequently then, young people who experience social anxiety are at risk for a variety of negative social (e.g., diminished friendship quality; Biggs et al., 2012), and mental health (e.g., loneliness, depression; Danneel et al., 2019) consequences.

Current evidence-based intervention practices for social anxiety typically utilize a combination of cognitive and behaviour therapies (see Pelissolo et al., 2019 for review). For example, young people with social anxiety are often encouraged to visually and/or physically confront their social fears by engaging in systematic, incremental amounts of exposure to social situations (i.e., systematic desensitization; see Pelissolo et al., 2019 for review). Importantly, other modes of intervention are constantly arising for consideration. However, there is a gap in the research literature on the use of computer-mediated-communication (CMC) tools such as text messaging, email, or social media websites, and how CMC tools can help facilitate the delivery

of intervention techniques. While elements of internet-delivered psychotherapy (i.e., where the therapist meets with the client online; Hedman et al., 2011) or the use of virtual reality (Chesham et al., 2018) have been considered for the treatment of social anxiety, the use of technologies that are readily available to educators, clinicians, and the general public are currently overlooked. This is important for two reasons: First, the use of these technologies has become ubiquitous today in the lives of young people (e.g., Anderson & Jiang, 2018), and thus these tools are readily available to educators, clinicians, parents, and young people themselves. Secondly, CMC tools offer specific features that may make using these technologies, in a therapeutic context, particularity advantageous for young people with social anxiety.

Borrowing from the CMC literature, it has been argued that the reduced audio-visual cues coupled with the opportunities for anonymity, which are afforded by CMC technologies, allow users to feel more comfortable disclosing personal information with friends (Valkenburg & Peter, 2009a). These affordances are imperative for the development of close friendships (Rubin & Shenker, 1978). In fact, the *social compensation hypothesis* postulates that, because of these affordances, CMC may be used as a compensatory mechanism for young people with social anxiety to connect with friends and avoid the discomfort felt when disclosing in face-to-face encounters (Valkenburg & Peter, 2009a; Weidman et al., 2012). Research suggests that, in general, using CMC to disclose personal information with friends is often associated with increases in social connectedness (Desjarlais et al., 2015) and subjective wellbeing (Liu et al., 2019). More importantly, there is research that supports the social compensation hypothesis, indicating that young people with social anxiety do benefit from using CMC to disclose with friends, and experience enhanced feelings of social connectedness (Desjarlais & Willoughby, 2010) and subjective wellbeing (Indian & Grieve, 2014; Van Zalk et al., 2011). However, there is a limitation in this line of literature, such that CMC disclosure studies, to date, have not

investigated the integration of *both* CMC and face-to-face disclosure for those with social anxiety during encounters with friends.

Rather than pitting CMC disclosure against face-to-face disclosure, as in current research (e.g., Wohn et al., 2017), the present study directly investigates whether the suggested benefits, in terms of social connectedness and subjective wellbeing, that result from disclosing using CMC depend on how comfortable young people are disclosing personal information face-to-face. To better understand whether utilizing CMC is beneficial for young people with social anxiety, it is necessary to control for some key variables. For example, it is necessary to identify whether the benefits of CMC disclosure that have been observed in previous research are contingent on the amount of self-disclosure these individuals are already engaging in face-to-face with their friends. This is especially important if CMC is to be considered as a tool for intervention in the lives of young people with social anxiety. Therefore, the purpose of the present study is to begin to address the gap in the present literature by: (1) Investigating whether young people with relatively higher levels of social anxiety benefit from CMC self-disclosure in terms of social connectedness and thereby subjective wellbeing, and if this is conditional on the level of self-disclosure they engage in face-to-face; and (2) Consider this information in guiding researchers and clinicians on the potential for CMC to be used in a therapeutic context.

Literature Review

The primary goal of the present study was to investigate methods of communication that can help alleviate social anxiety in young people. To address this primary goal, the present study has two objectives: (1) To identify whether young people with relatively higher levels of social anxiety benefit, in terms of their social connectedness and subjective wellbeing, from disclosing with friends using computer mediated communication (CMC); and (2) If so, to evaluate whether

researchers and clinicians should consider CMC to help supplement current intervention approaches for young people with social anxiety.

The present review provides background to the literature that defines social anxiety, how young people with social anxiety are often vulnerable to deficits in social connectedness and subjective wellbeing, the desire to help reduce these deficits, and a brief discussion on a limitation of current intervention approaches. Next, a review is provided of the relevant literature that suggests the possible benefits of CMC disclosure to facilitate social connectedness and subjective wellbeing. Following this section, the literature on how young people with social anxiety might benefit in terms of social connectedness and subjective wellbeing from using CMC to disclose with friends is described. Last, a synthesis of the gaps and themes outlined in the literature review, as well as the details of the present study, including the research questions and related hypotheses, are described.

Definitions, Prevalence, and Characteristics of Social Anxiety

Social anxiety and associated fears render young people vulnerable to experiencing negative consequences in their social connections and overall subjective wellbeing. The notion of social anxiety is not new and has been noted and discussed throughout human history. In fact, early accounts of social anxiety have been attributed to Hippocrates, dating back to between 460BC and 370AD, where he wrote of a boy named Nicanor who experienced a tremendous, irrational fear of a flute girl while attending a drinking party (Crocq, 2015; Smith 1994). Modern understandings of social anxiety, however, began with the work of Marks and Gelder (1966), who described social anxiety as a condition where a person experiences notable apprehension while performing social tasks. At present, social anxiety, also known as social phobia, may be conceptualized as marked, irrational, and persistent fears of engaging in social situations

(American Psychiatric Association, 2013; Leary & Kowalski, 1997; Heimberg et al., 2014; Schneier et al., 2002).

The most predominant fears associated with social anxiety typically include speaking and/or performing publicly; however, many individuals experience an extension of this anxiety to a variety of day-to-day social interactions (Pelissolo et al., 2019; Radtke et al., 2020). Accordingly, many individuals with social anxiety experience fear of relatively commonplace social interactions, including initiating conversations with peers, attending parties, talking with friends, and dating (Radtke et al., 2020). These individuals often avoid events that might lead to public humiliation, scrutiny, and embarrassment (American Psychiatric Association, 2013; Leary & Kowalski, 1995; Stein et al., 2008), which can occur in both real and imagined social interactions (Leary & Kowalski, 1997). More specifically, individuals with social anxiety excessively worry about (a) being negatively evaluated by others (American Psychiatric Association, 2013), (b) making a bad impression on others (Creed & Funder, 1998), as well as (c) appearing socially incompetent and thereby (d) being rejected by peers (Clark & Wells, 1995). Research also shows that the fear induced by social situations is often associated with increased levels of cortisol (Ketey et al., 2019), as well as other physiological symptoms, including increased heart rate, redness or blushing, and sweating—all of which further perpetuate the worry of being judged and publicly humiliated (Shalom et al., 2015). As a result, individuals with social anxiety adopt strategies, or self-protection mechanisms, to alleviate experiencing the fears that arise in social situations. Self-protection strategies often include avoiding social events, encounters and situations (Leary & Kowalski, 1997) and withdrawing from social circles (Rubin & Burgess, 2001). Furthermore, when actually engaging in social encounters, those with social anxiety also tend to protect themselves by disclosing less frequently and disclosing less personal

information than their non-socially anxious peers (Cuming & Rapee, 2010). The reduced level of disclosure has consequences for their friendships and subjective wellbeing.

Although some level of social anxiety may be adaptive in the sense that it can increase attention to the quality of interactions and help promote prosocial behaviours (Schneier et al., 2002), too much anxiety becomes problematic when it leads to levels of distress and/or impairment that interfere with being able to function adaptively on a daily basis (American Psychological Association, 2013). In fact, social anxiety was recognized as an anxiety-based mental disorder in the early 1980s and was included in the Diagnostic and Statistical Manual of Mental Disorders as a type of phobia (i.e., DSM-III; American Psychiatric Association, 1980). Clinically, the diagnostic criteria for social anxiety disorder (or social phobia) have evolved throughout the various updates of the DSM (see Hofmann & Otto., 2018 for review); however, all updates of the criteria generally identify social anxiety as marked by fears of embarrassment and/or humiliation in social situations, to an extent where it significantly impedes daily functioning. Although an exhaustive review of social anxiety disorder extends beyond the scope of the present study, the interested reader may find more information by reading Hofmann and Otto (2018), and/or Pelissolo and colleagues (2019) for more detail.

In terms of prevalence, there are a multitude of people who struggle with social anxiety. Disordered levels of social anxiety affect between 8 and 13% of Canadians between the ages of 15 and 64 (Government of Canada, 2006); and 12% of Americans 18 years and older (Ruscio et al., 2008). However, there is presently no specific clinical threshold for the level of impairment/distress that needs to be observed, or result from, social anxiety in order to meet diagnostic criteria (see Schneider et al., 2002 for review). This is relevant because, unsurprisingly, estimates of prevalence depend on clinical thresholds for defining social anxiety (Stein et al., 1994). As a result, there is a limitation in prevalence statistics, such that they may

underestimate the number of people who struggle with social anxiety but fail to meet potentially arbitrary clinical thresholds (Schneider et al., 2002; Stein et al., 1994). In fact, researchers have argued that the prevalence rate of people who suffer from social anxiety is substantially higher than the disorder estimates show (Stein et al., 2000), and have suggested rates of subclinical levels of social anxiety in the general population to be between 20%-36% (Jefferies & Ungar, 2020; Schneider et al., 2002).

Because subclinical levels of social anxiety may be highly distressing to individuals who suffer from social anxiety, researchers have advocated for better ways to estimate its prevalence (Schneider et al., 2002). Social anxiety is also characteristically similar, but more severe than the construct of shyness (Turner et al., 1990). Shyness and social anxiety overlap somewhat in the sense that they both include fear, discomfort, and awkwardness in social settings, as well as avoidance and withdrawal from others (Turner, 1990). However, social anxiety is distinct from shyness in the maladaptive level of fear that is experienced by the individual and, thus, the interference it has on the person's general functioning (Pelissolo et al., 2019; American Psychiatric Association, 2013). Given the underestimated prevalence rates of social anxiety, and the similarities it shares with related constructs such as shyness, researchers have proposed that social anxiety be viewed on a continuum, allowing subclinical levels of social anxiety to be considered in practice and research (see Schneider et al., 2002 for a full review in this regard). The present study follows this recommendation and specifically focuses on subclinical (i.e., relatively higher) levels of social anxiety and not on diagnosed clinical levels of social anxiety.

In both clinical (Steinert et al., 2013), and non-clinical (Schneider et al., 2002) samples of social anxiety, young people are disproportionately represented (Jeffries & Ungar, 2020). Research suggests that symptoms of social anxiety typically emerge early between the ages of 10 and 19 years (Steinert et al., 2013). In fact, it has been estimated that approximately 90% of

social anxiety cases occur prior to 23 years of age (Kessler et al., 2005). Researchers have found that in the general population of adolescents and young adults, social anxiety typically affects slightly more females than males; however, in clinical populations males and females are equally represented (American Psychiatric Association, 2013). The present study specifically focuses on young people who are between the ages of 17 and 21 years old, and includes both male and female participants.

