

MOTIVATIONS FOR AND OUTCOMES OF TMSI

**People's Motivations for and Outcomes of Technology-Mediated Sexual Interactions in
Committed Romantic Relationships**

by

Erin Leigh Courtice, B.Sc.

A dissertation submitted to the University of Ottawa in partial fulfillment of the requirements for
the Degree of Doctor of Philosophy (Ph.D.) in Experimental Psychology

School of Psychology

Faculty of Social Sciences

University of Ottawa

Supervisor

Krystelle Shaughnessy, Ph.D., Clinical Psychology

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Abstract

Technology-mediated sexual interaction (TMSI) is a behavioural domain that captures the variety of ways that people engage in interpersonal exchanges of self-created, sexual material via communication technology. People report TMSI with romantic partners more than in other relationship contexts, yet there are few theoretically driven studies on people's motives for TMSI within romantic relationships. This lack of theoretical framing in the existing TMSI research makes it difficult to organize findings across studies in a coherent way, to explain particular phenomena, and to make connections between people's technology-mediated and in-person sexual experiences. The overarching goal of this dissertation was to improve knowledge about people's motives for engaging in TMSI with a committed romantic partner. To address this goal, I produced four articles which together allowed me to: (1) develop an evidence-based grounding for TMSI; (2) address limitations in current approaches to TMSI research; and (3) apply the approach-avoidance motivational framework to examine people's motives for and outcomes of engaging in TMSI with a committed romantic partner. In Article 1, I completed a systematic literature review on definitions, prevalence, and relationship context of sexting and cybersex (two of the most common TMSI activities). I found that researcher's conceptual definitions of sexting and cybersex are virtually indistinguishable and that the prevalence of sexting and cybersex was similar when researchers used comparable definitions. From these results, I conceptualized the TMSI behavioural domain. In Article 2, I described four common conceptual and measurement problems that arise when researchers focus on activities (i.e., sexting) rather than behaviours (i.e., TMSI). These problems include: (1) imprudent focus on the medium, (2) inconsistent conceptual definitions, (3) poor measurement practices, and (4) a lack of theoretical frameworks. I argue that the solutions to these problems require construct valid measures,

theory-driven research, and a shift in focus away from sexting research and towards the TMSI behavioural domain. In Article 3, I used multi-grounded theory to guide qualitative analyses of 25 interviews focused on TMSI experiences and motives in current romantic partnerships. I found that participants described their TMSI motives in terms that aligned with the approach-avoidance motivational framework. In Article 4, I conducted two separate surveys to (1) develop a construct valid measure of people's approach and avoidance motives for TMSI with a current romantic partner (Article 4.1; $N = 269$) and (2) examine the extent to which people's approach and avoidance motives for TMSI with a romantic partner predicted well-being outcomes (Article 4.2; $N = 459$). I found that people's approach and avoidance motives predicted sexual, relationship, and life satisfaction through changes in dyadic sexual desire. Overall, this dissertation contributes to and extends knowledge about people's approach and avoidance TMSI motives by focusing on theoretically driven and construct valid research practices.

Acknowledgements

This dissertation is the culmination of personal and professional growth that would not have been possible without the support of many brilliant people. I only have so much space to name a few, although I appreciate the love and support of many more. To my supervisor, Dr. Krystelle Shaughnessy: ‘thank you’ barely scratches the surface. Working with you has made me a better researcher, writer, supervisor, academic, and person. You have supported and facilitated my growth, both within and outside the academic context in innumerable ways. I am so grateful for your patient feedback, wise INSITEs, advice, and dedicated mentorship; I could not have dreamed of a better graduate school experience, and that is down to you and all that you do. Thank you, thank you, thank you. To my committee members, Drs. Gaudreau, Lafontaine, Steeves, and Muise: thank you so much for your feedback and support. I am so grateful for your keen eyes, insightful questions, and kindness throughout the process of this (very long) dissertation.