The Consequences of Social Anxiety in the Real World

Young people with social anxiety avoid social situations (Leary & Kowalski, 1997), withdraw from social circles (Rubin & Burgess, 2001), and disclose less intimate information when engaging in social exchanges (Cuming & Rapee, 2010). Importantly, the consequences of social anxiety do not end with the experience of fear, nor with social avoidance and withdrawal. Individuals with social anxiety are at risk for a variety of other, negative consequences such as lower socio-economic status, lower levels of education, discrepancies in school/work performance, and social deficits (Davidson et al., 1994). As well, some of the most salient findings about young people with social anxiety focus on the vulnerability and deficits they experience in feeling socially connected (e.g., Biggs et al., 2012) and in their subjective wellbeing (e.g., Maričić & Štambuk, 2015). The next two sections outline the reasons young people with social anxiety are vulnerable in terms of social connectedness and subjective wellbeing.

Social Anxiety and Implications for Social Connectedness

It is longstanding wisdom that having close friendships and social connections is fundamental to human wellbeing, including for young peoples' lives (Baumeister & Leary, 1995). Social connectedness is generally defined as feelings of closeness to another person or to people in general (Rubin & Shenker, 1978; Reiss & Patrick, 1996; Ketay, 2019). Social

connectedness often involves elements of acceptance, inclusion, and mutual understanding (Berndt, 1989).

The development of close social connections has been investigated for years. In fact, early attempts to understand how close social connections are formed have been attributed to Aristotle and Kant, who indicated that close relationships were created by people forming a "mutual knowledge of one another" that is developed through a process of "intrinsically valuable self-disclosure" (Veltman, 2004, p. 225). The argument that intimate self-disclosure (i.e., the process of sharing personal thoughts, feelings, and experiences about oneself to other people) paves the road to feelings of social connectedness is also consistently found throughout decades of research (e.g., Bauminger et al., 2008; Ketay 2019; Reiss & Patrick, 1996; Rubin & Shenker, 1978). In particular, mutual (or reciprocal) self-disclosure, whereby persons disclose intimate information about themselves to another who listens, provides validation, and also then shares intimate personal information in return, is of upmost importance in developing and maintaining close social connections (Reiss & Patrick, 1996).

For young people with social anxiety, engaging in social encounters and disclosing personal information is often challenging because of the fears provoked by such events. However, there are collateral actions and emotions that may aggravate the challenge. First, given that young people with social anxiety often *withdraw* from others (Rubin & Burgess, 2001) or avoid social situations altogether (Batool & Zubair, 2018), their opportunities to engage in self-disclosure to develop close connections are reduced. Second, there is evidence to suggest that young people with social anxiety *disclose less* intimate information and engage in less reciprocal disclosures than their non-socially anxious counterparts, when they do engage in social exchanges (Batool & Zubair, 2018; Meleshko & Alden, 1993). As a result, young people with social anxiety often have difficulties developing new social connections (Cuming & Rapee, 2010;

Davidson et al., 1993; Ketay et al., 2019). Third, social anxiety is often associated with deficits in the closeness of existing social connections (Biggs et al., 2012), as well as reduced levels of social support and smaller social networks (Alden et al., 2014). This is significant because the absence of social connectedness is often associated with *feelings of loneliness* and alienation (Buhrmester, 1990). In fact, as discussed next, feelings of social connectedness are considered to be integral to subjective wellbeing (Santini et al., 2021).

Social Anxiety, Social Connectedness, and Implications for Subjective Wellbeing

Subjective wellbeing is a construct that comprises one's personal evaluation of life, including a personal assessment of one's overall experiences and satisfaction in life (Diener et al., 1999, 2003). There are multiple forms of subjective wellbeing in the present literature; for example*, cognitive subjective wellbeing* (i.e., cognitive appraisals of life satisfaction), and *affective subjective wellbeing* (i.e., the daily experiences of emotions and emotional responses to life events; Diener et al., 1999, 2003). While subjective wellbeing is based on personal perspectives and experiences, it is also inextricably related to a variety of related mental health constructs, including depression, loneliness, self-esteem, and life satisfaction (Diener et al., 1999). Although a full discussion on subjective wellbeing extends beyond the scope of the present study, the interested reader may be referred to Diener and colleague's (1999; 2003) writings for more information. To prevent the *jingle and jangle fallacy* (i.e., multiple constructs using the same label; see Gonzalez, MacKinnon & Muniz, 2021), it should be definitively noted that for the purpose of the present study the affective (or emotional) component of subjective wellbeing (Diener et al., 2003) will be considered a relevant variable to measure and represent subjective wellbeing.

Subjective wellbeing has been found to be enhanced by interpersonal relationships and social engagements (see Diener et al., 1999 for review). In fact, in the longest running

longitudinal study of its kind, researchers from Harvard university found that across a span of 80 years, multiple generations, and people from multiple different backgrounds, a sense of closeness in relationships (or social connectedness) was one of the most stable predictors of positive long-term health, happiness, and subjective wellbeing (Mineo, 2017). Not surprisingly then, lower levels of social connectedness are associated with feelings of unhappiness and concomitant deficits in subjective wellbeing (Marion et al., 2013).

In general, young people with social anxiety are vulnerable to experiencing lower levels of subjective wellbeing (Öztürk & Mutlu, 2010; Maričić & Štambuk, 2015), and higher levels of loneliness (Maričić & Štambuk, 2015) and depression (Danneel et al., 2019). As mentioned previously, young people with social anxiety engage less often in the social connection behaviors that yield subject wellbeing, namely, less interactions with friends and less intimate disclosure relative to non-socially anxious peers (as discussed above; e.g., Batool & Zubair, 2018). For example, in a study by Maričić and Štambuk (2015), feelings of loneliness (i.e., feeling alone and not socially connected) were found to fully mediate the relationship between social anxiety and deficits in subjective wellbeing. In other words, the way in which higher social anxiety was found to be related to lower levels of wellbeing was through the feeling of loneliness. Thus, given that both social connectedness and subjective wellbeing are components of healthy human development, and are particularly salient vulnerabilities for young people with social anxiety, both constructs are considered in the present study.

Current Intervention Strategies for Social Anxiety

Young people do not have to meet a diagnostic threshold, nor receive a diagnosis, to obtain professional help, support, and intervention to alleviate social difficulties (Fried & Fisher, 2014). Therefore, investigating and understanding intervention strategies for young people with subclinical levels of social anxiety, as in the present study, is worthwhile and meaningful. For

young people who do meet the criteria and are diagnosed with social anxiety, several evidence-based intervention strategies and frameworks have been validated to help them with their social anxiety, across psychopharmacological (e.g., Blanco et al., 2003) and psychotherapeutic techniques (Canton et al., 2012; Pelissolo et al., 2019). Although an exhaustive discussion about these interventions and tools extends beyond the scope of the present study, the interested reader is referred to Hofmann and Otto (2018), Canton and colleagues (2012), and/or Pelissolo and colleagues (2019) for more information. For the purpose of the present study, it suffices to note that a combination of cognitive and behavioural therapy (i.e., CBT) is considered the gold standard for the treatment of social anxiety (see Hoffman et al., 2017; Pelissolo et al., 2019 for review).

In present research and practice, the behavioural aspect of CBT therapy (i.e., exposing the client to an aversive stimulus and reducing the fear reinforcing response; Halbur & Halbur, 2019; Skinner, 1939) is often considered an essential component of therapeutic interventions for social anxiety (Radtke et al., 2020; see Hofmann & Otto, 2018 for review). Elements of behaviour therapy often include exposure therapy, or the controlled, systematic, and incremental exposure to increasingly anxiety-provoking social situations (see Radtke et al., 2020). To execute exposure techniques, as outline by Radtke and colleagues (2020), clients are typically first asked to construct a fear hierarchy, where they create a list of increasingly difficult social situations that provoke their anxieties and fears. Following the creation of this fear hierarchy, the therapist (with the help of natural supports such as parents, other adults, or friends) works collaboratively alongside clients to slowly expose them (either visually or physically in person) to each step of the fear hierarchy they have created (Radtke et al., 2020). The use of exposure therapy as an evidence-based practice to help alleviate and/or reduce the fears of those with social anxiety has

garnered notable support both in research and in practice (Mallott & Beidel, 2014; Radtke et al., 2020).

To expand support to young clients with social anxiety, technology may facilitate exposure techniques. Recent research has largely focused on using internet-delivered psychotherapy (i.e., where the therapist meets with the client online; Hedman et al., 2011), or the use of virtual reality (Chesham et al., 2018). However, to date, research of commonplace technologies that promote social interactions (i.e., computer mediated communication, CMC; e.g., text messaging, email, social networking websites) and help to facilitate the delivery of intervention techniques such as behavioural desensitization for social anxiety is missing. This is a significant gap in the literature for two reasons. First, the use of these technologies has become ubiquitous today in the lives of young people (e.g., Anderson & Jiang, 2018). This means that using these technologies is familiar to young people, and that the use of these tools is readily available to educators, clinicians, parents, and young people themselves. Second, CMC tools offer specific features that may make using these technologies, in a therapeutic context, particularity advantageous for young people with social anxiety.

The Features and Benefits of Computer Mediated Communication (CMC)

Although computer mediated communication (CMC) has not been investigated in a therapeutic context to date, CMC has the potential to be used therapeutically as outlined in the following sections.

Definitions, Statistics, and Understanding Computer-Mediated Communication for Therapeutic Purposes

Computer-mediated-communication (CMC) may be conceptualized as the use of various forms of technology, including: Text messaging, instant messaging, email, and social networking to communicate with friends (Valkenburg & Peter, 2009a). CMC represents an emerging new

context for users to disclose and exchange personal information within their social networks. Indeed, CMC has become pervasive among young people in North America. For example, the Pew Research Center indicates that approximately 96% of American young adults between the ages of 18 and 29 years report owning a smart phone (Pew Research Center, 2021); the proportion of ownership has grown substantially from the proportion of 83% reported in 2011 (Smith, 2011). Furthermore, these rates are consistent across adolescent users, where 95% of American adolescents report having access to a smart phone, and nearly half (45%) of American adolescents report being online "almost constantly" (Anderson & Jiang, 2018). Importantly, across young adults (Smith, 2011; Pew Research Center, 2021) and adolescents (Schaeffer, 2019), the majority of smartphone users cite connecting with their friends as their primary reason for using their device.

Computer Mediated Communication, Social Connectedness, and Subjective Wellbeing

In addition to the reliance on CMC by young people today, CMC offers features that in general may allow users to feel comfortable sharing information. The beneficial features of CMC are best described by Valkenburg and Peter's (2009a) *internet enhanced self-disclosure hypothesis*. Specifically, the internet enhanced self-disclosure hypothesis reflects two major assumptions about communicating using CMC. The first assumption is that the reduced audio and visual cues, coupled with the opportunities for anonymity, allow users to feel more comfortable disclosing personal information with friends than in traditional in person situations (Davis, 2012; Valkenburg & Peter, 2009a; 2011). Support for this assumption has been documented within the CMC literature for years. For example, in 2007, Chiou revealed that when a sample of young people were discussing highly personal information (e.g., sexualized information) with a cyber-friend, they were more willing to disclose information when only a username was used than when a live-stream web cam was included, and users could see face-to-

face cues. The notion that the anonymity provided by the reduced audio-visual cues afforded by CMC increased self-disclosure has also been advanced in more recent research studies. In a recent meta-analysis of studies on anonymity and online self-disclosure, Clark-Gordon et al. (2019) found that online anonymity was positively associated with increases in CMC self-disclosure.

The second assumption of the internet-enhanced self-disclosure hypothesis is that, as a result of users' comfort using the technology, they disclose more and reap the benefits of social connection and enhanced subjective wellbeing (Valkenburg & Peter, 2009a). Indeed, support for this assumption has been found (see Liu et el., 2019 for review). For example, Desjarlais and Joseph (2017) found that CMC use led to increases in both online and offline self-disclosure, which then led to increases in the intimacy of users' social connections (see also Köbler et al., 2010; Kraut et al., 2002). There is also evidence that CMC disclosure is associated with enhancements in social capital (Williams, 2019), friendship maintenance (Davis, 2012), and feeling supported by friends (Wright et al., 2013). In fact, increases in social connectedness and/or the quality of friendships is one of the most consistent findings in the CMC and self-disclosure literature (see Desjarlais et al., 2015 for review). The social connectedness observed from online disclosure may translate into enhancements for users' subjective wellbeing, and associated constructs (see Liu et al., 2019; Verduyn et al., 2017 for review). For example, correlational research has revealed that disclosing using CMC leads to increases in social connection, and decreases in depressive symptoms (Grieve et al., 2013), depressive mood (Frison & Eggermont, 2016), and loneliness (Karsay et al., 2019), as well as enhancements in self-esteem, overall mood, life satisfaction (Webster et al., 2021 for review) and subjective wellbeing (see Joseph et al., 2021). Additionally, in an experimental study by Deters and Mehl (2013), participants in the experimental condition were asked to intentionally use CMC as a mechanism

with which to post, message, and interact with friends. The researchers found that using CMC to self-disclose with friends led to significant decreases in young peoples' loneliness compared to a control group (Deters & Mehl, 2013). The decrease in loneliness was attributed to higher levels of social connectedness in the experimental group.

Although these findings reveal that, in general, CMC poses benefits for users in terms of social connectedness and subjective wellbeing, there are unanswered questions such as: Do these benefits extend to young people with social anxiety? Could CMC be used as a compensatory mechanism to help socially anxious young people connect with friends when they are uncomfortable doing so face-to-face? The relevance of answering these questions will be addressed in the next section.

Computer Mediated Communication as a Compensatory Mechanism for Social Anxiety

Research investigating whether CMC may be used as a compensatory mechanism by young people with social anxiety for disclosing information has led to mixed findings. According to the *social compensation hypothesis* (Valkenburg & Peter 2009a), young people with social anxiety may be able to turn to CMC to connect with friends and, by doing so, compensate for their discomfort engaging in face-to-face interactions. As indicated previously, CMC affords young people with social anxiety the ability to disclose and feel connected to friends with less fear of judgement and real-time unpredictability given the reduction in audio-visual cues, the increased anonymity (Valkenburg & Peter, 2007; 2009a), and the benefit of planning ahead for the communication. There is support for the social compensation hypothesis (e.g., Indian & Grieve, 2014). Specifically, social anxiety has been found to be a predictor of CMC use; people with social anxiety are more likely to turn to CMC than face to face to interact with friends (Bodroža & Jovanović, 2016; Kraut et al., 2002), and report a preference in using CMC as opposed to face-to-face interactions (Hutchins et al., 2021). Moreover, Weidman et al. (2012)

found that socially anxious young people perceive CMC as more valuable for self-disclosure, report greater levels of CMC disclosure (Valkenburg & Peter, 2007a), as well as use CMC for social purposes more frequently than less socially anxious peers (McCord et al., 2014).

That young people with social anxiety may be able to reap social and mental health benefits from CMC use suggests that CMC could have therapeutic value. In a longitudinal study by Desjarlais and Willoughby (2010), social anxiety was included as a moderating variable to evaluate the relationship between CMC disclosure and social connectedness. The results revealed that, over time, socially anxious adolescent males who used CMC to interact with friends exhibited increases in social connectedness compared to less anxious adolescent males. However, Indian and Grieve (2014) found that, regardless of level of social anxiety, increases in social connectedness was observed for all participants after using CMC. Interestingly, Indian and Grieve (2014) found that only participants with higher levels of social anxiety exhibited benefits in subjective wellbeing from the social connectedness derived from using CMC. In more recent research, Chan (2021) found that, socially anxious individuals who used CMC were observed to show increases in disclosing personal information, feeling more connected with friends, and subjective wellbeing. These studies help illustrate the potential for CMC as a compensatory mechanism for treating young people with social anxiety.

In contrast, some researchers reject the social compensation hypothesis, and propose that young people who use CMC tend to be socially confident and, therefore, reap the social and wellbeing benefits of CMC compared to those with social anxiety (i.e., the *social enhancement hypothesis;* see Kraut et al., 2002). For example, research in this regard has indicated that socially confident young people disclose more personal information using CMC than their anxious peers (Hollenbaugh & Ferris, 2014; O'day & Heimberg, 2021). Furthermore, when socially confident young people disclose using CMC, it offers them further opportunity to practice and enhance

their strong social skills (Bouchillon, 2020). As a result, socially confident young people gain further enhancements in social connectedness (Weiqin et al., 2016) from disclosing using CMC, relative to anxious peers.

Still, others have observed that both the socially anxious and the socially confident benefit from CMC disclosure in terms of friendships and subjective wellbeing (Desjarlais & Willoughby; 2010; Wang et al., 2018). One limitation in the CMC disclosure studies to date is the absence of understanding the integration of disclosure during both CMC and face-to-face encounters with friends. Although researchers have found that face-to-face disclosure is *more* beneficial to social connectedness and subjective wellbeing than CMC disclosure (e.g., Wohn et al., 2017), the present study conceptualizes CMC use as one of supplementing, not replacing face-to-face interactions. In other words, rather than pitting face-to-face versus CMC disclosure as opposites, CMC may be viewed as a compensatory mechanism that builds on baseline levels of face-to-face disclosure. This is essential if CMC is to be considered as a tool for intervention in the lives of young people with social anxiety.

The Present Study

Young people with social anxiety experience fears of public humiliation during social encounters (American Psychiatric Association, 2013), leading to self-protective strategies such as avoiding social situations (Leary & Kowalski, 1997), and a lack of personal disclosure when engaging in social exchanges (Cuming & Rapee, 2010). Because intimate and reciprocal self-disclosure is essential for developing and maintaining social connections (Bauminger et al., 2008; Ketay 2019), young people with social anxiety are vulnerable to feeling disconnected socially (Biggs et al., 2012). Furthermore, these deficits in social connection may exacerbate deficits in subjective wellbeing (Maričić & Štambuk, 2015). There are currently well-established intervention techniques (i.e., exposure therapy; see Radtke et al., 2020) that help reduce the social

fears and ameliorate the social and mental health vulnerabilities of those suffering from social anxiety. However, one gap in the current research is whether CMC may be practically used to help supplement the delivery of present intervention techniques for young people with social anxiety.

In the present study, the social compensation hypothesis is considered a potentially useful hypothesis in which to cast the benefits of CMC to help socially anxious young people confront their social fears. To establish CMC as a tool to help supplement current intervention strategies, it is necessary to first identify whether young people with relatively high levels of social anxiety benefit in terms of their social connectedness and subjective wellbeing from disclosing with friends using CMC. If so, then a second objective is to evaluate how researchers and clinicians should use CMC to help supplement current intervention approaches for young people with social anxiety. The present study investigates the following Research Questions (RQs) and respective hypotheses.

Research Question 1 (RQ1): Do socially anxious young people report benefits in social connectedness, and thereby benefits in their subjective wellbeing, from disclosing information using CMC? The answer to this research question provides a rationale for the potential of CMC to be considered during therapy for social anxiety. Figure 1 shows the variables of interest for RQ1.

Figure 1.

Theoretical Meditation Model for Research Question One.

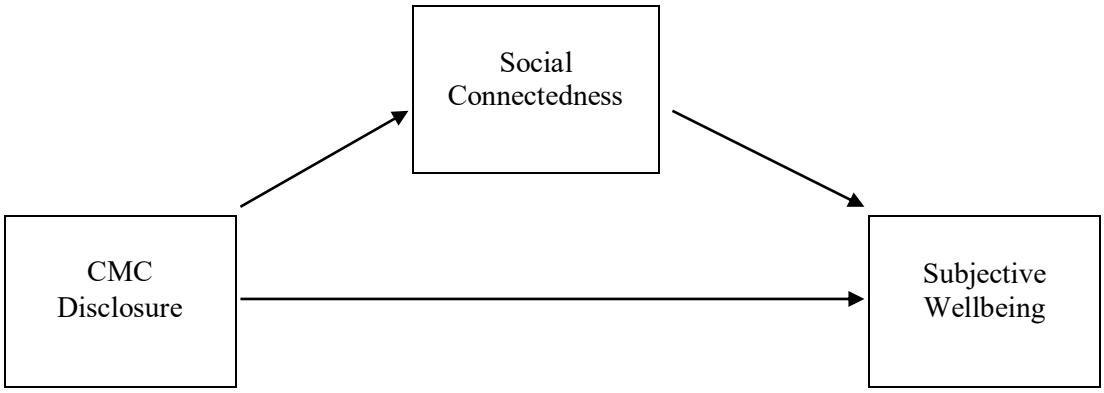


Figure 1 shows the expected relationships: CMC self-disclosure is expected to lead to enhancements in social connectedness and thereby enhancements in subjective wellbeing (as per the internet enhanced self-disclosure hypothesis, see Valkenburg & Peter, 2009a). This relationship is formally expressed in the following hypothesis:

> H1a: There is a positive indirect relationship between CMC disclosure and subjective wellbeing through feelings of social connectedness for young people with relatively high social anxiety.

As depicted in Figure 1, in the present study, social connectedness is hypothesized to serve as a mediator, transmitting the effects of CMC disclosure to enhancements in subjective wellbeing.

The present study investigates the indirect effect of CMC on subjective wellbeing only for young people with relatively elevated levels of social anxiety (i.e., above the median). Although there is evidence to suggest that (as per the social compensation hypothesis), social anxiety may act as a predictor (e.g., Bodroža & Jovanović, 2016) of CMC disclosure, or a moderator for the benefits of CMC disclosure (e.g., Desjarlais & Willoughby, 2010), the objective of the present study was to evaluate whether CMC could be used as a therapeutic tool, specifically for young

people with social anxiety. By directly examining the effects of CMC disclosure among young people with elevated social anxiety, rather than identifying whether these young people turn to CMC, or benefit *more* than less socially anxious peers to support the social compensation perspective, the present study expands our understanding of the compensatory potential of CMC for young people with social anxiety.