I’ve benefitted from incredible academic and professional mentors throughout my years as an undergraduate and graduate student. Thank you especially to Dr. Karen Blair, Dr. Rhea Ashley Hoskin, Dr. Diane Holmberg, Dr. Tony Toneatto, Dr. John Sylvestre, Dr. Isabelle Boutet, Dr. Annie Robitaille, Lisa Henry, Christine Mao, and Meaghan Cheung. I am also grateful for the camaraderie of my academic cohort, research lab, and friends. You have all helped to make this journey a little less daunting. Thank you to INSITE Lab members (past and present), and especially to Marilyn Ashley, Justine Braham, Pari-Gole Noorishad, and Konrad Czechowski. Many conferences and academic discussions have been made all the more fun because of you! Dr. Heather Tasker, thank you for being an incredible first graduate student pal and all-around supportive, wise friend. Dr. Zahra Clayborne, thank you for being my longest friend (go

Cowboys, I guess?); you are an exemplary scholar and human, and I cannot wait to watch you change the world. Brianna Jennett-McNeill, thank you for sharing in many laughs and commiserations with me, on and off the clock. Thank you to the many members of the KLB Research Group for pictures of adorable pets, Slack chats, and both insightful and silly discussions. Bre O’Handley, thank you for many (many) writing/commiseration sessions and for being a phenomenal half of the dynamic duo. Shawn Sanders, thank you for sharing many wonderful meals and irregular but delightful get-togethers with me over the years – I’m so glad Ottawa brought us together. Amy Webb, I am so grateful for your friendship and many beautiful, thoughtful conversations in a variety of settings (shared office space, over drinks, in Sweden...). Fatou Sarr, Noor Sharif, and members of PSST and SSTEP (past, present, and future) – thank you for being inspiring changemakers in equity, diversity, and inclusion; I have learned so much from all of you and am incredibly proud of what we’ve accomplished.

Last and never least, to my family. Maureen and Rienus Ooms, Janet, Grace, and the late Jim Palendat, thank you for being your generous and wonderful selves; I am so grateful to call all of you family. Kevin, thank you for being an incredible partner, cheerleader, sounding board, editor, and for helping to absorb and assuage my stress. I love you; you (and Frankbert) will always be my home. Mom, Dad, Paige, there are no words. I couldn’t have done any of this without your unending love, support, wisdom, care... The list goes on and on. You are my whole heart and I love you all so much. Thank you.

Statement of Co-Authorship

This dissertation includes four articles co-authored by myself and my PhD supervisor, Dr. Krystelle Shaughnessy. I am the first author of all four articles and Dr. Shaughnessy is the second (supervising) author. The first article (Chapter 2), entitled “Technology-mediated sexual interaction and relationships: A systematic review of the literature,” was published in *Sexual and Relationship Therapy* in 2017 (DOI: 10.1080/14681994.2017.1397948). I conceptualized the research questions, collected the data, planned and performed the analyses, and wrote, revised, and submitted the manuscript for publication. The second article (Chapter 4), entitled “Four problems with sexting research and their solutions,” was published in *Sexes* in 2021 (DOI: 10.3390/sexes2040033). Dr. Shaughnessy and I conceptualized this manuscript together; I wrote, revised, and submitted this manuscript for publication. The third article (Chapter 6) is titled “Motives for technology-mediated sexual interactions in committed romantic relationships: Using the approach-avoidance framework in a multi-grounded qualitative examination,” and the fourth article (Chapter 8) is titled “A technology-informed approach-avoidance motivational framework for technology-mediated sexual interactions in committed romantic relationships.” These final two articles are not currently submitted for publication; they will be shortened and submitted following the defense of this dissertation. For both, I conceptualized the research questions and methodology, collected the data, planned and performed the analyses, and wrote the manuscripts. For all articles, Dr. Shaughnessy served in a supervisory and advisory capacity during the formulation of research questions and hypotheses, the development and selection of the questionnaires, conducting statistical analysis, and provided substantial editorial assistance and feedback on numerous written drafts.