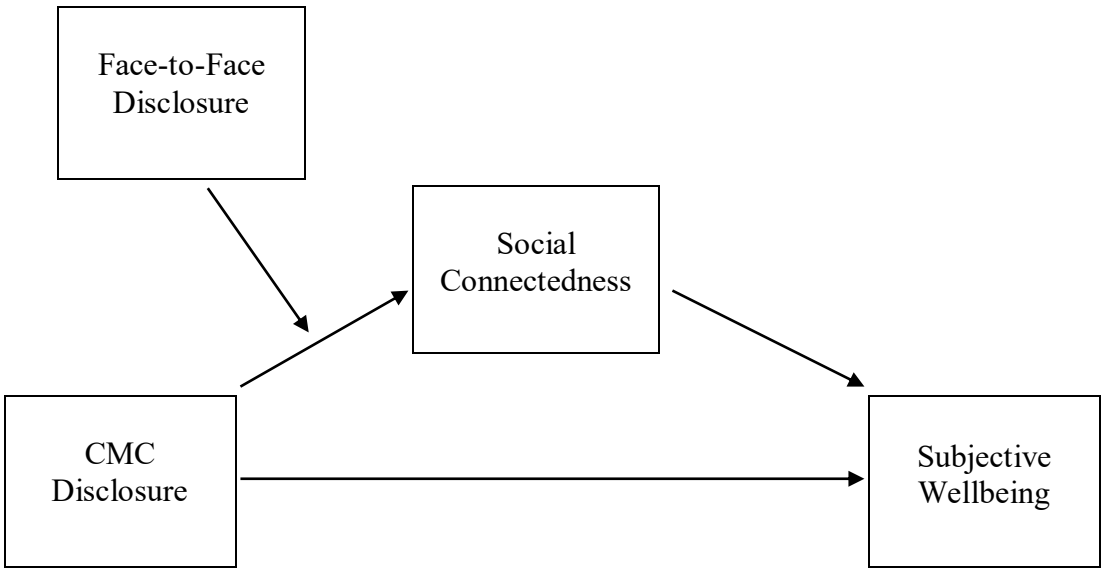
Research Question Two (RQ2) involves the therapeutic potential of CMC: Are the resulting benefits in social connectedness and subjective wellbeing arising from CMC disclosure *contingent* on the face-to-face self-disclosure in which socially anxious young people are already engaging? In line with the social compensation hypothesis, socially anxious young people who experience higher levels of face-to-face disclosure would be expected to benefit less from CMC disclosure because they need less compensation. In contrast, those with lower levels of face-to-face disclosure would be expected to benefit more from CMC disclosure to compensate for their lower levels of face-to-face disclosure. Although previous investigators have looked at whether face-to-face *or* CMC disclosures are *more* beneficial for the socially anxious (e.g., Wohn et al., 2017), to better understand the social compensation perspective both types of disclosure should be investigated in a sample of participants. Again, if CMC is viewed as a compensatory mechanism, and not a replacement to face-to-face interactions, then CMC could be used as a tool to help supplement the exposure of socially anxious young people to social situations, and potentially do so while in therapy. As depicted in Figure 2, the present study will include face-to-face disclosure as a moderator for the indirect relationship between CMC disclosure, social connectedness, and subjective wellbeing (i.e., moderated mediation). The use of face-to-face disclosure as a moderator is relevant because it provides a direct test of whether compensatory benefits from CMC disclosure are occurring at all levels of face-to-face disclosure, or whether these benefits accrue to a particular subset of the levels of face-to-face disclosures. If true

compensation occurs, young people with social anxiety who disclose little in face-to-face interactions should particularly benefit from using CMC. The relationship outlined in the second research question is formally expressed in the following hypothesis:

H2: The positive indirect relationship between CMC disclosures and subjective wellbeing through feelings of social connectedness will be strongest for those who engage in less intimate self-disclosure while face-to-face in a sample of young people with relatively high levels of social anxiety. For those with moderate or high levels of face-to-face disclosure, the benefits of CMC disclosure may be significant but less so than for those with relatively lower levels of face-to-face disclosures.

Figure 2.

Theoretical moderated mediation model for the research question.



Methods

Participants and Procedure

The present study investigated whether (1) young people with relatively high levels of social anxiety benefit from computer mediated communication (CMC) in terms of social connectedness and thereby subjective wellbeing, and (2) whether the benefits are conditional on the depth of self-disclosure they engage in while face-to-face. Data collected by researchers at the Digital Media and Human Behaviour Research Lab at Mount Royal University were analyzed to answer the research questions; thus, this study represents a secondary data analysis (see Andersen et al., 2011). Ethical approval to use this dataset was granted by Alberta Research Information Services (ARISE) at the University of Alberta on July 5, 2021.

The participants included a sample of 427 undergraduate psychology students (80.8% female) between the ages of 17 and 21 years old (M = 19.22, SD = 1.15). Participants completed an online survey between February 2017 and December 2017. Participation lasted approximately 30 minutes and participants were compensated for their contribution by receiving 0.5% towards their introductory psychology course, in accordance with their course requirements. Among the questions asked on this survey, only those that are relevant to the present study are presented in this section.

Before outlining the study measures considered in the analysis, it should be noted that, previous to this study, this dataset had been used to address other research questions. However, the present study evaluates the relationship between subjective wellbeing and face-to-face disclosure in a way not previously done, and operationalizes CMC disclosure in a novel way. The social connectedness scale has been used and analyzed to answer other research questions that extend beyond the scope of the present research objectives. The full questionnaire can be found in Appendix A.

Measures

Demographic Variables

Two demographic variables were considered in the present study: Age and gender. As part of pre-screening, participants were asked to indicate their age to ensure they met the 17-21 years of age inclusion criteria, before proceeding to complete the survey. During the survey, participants were also asked to indicate the gender with which they identified (i.e., male, female, other). Demographic variables were included for descriptive purposes and to inform the potential generalizability of results.

Social Anxiety

Social anxiety was measured using the 13-item revised Cheek and Buss Shyness Scale (Cheek & Buss, 1981). Participants were asked to rate a series of statements (e.g., "I feel tense when I am with people I don't know well") on a scale from 1 (*very uncharacteristic of me*) to 5 (*very characteristic of me*). Given that subjective, or personal, interpretations of social comfort and social awkwardness are related to symptoms of social anxiety (Hofmann, 2007), and that social anxiety is characteristically similar to shyness (Turner, 1990), this measure was included to operationalize and represent social anxiety in the present study. Scores on this scale were averaged and high scores were used as indicators of greater levels of social discomfort than low scores. The internal consistency of the Cheek and Buss Shyness Scale (1981) in this sample was measured using Cronbach's alpha at 0.88. Typically, an internal consistency value of at least .70 is considered acceptable for experimental research (Nunnally, 1978).

CMC Self-disclosure

To measure depth of CMC self-disclosure in multiple contexts, a five item online self-disclosure questionnaire developed by Valkenburg and Peter (2009b) was adapted for use. Participants were asked to respond to 10 items, across two CMC contexts, in the following order:

The first context involved 'using technology to communicate *privately* with one person (i.e., one-to-one messaging; e.g., text messaging, email, Facebook messenger);' and the second context involved 'using technology to communicate with one or more people, where the information is posted *publicly* (i.e., one-to-many messaging; e.g., posting on Facebook, Instagram, Twitter).' On a scale from 1 (*nothing about it*) to 5 (*everything about it*), participants were asked to indicate the degree to which they shared information with friends across five relatively intimate topics, including: Personal feelings, secrets, shame, love, and worries. Participants rated their depth of CMC disclosure across the five topics when communicating privately and then again for when communicating publicly. The five ratings from private disclosures using CMC and the five ratings from public disclosures using CMC were averaged for an *overall* CMC disclosure score. Higher averaged scores indicated higher levels of CMC disclosure. The internal consistency of the adapted Valkenburg and Peter's (2009b) scale in this sample was measured using Cronbach's alpha at 0.88.

In Person, or Face-to-Face, Self-disclosure

Valkenburg and Peter (2009b)'s online self-disclosure scale is comprised five items and was also adapted to measure the degree to which participants disclosed personal information, across the five intimate topics (i.e., personal feelings, secrets, share, love, and worries) when in person with friends. The online self-disclosure scale described "in person" as interactions in person, using video conferencing (e.g., Skype), or talking on the phone. Thus, this is a potential limitation with the scale because it may have confused participants as to what was meant by "in person." In person is often assumed to involve real time, physically proximal interactions. Despite the limitation, for the purpose of the present study, this scale was used to operationalize real time, face-to-face interactions. The face-to-face self-disclosure scale is distinct from the CMC self-disclosure scale because the interactions measured with the former take place in real-

time and without the opportunity to defer, or plan responses that would be assumed to be taking place contemporaneously. Ratings on the face-to-face self-disclosure scale were averaged. Higher scores indicated higher levels of face-to-face disclosure. The internal consistency of the adapted form of the Valkenburg and Peter's (2009b) scale in this sample was measured at .91 using Cronbach's alpha.

Social Connectedness

To measure social connectedness, the alienation subscale from Armsden and Greenberg (1987)'s Peer Attachment Scale was used. Participants were asked to rate the truth of a series of seven statements (e.g., "my friends don't understand what I am going through these days") on a scale from 1 (*almost never/never true*) to 5 (*almost always/always true*). Ratings were then reverse coded and averaged, where higher scores reflected lower levels of alienation from friends (i.e., higher levels of feeling socially connected). The ratings were reverse coded for interpretation purposes, so that higher ratings on this scale represented higher levels of social connectedness (i.e., the mediating variable). In the present sample, the internal consistency of this subscale was measured at .74 using Cronbach's alpha.

Subjective Wellbeing

Given that the experience of emotion and emotional responses to life events often drive one's overall subjective evaluations (Diener et al., 1999), for the purpose of this study, subjective wellbeing was conceptualized as one's subjective evaluation of the emotions experienced in life. To measure subjective wellbeing, Diener et al., (2009)'s Scale of Positive and Negative Experiences (SPANE) was used. On a scale from 1 (*never*) to 4 (*often*), participants were asked to indicate the frequency with which they experience 10 different emotions: Positive, contented, good, happy, joyful, negative, afraid, angry, bad, and sad. Each of the five positive affect items and each of the five negative affect items were summed separately. The summed negative affect

ratings were then subtracted from the summed positive affect ratings to produce an overall affect score. Higher scores indicated higher levels of subjective wellbeing. In the present sample, the internal consistency of the positive items was measured at .85 using Cronbach's alpha, and at .76 for the negative items.

Results

Data Preparation and Assumption Testing

Missing values were the first step in preparing the current data file for analysis. A total of 16 participants did not complete at least 75% of the total survey and were subsequently removed from the analysis, resulting in a reduced sample size of 411. The data were checked for the presence of outliers and adherence to assumptions of normality for descriptive purposes only. The requirements of the bootstrapping analyses conducted via the SPSS PROCESS macro does not assume normality; thus, no adjustments to the non-normality of data were required (Hayes, 2017). However, these checks were carried out nonetheless to present the distributional properties of the data.

In carrying out these checks, outliers were identified using an amalgamation of Mahalnobis distance, Cooks distance, and Leverage tests. Four outliers were revealed in violation of two or more of the preceding distance tests. No corrections were made as indicated previously. Normality was assessed using a visual scan of histograms for all variables (i.e., the predictor, moderating, mediating, and dependent variables). The dependent variable (subjective wellbeing), moderating variable (face-to-face self-disclosure), and mediating variable (social connectedness) displayed normality, whereas the predictor variable (online self-disclosure) displayed a slight skew to the right in its distribution. Again, no corrections were made as indicated previously. The assumption of non-multicollinearity was met, such that the Pearson correlations between predictor variables did not exceed .70. A scatterplot between the dependent and predictor

variables was also checked, indicating the assumption of linearity was met. In addition, a homoscedastic scatter plot was generated to check the homogeneity of the distributions for the different variables and this assumption was also met.

Describing the Sample

Descriptive statistics of all variables were calculated to gain an understanding of the characteristics of the sample. The sample was largely female (80.8%), and ranged in age from 17-21 years ($M = 19.22$, $SD = 1.15$). Across the entire sample ($N = 411$), social anxiety ratings ranged from 1 to 4.77, with an average of $M = 2.78$, $SD = 0.72$. This distribution suggests that the present sample had a dispersion of social anxiety scores that that ranged from the lowest levels possible to nearly the highest levels of the social anxiety scale. The range of dispersion is necessary to provide a meaningful representation of relatively high levels of social anxiety, and to test the research questions. Pearson correlations between social anxiety and the predictor, moderating, mediating, and dependent variables were also calculated. As depicted in Table 1, social anxiety was negatively associated to self-disclosing with friends using both CMC and face-to-face communication. Social anxiety was also negatively related to feelings of social connectedness and overall subjective wellbeing.

Descriptive statistics and correlations were also calculated to assess the relationships among variables for purposes of the research question. Means, standard deviations, ranges, and correlations for all study variables are presented in Table 1. Relevant to the research question, CMC disclosure (i.e., the predictor variable) and face-to-face disclosure (i.e., the moderating variable) were positively related to social connectedness (i.e., the mediating variable). Social connectedness was also positively related to subjective wellbeing (i.e., the dependent variable).

Given these associations, the proposed moderated mediation model exhibited plausibility and was tested as follows.

Table 1

Correlations and Descriptive Statistics for Study Variables

	1	2	3	4	5	*M* (*SD*)	Range
1. CMC Disclosure	-					2.30 (0.75)	1.00–5.00
2. Face-to-Face Disclosure	.55***	-				3.10 (1.08)	1.00–5.00
3. Social Anxiety	-.10*	-.20***	-			2.78 (0.72)	1.00– 4.77
4. Connectedness	.10*	.16**	-.37***	-		3.61 (0.67)	1.86–5.00
5. SWB	.02	-.01	-.42***	.46***	-	4.70 (5.23)	-13.0–18.0

Note. $N = 411$. [a]SWB = subjective wellbeing.

*$p < .05$. **$p < .01$. ***$p < .001$

Approach to Testing the Moderated Mediation Model

Because the focus of the present study involved the potential benefits of CMC disclosure for young people with relatively high levels of social anxiety, the main analysis only included participants who self-reported higher levels of social anxiety relative to others. Classification of high versus low social anxiety was accomplished using a median split (see Field, 2013). High social anxiety was operationalized at self-reported levels that were above the median (i.e., 50th percentile). Consequently, the sample size was reduced to 192 for the main analysis.

It should also be noted that for the purpose of the present study, only the model addressing RQ2 (i.e., whether the indirect effect of CMC disclosure on subjective wellbeing through social connectedness is moderated by level of face-to-face disclosure; see Figure 2) was statistically tested. This is due to the fact that the response to RQ1 is inherent in the model for

RQ2. Moreover, the presence of an interaction effect changes the interpretation of the indirect effect in moderated mediation. Therefore, presenting the indirect effect (i.e., RQ1) without considering the moderating variable (i.e., RQ2) is potentially misleading given the objective of the study.

The moderated mediation model is shown in Figure 2. The model was tested using IBM SPSS Statistics (Version 26) and, specifically, using the PROCESS macro for SPSS (Version 3.5) developed by Hayes (2020). Model 7 of the PROCESS macro was used to simultaneously test whether online CMC self-disclosure, face-to-face self-disclosure, and their interaction predicted subjective wellbeing, through feelings of social connectedness. The bootstrapping analysis created a 5,000-participant sample, via sampling and replacement, and constructed 95% confidence intervals (CIs) around the proposed conditional indirect effect (i.e., moderated mediation). In accordance with Hayes (2017), the conditional indirect effect is interpreted to be statistically significant by evaluating the CI of the non-zero index of moderation mediation. The 95% CI for the conditional indirect effect cannot contain a zero if the effect is statistically significant. Significant indirect effects are then explored using a technique called the pick-a-point approach discussed by Hayes (2017). Here, the indirect effect of CMC disclosure on subjective wellbeing through feelings of social connectedness would be examined at low (16^{th} percentile), medium (50^{th} percentile) and high (84^{th} percentile) levels of face-to-face disclosure to evaluate the nature of the interaction.

Testing the Moderated Mediation Model

Detailed results of the model are presented in Table 2, and a visual representation of the results is depicted in Figure 3. As a direct test of the research questions, the index of moderated mediation was considered. The Index of Moderated Mediation was statistically significant (B = 0.39, SE = .19, 95% CI [0.03, 0.77]). This indicated that the indirect effect of CMC disclosure on

subjective wellbeing through feelings of social connectedness changed as a function of face-to-face disclosure. Accordingly, further probing of this interaction was necessary. The probing analysis revealed that CMC self-disclosure was significantly related to subjective wellbeing through social connectedness *only for participants who reported higher levels of face-to-face disclosure*, $B = 0.73$, $SE = 0.27$, 95% CI [0.05, 1.43]. In other words, for socially anxious participants with high levels of face-to-face disclosure, CMC self-disclosure was positively related to reports of social connectedness ($B = 0.21$, $t = 2.33$, $P < .05$), and in turn this level of social connectedness was positively related to subjective wellbeing ($B = 3.33$, $t = 6.13$, $p < .001$). For those with moderate ($B = 0.19$, $SE = 0.34$, 95% CI [-0.33, 0.74]) and relatively lower ($B = -0.20$, $SE = 0.37$, 95% CI [-0.92, 0.51]) levels of face-to-face disclosure, however, the indirect effect *was not* statistically significant. In other words, for socially anxious participants with only moderate ($B = 0.06$, $t = 0.70$, $p = 0.49$) or low ($B = -0.06$, $t = -0.55$, $p = 0.59$) levels of face-to-face disclosure, CMC self-disclosure was not significantly related to feelings of social connectedness, and, in turn, subjective wellbeing. The implication of these results is discussed in the next section.

Table 2

Results of the Moderated Mediation Model

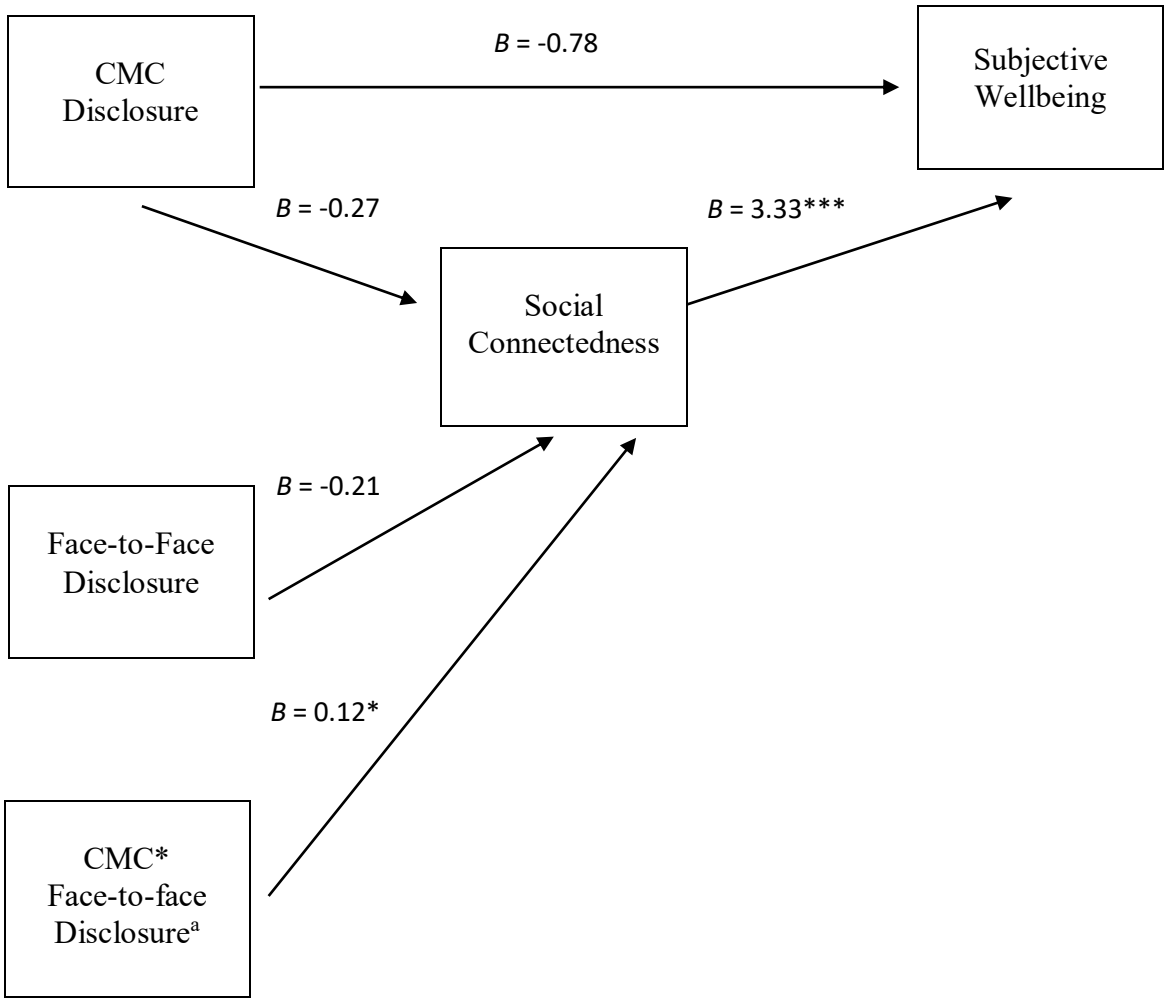
	Social Connectedness			Subjective Wellbeing		
	B	*SE*	95% CI	B	SE	95% CI
Overall	R^2 = .05*, F(3, 188) = 3.63			R^2= .17***, F(2, 189) = 18.98		
	$\triangle R^2$ = 0.02*, F(1, 188) =4.67					
CMC	-0.27	.19	[-0.65, 0.12]	-0.78	.48	[-1.73, 0.18]
Face-to-face	-0.21	.13	[-0.47, 0.05]			
CMC*Face-to-face	0.12*	.05	[0.01, 0.22]			
Social Connectedness				3.33**	.54	[2.26, 4.40]

Note. Values are represented by unstandardized regression coefficients. CMC = CMC self-disclosure. Face-to-face = Face-to-face self-disclosure. CMC*Face-to-face = the interaction term.

*p < .05. **p < .01. ***p < .001

Figure 3.

Statistical Results of the Moderated Mediation Model



Note. $N = 192$.

[a]CMC*Face-to-face Disclosure = the interaction term.

$^{*}p < .05$, ** $p < .01$, *** $p < .001$

Discussion

As discussed previously, young people with social anxiety experience fears of public humiliation during social encounters (American Psychiatric Association, 2013), leading to self-protective strategies such as avoiding social situations (Leary & Kowalski, 1997), and withholding personal disclosure during social exchanges (Cuming & Rapee, 2010). As a result, young people with social anxiety are vulnerable to feeling disconnected socially (Biggs et al., 2012), which can exacerbate negative appraisals of subjective wellbeing (Maričić & Štambuk, 2015). Therefore, finding ways to alleviate the fears of young people with social anxiety, including those with subclinical levels is a worthwhile research endeavor (Schneier et al., 2002).

To expand supports for young clients with social anxiety, the primary goal of the present study was to investigate methods of communication that can help alleviate social anxiety in young people. To address this primary goal, the present study had two objectives: (1) To identify whether young people with relatively high levels of social anxiety benefit, in terms of their social connectedness and subjective wellbeing, from disclosing with friends using computer mediated communication (CMC); and (2) If so, to evaluate whether researchers and clinicians should consider CMC to help supplement current intervention approaches for young people with social anxiety. Because there are inconsistencies in the research literature regarding whether CMC may be used as a compensatory mechanism for young people with social anxiety to disclose with friends, and thereby reap benefits in social connectedness and subjective wellbeing, the present study addressed two research questions (RQs). The first question focused on whether socially anxious young people benefit from disclosing using CMC in terms of social connectedness and subjective wellbeing. The second question focused on whether any resulting benefit in social connectedness and subjective wellbeing from CMC disclosure for socially anxious youth are contingent on current levels of face-to-face self-disclosure.

In response to the first question, the preliminary correlation analysis revealed that social anxiety was negatively related to both face-to-face and CMC disclosure, meaning that youth who are more anxious tend to disclose less generally. Although the preliminary correlations were not suggestive of a *direct benefit* of CMC for those with varying levels of social anxiety, support for the benefits of CMC came from the mediation-moderation analyses that focused on youth with moderate to higher levels of anxiety (see Results). More specifically, the results from the main analysis showed that CMC disclosure had an *indirect effect* on subjective wellbeing for the most anxious youth through feelings of social connectedness. In other words, benefits from disclosing using CMC were observed for young people with moderate to high levels of social anxiety. The benefits were related to improvements in their social connectedness, which in turn was related to increases in subjective wellbeing.

At first glance it seems that the results to the first research question support the social compensation hypothesis since CMC disclosure was positively linked to social connectedness, which in turn was positively related to improved subjective wellbeing. However, the findings from the second research question indicate that the benefits of CMC should not be viewed as a main effect but, rather, as interactive. In response to the second research question, the findings indicate that the benefits afforded by CMC disclosure for social connectedness and subjective wellbeing *only* occurred for socially anxious youth who were *already comfortable* disclosing in real time, face-to-face interactions. Contrary to the hypothesis that those with *low levels* of face-to-face disclosure would benefit the most from CMC disclosure, the real beneficiaries were young people with high levels of comfort with face-to-face interactions. These findings are surprising in light of the hypotheses because they suggest that CMC has a *conditional* compensatory and enhancing effect. These results have both theoretical and clinical implications.

Theoretical Implications

Consistent with some of the findings in the current research literature (e.g., Wang et al., 2018), the present study revealed support for *both* the social compensation and the social enhancement hypotheses. Whereas previous researchers have claimed support for the social compensation hypothesis by finding that young people with social anxiety are often drawn to CMC to disclose with friends (e.g., Bodroža & Jovanović, 2016), and that they benefit from CMC disclosure (e.g., Desjarlais & Willoughby, 2010), the present study found certain conditions had to be in place for CMC to afford these benefits:

First, CMC disclosure had an indirect effect on improvement in subjective wellbeing via the variable of social connectedness. That is, greater CMC disclosure led to increased levels of social connectedness, which in turn improved subjective wellbeing. This result supports the social compensation hypothesis, and is consistent with previous research showing that socially anxious young people can reap benefits from CMC disclosure in their social connectedness (Desjarlais & Willoughby, 2010) and subjective wellbeing (Indian & Grieve, 2014).

Second, the condition for observing this three-way link (CMC -> Social Connectedness -> Subjective Wellbeing) was a participant's *prior level* of face-to-face disclosure. Namely, this group of young people with relatively high levels of anxiety also had to have the feature of a higher level of comfort with face-to-face disclosure to exhibit increases in social connectedness and thereby improved subjective wellbeing. Although it may be surprising that CMC disclosure afforded benefits primarily to those highly anxious young people who were already more comfortable with face-to-face disclosure, this result speaks to the multifaceted nature of social anxiety. For example, consider a young person who enjoys human interactions but fears how to maintain a conversation, or fears their appearance will be scrutinized, then CMC can offer the benefit of alleviating the pressure of real-time interactions. This supports the social enhancement

hypothesis as it suggests that CMC self-disclosure can facilitate the interactions of those who may already like to interact, but the real time nature of most face-to-face interactions pose personal concerns.

In short, the present study did not find support for the argument that youth with any level of social anxiety are drawn to CMC to disclose (e.g., Bodroža & Jovanović, 2016). Instead, these results suggest that young people with greater social anxiety benefit in social connectedness and subjective wellbeing from disclosing using CMC, conditioned on already having high comfort disclosing face-to-face. Interestingly, the supposed 'high comfort' with disclosing face-to-face may be less about comfort than a very high enjoyment for human interaction – despite the discomfort. This is a construct that may require further study.

The findings of the present study then revealed that social connectedness and subjective wellbeing from CMC disclosure occurs mainly for those who already like to disclose as measured by their face-to-face levels of disclosure. Consistent with researchers who have found evidence to suggest a social enhancement perspective (e.g., Kraut et al., 2002), these present findings suggest that, even among those with higher levels of social anxiety, more socially interested or confident young people are the ones who disclose more information (O'day & Heimberg, 2021) and exhibit enhancements in social connectedness and subjective wellbeing as a result (Weiqin et al., 2016). That these findings support both the social compensation (in part) and the social enhancement hypotheses suggest that CMC-based therapeutic interventions need to be uniquely tailored to the population of interest.

Alternatively, it is worth considering the methodological limitations of the study that may have influenced the present findings and the absence of full support for the social compensation hypothesis. One possible explanation might be the measurement of CMC in the present study. In the current study, CMC was conceptualized as an amalgamation of *any* type of technology that

allows for social interactions, across text messaging, instant messaging, email, and social networking sites (Valkenburg & Peter, 2009a). Notably, when social compensation via CMC disclosure has been observed in previous research, it has been through online chatting (e.g., Desjarlais & Willoughby, 2010), text messaging (Valkenburg & Peter, 2009b), or direct (i.e., privately) messaging with someone using social networking sites (Ryan & Xenos, 2011). In the present study, a more global conceptualization of CMC was utilized with the inclusion of social networking sites more broadly (e.g., posting on Instagram). This is important because platforms such as Instagram and SnapChat encourage users to publicly broadcast themselves to a global audience, as opposed to engaging in more intimate social exchanges, as in text message or private messaging (Lim et al., 2017). Thus, there are confounding variables in the measurement of CMC, namely, audience reach. Given fears of social encounters, particularly among larger groups of people (Pelissolo et al., 2019), disclosing via these platforms may be difficult for those with very high levels, or particular manifestations, of social anxiety. Thus, this confound would result in a lower likelihood of disclosure using CMC and artificially attenuate the occurrence of social compensation. Accordingly, the inclusion of social networking platforms, broadly conceived, in the measurement of CMC may, in part, explain a negative correlation between CMC disclosure and social anxiety, and the conditional support found for the social compensation hypothesis. Consequently, researchers should tease apart the specific forms of CMC when examining social compensation, and the potential benefits of CMC for young people with social anxiety. This is particularly relevant today given that youth are gravitating towards using social networking sites such as Instagram over Facebook (which promotes social connections), or traditional text messaging platforms (Anderson & Jiang, 2018).

Another possible explanation for the present findings is that our current understanding of social compensation via CMC disclosure is limited. Specifically, the present research literature

pits the social compensation and social enhancement hypotheses as competing proposals (e.g., Kraut et al., 2002). Moreover, when investigating CMC as a compensatory mechanism, current investigators examine whether young people with social anxiety benefit *more* from CMC disclosure (in terms of social connectedness and subjective wellbeing) than their non-socially anxious counterparts (e.g., Desjarlais & Willoughby, 2010; Valkenburg & Peter, 2009a). However, notwithstanding the measurement issues just mentioned, the results of the present study suggest a potential refinement of how these hypotheses are considered. Specifically, the results of the present study provide a rationale for viewing these hypotheses as mutually compatible where compensation functions differently depending on the characteristics of the sample considered (i.e., those who are comfortable or willing to disclose personal information face-to-face).

Moving forward, it is recommended that future researchers utilize the extension of the social compensation hypothesis and begin addressing the questions of *for whom* and under *what circumstances* (see also Pouwels et al., 2021) CMC provides social compensation for those with social anxiety, noting that social compensation via CMC is conditional on the level of intimate disclosure young people with social anxiety engage in face-to-face.

Clinical Implications

To reiterate, the present study conceptualized the use of CMC as a mechanism for clinicians to supplement current intervention strategies for young people with social anxiety, using technologies with which they are comfortable (Valkenburg & Peter, 2009a) and that are readily available to clinicians, educators, parents, and young people (Anderson & Jiang, 2018). In this regard, the present study provided evidence to suggest a potential for CMC to be used therapeutically. The present study revealed that those with relatively high levels of social anxiety (above the 50th percentile) who report higher levels of disclosure of personal information with friends using CMC exhibited benefits in their feelings of social connectedness, which were

associated to enhancements in their overall subjective wellbeing. However, in clarifying the theoretical gaps in the CMC literature, the present study also found that CMC disclosure was generally negatively related to social anxiety, and that only young people with social anxiety who are willing and/or comfortable disclosing while face-to-face benefited from CMC disclosure.

What these findings reveal for clinicians is that CMC may have therapeutic potential for young people with social anxiety, and that the associated reductions in audio-visual cues, coupled with anonymity that is afforded by CMC may be beneficial for those who are socially very anxious (i.e., social compensation; Valkenburg & Peter, 2009a). However, the results also suggest that a "one-size-fits-all" approach cannot be assumed when implementing CMC tools in therapy. In other words, the use of CMC in therapy should be considered a potential tool for those with high levels of social anxiety who have some willingness, comfort, or ability to disclose personal information face-to-face. Thus, the results of the present study offer another tool for the clinicians' toolbox to help supplement the treatment of social anxiety, when appropriate and tailored to the individual client (Fried & Fisher, 2014). This might include encouraging young socially anxious clients to initiate conversations via one-to-one text messaging, or practice exchanging reciprocal dialogue through a social networking messaging platforms (e.g., Facebook messenger), in tandem with engaging in imagined or physical, in person, social encounters as part of exposure techniques.

Strengths, Limitations, and Direction for Future Research and Practice

The present study investigated whether CMC might be considered a potential tool for the treatment of social anxiety by investigating the conditions under which young people with social anxiety might benefit from CMC disclosure in terms of feelings of social connectedness and subjective wellbeing. In doing so, the present study addressed a gap in the social anxiety treatment literature. This study also included both methodological strengths and weaknesses. For

example, the large sample size of the present study allowed for sufficient power to detect effects, and permit a mediation-moderation analysis to be executed. The sample also reflected the variability in measured distributions of variables to be able to detect covariation and statistical significance of effects. This allowed the author to make meaningful conclusions regarding young people with levels of social anxiety that are elevated and might warrant intervention. In addition, the present study utilized empirically validated scales that demonstrated high levels of reliability in previous research and with the present sample, as well as uniquely included face-to-face disclosure as a moderating variable. This further allowed for meaningful conclusions to be drawn from the present study, and addressed the limitations of the current CMC literature.

As a result of the methodological strengths, the present study meaningfully expanded our understanding of the compensatory potential of CMC for young people with social anxiety. More specifically, this study expanded the boundaries of the social compensation hypotheses (Valkenburg & Peter, 2009a) by suggesting that social compensation via CMC disclosure can exist for young people with social anxiety, under the condition that they are already somewhat comfortable, or willing, to disclose personal information during social encounters face-to-face, in the real world. Gaining this understanding also then expands our ability to provide supportive and innovative treatment strategies for young people with social anxiety. In addition, the present study provides evidence to suggest that CMC may be a valuable clinical tool to supplement current intervention strategies for young clients who struggle with social anxiety who are, to some degree, comfortable disclosing personal information in face-to-face encounters.

It should be noted that, while the present study revealed evidence that supports the use of CMC during therapy for young people with social anxiety, there are limitations. The results should be taken with some degree of caution, bearing the limitations. Some of these limitations have already been mentioned such as the operationalization of CMC. In addition, there is also the

limitation of the conceptualization of face-to-face self-disclosure in the present "in person" scale, which includes conflicting notions of being in person, as well as using technologies that mimic real-time, face-to-face interactions (see Method section). Specifically, the inclusion of technologies in this scale may have confounded participants' responses by confusing the definition of intimate self-disclosure while face-to-face. Therefore, there is a call for future researchers to improve this scale during future investigations of the role of face-to-face self-disclosure in the realm of social compensation.

Additional limitations to the present study include the cross-sectional design and the correlational analysis, which does not support causal conclusions. It is tempting to assume a causal relationship (see Hayes, 2017) between CMC use, social connectedness, and subjective wellbeing. However, the specific direction of the effects, the causal nature of the effects, or how these effects play out over time cannot be made. Accordingly, the present study paves the way for future researchers to expand on the present findings by investigating whether CMC may be used as a compensatory mechanism for young people with social anxiety, using longitudinal data and/or an experimental design—particularly in the context of intervention.

Moreover, there are variables regarding CMC use that clinicians, parents, young people, and future researchers need to consider, that extended beyond the scope of the present study. For example, internet addiction (see, Alim, 2017 for review), cyberbullying (see Mihajlov & Vejmelka, 2017 for review), and negatively evaluating oneself compared to peers online (see Verduyn et al., 2020 for review) have all been identified as negative consequences that are associated with the use of CMC in young people. Accordingly, future research will need to consider these variables and the ways that they may impede the benefits of using CMC therapeutically; they may serve as additional conditions that need to be measured to tailor the use of CMC. It is then recommended that before clinicians use CMC therapeutically, research be

conducted to evaluate planned, structured, and supervised exposure schedules. These schedules should be well understood as is expected of traditional, in person exposure therapy for social anxiety (Radtke et al., 2020).

Concluding Remarks

Taken together, the present study investigated whether CMC might offer therapeutic potential by exploring whether, and under what conditions, young people with social anxiety benefit from disclosing using CMC, in terms of social connectedness and subjective wellbeing. In doing so, this study expanded the boundaries of the social compensation hypothesis (Valkenburg & Peter, 2009a) by suggesting that social compensation via CMC disclosure can exist for young people with social anxiety under certain conditions; namely, that they are already somewhat comfortable, or willing, to disclose personal information during social encounters face-to-face, in the real world. The findings are promising for CMC to be considered as a potential tool to supplement current intervention strategies for young clients who struggle with social anxiety. However, the present study also provided the clarification that a one-size-fits-all approach cannot be taken when considering CMC as a potential therapeutic tool, such that the use of CMC may only be beneficial for young clients with social anxiety who are already, to some degree, comfortable disclosing personal information during social encounters when face-to-face. While the present study demonstrated promise for the therapeutic use of CMC, the use of CMC in therapy will need to be investigated, monitored, and future researchers will need to specifically integrate CMC into therapy to directly investigate whether interactions using CMC are effective for intervention within this population. Combined, the theoretical and clinical findings of this study provide a foundation for future research and clinical practice that may ultimately improve our ability to enhance the lives of young people with social anxiety.

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Appendix A

Full Questionnaire

A Short Longitudinal Study of the Benefits of Sharing on Social Media: Survey 1

* Required

The following two questions will determine your eligibility to participate in the current study. If you are eligible, you will be taken to the consent form in which more detail about the study will be provided to you.

1. Hold old are you today? *

   Mark only one oval.

   - ◯ 18
   - ◯ 19
   - ◯ 20
   - ◯ 21
   - ◯ None of the above

2. As a Canadian resident, which province do you currently live in? *

   Mark only one oval.

   - ◯ I am not a Canadian resident.
   - ◯ British Columbia
   - ◯ Alberta
   - ◯ Saskatchewan
   - ◯ Manitoba
   - ◯ Ontario
   - ◯ Quebec
   - ◯ Nova Scotia
   - ◯ New Brunswick
   - ◯ Newfoundland
   - ◯ Prince Edward Island
   - ◯ Yukon
   - ◯ Nunavut
   - ◯ Northwest Territories

A Short Longitudinal Study of the Benefits of Sharing on Social Media: Survey #1 Consent Form

Investigator: Dr. Malinda Desjarlais
Associate Professor, Department of Psychology
Digital Media and Human Behaviour Research Lab
URL: https://sites.google.com/a/mtroyal.ca/digital-media-human-behavior-lab
Mount Royal University; Calgary, Alberta
email: mddesjarlais@mtroyal.ca

This consent form provides an overview of the research; it is only one part of the consent process. Please read this consent form carefully. If you have any questions, please email Dr. Malinda Desjarlais at mddesjarlais@mtroyal.ca before completing the survey. A copy of the consent form for your records will be emailed to you after completing the survey.

Summary of the Study and Participant Involvement:
You are being invited to participate in a two-part survey. Your consent today will be to participate in survey #1 and to be contacted via the email address you provide to be invited to participate in survey #2 in 5-months.

The purpose of this study is to examine if sharing personal information on social media influences feelings of closeness among existing and new friendships over time, and if these associations change for different types of social media and levels of shyness. The study will also examine the link between social media use and well-being over time for different types of social media, levels of shyness, and gender. To participate you must be a Canadian resident between the ages of 18 and 21 years old.

In survey #1 (today), you will complete an online survey that asks about your use of different types of social media, the amount/types of topics you discuss on social media and when in person, closeness to existing friends and new friends (or acquaintances), shyness, and subjective well-being. This will take about 15 minutes.

In 5-months you may likely be contacted, using the email address you provide, to participate in survey #2. At that time, you will be provided with details of the research, and asked to provide consent to participate then in survey #2. If you decide to participate in survey #1 today, You are under no obligation to participate in survey #2. You will receive an initial email invitation and then up to two email reminders. If you decide not to participate in survey #2 you can simply ignore the emails. Only the first 500 respondents for survey #2 will be eligible for compensation at that time.

Collection of Personal Information:
You will be required to provide your full name and email address. This information is required so that you can be invited to participate in the second survey in 5-months, and to connect your scores from survey #1 to survey #2 if you choose to participate at that time. Your information will only be seen by Dr. Desjarlais and her research assistants. This information will be deleted from all records: (1) if you do not complete survey #2 within the required time, (2) if you withdraw from survey #1, or (3) after your scores from survey #1 are linked with your scores on survey #2. All information is collected through Google Forms and saved on password-protected servers that will only be accessed by Dr. Desjarlais and her research assistants.

Your anonymized data will be retained indefinitely. There is a possibility that the data will be used to address additional research questions in the future.

Study Risks for Participants:
There are no foreseeable risks associated with participating in this survey.

Compensation:
Students in an introductory psychology course at Mount Royal University will be compensated for participation in survey #1 today by receiving 0.5% towards your introductory Psychology course, as per your course directives. All other participants will have their name entered into a draw to win one of three $100 Amazon.ca gift certificates. A maximum of 1000 participants will be recruited for survey #1. Recipients of the gift certificate will be contacted on June 30, 2017 using the provided email address.

Separate compensation for participation in survey #2, if you choose to participate, will be detailed in the consent form provided in 5-months.

Voluntary Participation and Withdrawal of Consent:
You are not required to participate in this study and are free to withdraw at anytime by exiting the browser window. Should you choose to withdraw, you may do so without penalty and will still be eligible for the compensation described above. Any incomplete surveys will be considered a withdraw and will be excluded from all analyses and reports. Once you submit your responses, you have until January 15, 2018 to contact Dr. Desjarlais (mddesjarlais@mtroyal.ca) if you change your mind and would like to withdraw your survey. After this time you will not be able to withdraw since all identifying information will be removed from the surveys and there will be no way to identify which survey belongs to you. If you choose not to participate in survey #2, your data from survey #1 may still be used and included in reports unless you request your survey to be removed from the study.

What will happen to the results of this research project?
The results of this study will potentially be presented at academic conferences, as well as published in a peer reviewed academic journals. A report will be made available to the community on the Digital Media & Human Behaviour Research Lab website in Fall 2018 (see URL: https://sites.google.com/a/mtroyal.ca/digital-media-human-behavior-lab).

Who should I contact if I have concerns regarding ethical issues related to this research project?
If you have any questions concerning your rights as a possible participant in this research, please contact the Research Ethics Officer, at Mount Royal University, 403-440-8470, hreb@mtroyal.ca.If you have any further questions concerning matters related to this research, please contact Dr. Malinda Desjarlais (Department of Psychology) at mddesjarlais@mtroyal.ca

3. *Do you give consent to participate in the research study? By checking the box and proceeding to the next page you are indicating that you voluntarily consent to participate in the research project and that you understand the information regarding your participation as detailed above.
*

Mark only one oval.

- ◯ Yes
- ◯ No

Your name and email address will be used to contact you: (a) to invite you to participate in the second part of the study in 5 months, (b) to connect your scores from this first survey to second survey if you participate at that time, (c) send you a copy of the consent form, and (d) if applicable, you are a recipient of the $100 gift certificate for Amazon.ca (done through a draw on June 30, 2017).

4. Full Name *

5. Email address: *

6. D1. What gender do you identify with?

Check all that apply.

- [ ] female
- [ ] male
- [ ] other

7. D2. What is your highest level of education?

Check all that apply.

- [ ] some high school
- [ ] high school diploma
- [ ] some post-secondary (diploma program, college, university, etc)
- [ ] completed post-secondary (program or certificate)

Other: [ ] _____

8. ST1. Reflecting on how you typically use social networking sites (Facebook, Instagram, Twitter, etc), how often do you engage in the following activities during a typical visit?

Mark only one oval per row.

	Never	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently	Always
Status Updates	◯	◯	◯	◯	◯	◯	◯
Uploading Photos	◯	◯	◯	◯	◯	◯	◯
Sharing Links or Memories	◯	◯	◯	◯	◯	◯	◯
Commenting on Friends' Posts	◯	◯	◯	◯	◯	◯	◯
Like/Reacting to Friends' Posts	◯	◯	◯	◯	◯	◯	◯
browsing through what others have posted on their social networking pages	◯	◯	◯	◯	◯	◯	◯

9. ST2. Reflecting on the feedback you typically receive on social networking sites (likes, comments, reactions etc.) how does the amount of feedback you wish to receive compare to the amount of feedback you actually receive?

Mark only one oval.

- ◯ Does not meet my expectations
- ◯ Meets my expectations
- ◯ Exceeds my expectations

10. SS1. The following questions ask you about your social interactions. Please read each item carefully and decide to what extent it is characteristic of your feelings and behavior.

Mark only one oval per row.

	Very uncharacteristic or untrue of me	Uncharacteristic of me	Neutral	Characteristic of me	Very characteristic or true of me
I feel tense when I'm with people I don't know well.	◯	◯	◯	◯	◯
I am socially somewhat awkward.	◯	◯	◯	◯	◯
I do not find it difficult to ask other people for information.	◯	◯	◯	◯	◯
I am often uncomfortable at parties and other social functions	◯	◯	◯	◯	◯
When in a group of people, I have trouble thinking of the right things to talk about.	◯	◯	◯	◯	◯
It does not take me long to overcome my shyness in new situations.	◯	◯	◯	◯	◯
It is hard for me to act natural when I am meeting new people.	◯	◯	◯	◯	◯
I feel nervous when speaking to someone in authority.	◯	◯	◯	◯	◯
I have no doubts about my social competence.	◯	◯	◯	◯	◯
I have trouble looking someone right in the eye.	◯	◯	◯	◯	◯
I feel inhibited in social situations.	◯	◯	◯	◯	◯
I do not find it hard to talk to strangers.	◯	◯	◯	◯	◯
I am more shy with members of the opposite sex.	◯	◯	◯	◯	◯

For the following questions think about your close friends.

ONE to ONE MESSAGING refers to instances where you are using text based technology to communicate privately with one person, where only the person that the message is sent to can view and respond to you (e.g., text messages, e-mail, Facebook messenger, Snapchat). For the following questions think about your ONE to ONE MESSAGING interactions with your CLOSE FRIENDS.

11. 1C-SD1. During your ONE to ONE MESSAGING, how much do you usually tell your CLOSE FRIENDS about the following:

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
Your personal feelings.	◯	◯	◯	◯	◯
The things you are worried about.	◯	◯	◯	◯	◯
Being in love.	◯	◯	◯	◯	◯
Your secrets.	◯	◯	◯	◯	◯
Moments in your life you are ashamed of.	◯	◯	◯	◯	◯

12. 1C-SD2. Think about when you share non-revealing or impersonal information during ONE TO ONE MESSAGING. Which of the following statements best describes those conversations with your CLOSE FRIENDS?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
My messages are limited to just a few topics.	◯	◯	◯	◯	◯	◯
My messages range over a variety of topics.	◯	◯	◯	◯	◯	◯
Once I get started writing my messages, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
My messages address a variety of subjects.	◯	◯	◯	◯	◯	◯
My messages tend to centre around one subject of interest.	◯	◯	◯	◯	◯	◯

ONE TO MANY MESSAGING refers to instances where you share information, either to one friend or many friends, where the information is posted publicly. Multiple people are able to view and may respond to it (e.g., Facebook, Instagram or Snapchat community posts, Tweets). For the following questions think about your ONE to MANY MESSAGING interactions with your CLOSE FRIENDS.

13. 2C-SD1. During ONE TO MANY MESSAGING, how much do you usually tell your CLOSE FRIENDS about the following:

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
Your personal feelings	◯	◯	◯	◯	◯
Things you are worried about	◯	◯	◯	◯	◯
Being in love	◯	◯	◯	◯	◯
Your secrets	◯	◯	◯	◯	◯
Moments in life you are ashamed of	◯	◯	◯	◯	◯

14. 2C-SD2. Think about when you share non-revealing or impersonal information during ONE TO MANY MESSAGING. Which of the following statements best describes those conversations with your CLOSE FRIENDS?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
My messages are limited to just a few topics.	◯	◯	◯	◯	◯	◯
My messages range over a wide variety of topics.	◯	◯	◯	◯	◯	◯
Once I get started writing my messages, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
My messages address a variety if subjects.	◯	◯	◯	◯	◯	◯
My messages tend to centre around one subject on interest.	◯	◯	◯	◯	◯	◯

For the following questions think about your interactions with your close friends when you are together in person, using video conferencing (Skype, FaceTime), or talking on the phone. These interactions will be called "in person".

15. FTF-SD1. IN PERSON, how much do you usually tell your CLOSE FRIENDS about the following:

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
My personal feelings.	◯	◯	◯	◯	◯
The things I am worried about.	◯	◯	◯	◯	◯
Being in love.	◯	◯	◯	◯	◯
My secrets.	◯	◯	◯	◯	◯
Moments in life I am afraid of.	◯	◯	◯	◯	◯

16. FTF-SD2. Think about when you share non-revealing or impersonal information IN PERSON. Which of the following statements best describes those conversations with your CLOSE FRIENDS?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
I talk only talk about a few specific.	◯	◯	◯	◯	◯	◯
I talk about a wide variety of topics.	◯	◯	◯	◯	◯	◯
Once I get started talking, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
I address a variety of topics.	◯	◯	◯	◯	◯	◯
I tend to only talk about one subject of interest.	◯	◯	◯	◯	◯	◯

17. FQC. Below are statements regarding your relationships with your CLOSE FRIENDS. Please indicate how true each of the following statements are to you by selecting the box that best corresponds with your answer.

Mark only one oval per row.

	Almost never or never true	Not very often true	Sometimes true	Often true	Almost always/always true
Talking over my problems with friends makes me feel ashamed or foolish.	☐	☐	☐	☐	☐
I feel the need to be in touch with my friends more often.	☐	☐	☐	☐	☐
My friends don't understand what I'm going through these days.	☐	☐	☐	☐	☐
I feel alone or apart when I am with my friends.	☐	☐	☐	☐	☐
I feel angry with my friends.	☐	☐	☐	☐	☐
I get upset a lot more than my friends know about.	☐	☐	☐	☐	☐
It seems as if my friends are irritated with me for no reason.	☐	☐	☐	☐	☐

Acquaintances refer to people who you know slightly, but do not consider a close friend.

Please list the names of up to 10 people (first name and last initial) who you consider acquaintances.

18. 1. _____

19. 2. _____

20. 3. _____

21. 4. _____

22. 5. _____

23. 6. _____

24. 7. _____

25. 8. _____

26. 9. _____

27. 10. _____

28. 1A-SD1. During ONE TO ONE MESSAGING, (e.g., texting, Facebook messenger, e-mail), how much do you usually tell the ACQUAINTANCES listed above about the following?

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
Your personal feelings	◯	◯	◯	◯	◯
The things you are worried about	◯	◯	◯	◯	◯
Being in love	◯	◯	◯	◯	◯
Your secrets	◯	◯	◯	◯	◯
Moments in your life you are ashamed of	◯	◯	◯	◯	◯

29. 1A-SD2. Think about when you share non-revealing or impersonal information during ONE TO ONE MESSAGING (e.g., texting, Facebook messenger, e-mail). Which of the following statements best describes those conversations with the ACQUAINTANCES listed above?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agee	Strongly Agree
My messages are limited to just a few specific topics.	◯	◯	◯	◯	◯	◯
My messages range over a wide variety of topics.	◯	◯	◯	◯	◯	◯
Once I get started writing my messages, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
My messages address a variety of topics.	◯	◯	◯	◯	◯	◯
My messages tend to centre around one subject of interest.	◯	◯	◯	◯	◯	◯

30. 2A-SD1. During ONE TO MANY MESSAGING (e.g., Facebook wall, Instagram and Snapchat community posts, Tweets), how much do you usually tell the ACQUAINTANCES listed above about the following:

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
Your personal feelings	◯	◯	◯	◯	◯
The things you are worried about	◯	◯	◯	◯	◯
Being in love	◯	◯	◯	◯	◯
Your secrets	◯	◯	◯	◯	◯
Moments in life you are ashamed of	◯	◯	◯	◯	◯

31. 2A-SD2. Think about when you share non-revealing or impersonal information during ONE TO MANY MESSAGING (e.g., Facebook wall, Instagram and Snapchat community posts, Tweets). Which of the following statements best describes those conversations with the ACQUAINTANCES listed above?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
My messages are limited to just a few specific topics.	◯	◯	◯	◯	◯	◯
My messages range over a variety of topics.	◯	◯	◯	◯	◯	◯
Once I get started writing my messages, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
My messages address a variety of subjects.	◯	◯	◯	◯	◯	◯
My message centre around one subject of interest.	◯	◯	◯	◯	◯	◯

32. AFTF-SD1. IN PERSON, how much do you usually tell the ACQUAINTANCES listed above about the following:

Mark only one oval per row.

	Nothing about this	A little about this	A fair amount about this	An extreme amount about this	Everything about this
Your personal feelings.	◯	◯	◯	◯	◯
The things that you are worried about.	◯	◯	◯	◯	◯
Being in love.	◯	◯	◯	◯	◯
Your secrets	◯	◯	◯	◯	◯
Moments in your life you are ashamed of.	◯	◯	◯	◯	◯

33. AFTF-SD2. Think about when you share non-revealing or impersonal information IN PERSON. Which of the following statements best describes those conversations with the ACQUAINTANCES listed above?

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
I only talk about a few specific topics.	◯	◯	◯	◯	◯	◯
I talk about a wide range of topics.	◯	◯	◯	◯	◯	◯
Once I get started talking, I move easily from one topic to another.	◯	◯	◯	◯	◯	◯
I address a variety of subjects.	◯	◯	◯	◯	◯	◯
I tend to only talk about one subject of interest.	◯	◯	◯	◯	◯	◯

34. Please indicate the frequency in which you experience each of the following emotions by selecting thebox that best corresponds with your answer.

Mark only one oval per row.

	Never	Seldom	Sometimes	Often	Always
Positive	◯	◯	◯	◯	◯
Happy	◯	◯	◯	◯	◯
Good	◯	◯	◯	◯	◯
Joyful	◯	◯	◯	◯	◯
Contented	◯	◯	◯	◯	◯
Angry	◯	◯	◯	◯	◯
Afraid	◯	◯	◯	◯	◯
Bad	◯	◯	◯	◯	◯
Negative	◯	◯	◯	◯	◯
Sad	◯	◯	◯	◯	◯

35. Please indicate the degree to which you agree/disagree with each of the following statements by selecting the box that best corresponds with your answer.

Mark only one oval per row.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
I lead a purposeful and meaningful life	◯	◯	◯	◯	◯	◯
My social relationships are supportive and rewarding	◯	◯	◯	◯	◯	◯
I am engaged and interested in my daily activities	◯	◯	◯	◯	◯	◯
I actively contribute to the happiness and well-being of others	◯	◯	◯	◯	◯	◯
I am competent and capable in the activities that are important to me	◯	◯	◯	◯	◯	◯
I am a good person and live a good life	◯	◯	◯	◯	◯	◯
I am optimistic about my future	◯	◯	◯	◯	◯	◯
People respect me	◯	◯	◯	◯	◯	◯

Thank you for your participation in this survey. If eligible, your email address will be entered into the draw for one of three $100 gift certificates for Amazon.ca (draw will take place on June 30, 2017; winners will be notified at that time via e-mail).