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Chapter 1 (General Introduction)

The rapid advancements in communication technology over the past two decades have spawned significant new areas of research development in a variety of psychological fields. In particular, researchers have focused on examining the prevalence with which technology-mediated behaviours occur and the extent to which they influence various domains of people's lives – for better or worse. In the domain of sexuality, both popular media and scholarly discourses have focused on understanding people's experiences with sexting and cybersex. Generally, sexting refers to the use of mobile phones to create and exchange sexually explicit content (e.g., via Short Messaging Service or Media Messaging Service; Weisskirch & Delevi, 2011); whereas cybersex refers to the interactive and real-time, Internet-mediated exchange of sexually explicit messages (e.g., via email or instant messaging services; Shaughnessy et al., 2011). Both sexting and cybersex could not exist without advancements in communication technology. However, these activities also likely represent the tip of the iceberg in terms of potential interpersonal sexual behaviours that can and will be conducted via technology. Indeed, alongside developments in virtual reality and haptic devices, some researchers have argued that the future of human sexual behaviour will increasingly involve technology (e.g., McArthur & Twist, 2017). Therefore, understanding the behaviour that underlies sexting and cybersex will not only shed light on people's sexual behaviour at present, but will also lay the foundation for understanding how human sexual behaviour will evolve in the future.

Both sexting and cybersex refer to essentially the same behaviour: the use of communication technology to send, receive, and/or exchange self-created, sexually explicit content with another specified person or people. Despite the conceptual overlap in 'sexting' and 'cybersex' definitions, most researchers have studied and discussed people's sexting and

cybersex experiences separately, largely based on the technological medium through which the behaviour occurs (i.e., mobile phone or Internet-based mediums). In this dissertation, I propose that sexting, cybersex, and similar constructs such as *phone sex* (i.e., sexually explicit audio conversations between two or more people via telephone; Kafka & Prentky, 1992), *haptic sex* (i.e., sexual activity in which one person remotely controls – via an Internet or data link – a device that produces the sexual, tactile sensations that are experienced by another person; Liberati, 2017), and *virtual sex* (i.e., sexual activity that occurs in immersive, virtual reality environments; Lafortune et al., 2020) are essentially different components of one overarching behavioural domain. I propose that these constructs should be referred to and studied together because they differ more in the technology used, rather than in the underlying behaviour itself. In other words, although the technology that people use may differ or change, the core underlying behaviour likely remains the same. To refer to this single behavioural domain, I use the term *technology-mediated sexual interaction* (TMSI). I define TMSI as any interpersonal interaction with a specified other person(s) that occurs through technology and includes the exchange of self-created, sexually explicit content (e.g., sending and/or receiving photos, videos, auditory messages, text messages, or physical sensations).

Motivation is the driving force behind human behaviours, including sexual behaviours and (likely) TMSIs. Researchers consistently find that people's motives for engaging in a variety of behaviours are strong predictors of the positive and negative outcomes that they experience. Despite interest in various forms of TMSI (sexting in particular), few researchers have examined adults' motives for and outcomes of TMSI with a theory-driven, motivational framework. Furthermore, researchers have not accounted for possible underlying mechanisms that may inform the connection between TMSI motives and outcomes, such as the frequency of TMSIs or

the desire for sexual activity. The approach-avoidance motivational framework posits that people experience more positive outcomes when their motives direct them towards a positive outcome (approach motives; Elliot et al., 2006; Gable, 2006; Gable & Impett, 2012). Conversely, people experience more negative outcomes when their motives direct them away from a negative outcome (avoidance motives). Approach and avoidance motives for TMSI could explain why some people experience more positive – and others more negative – TMSI outcomes. As such, in this dissertation, I examine people's motivations for and outcomes of TMSI through the lens of the approach-avoidance motivational framework.

People can engage in sexting and cybersex – and therefore, TMSI – within different relationship contexts (e.g., with a committed romantic partner, a casual sex partner, and/or an anonymous stranger); however, researchers have found that most people engage in sexting and cybersex with a committed romantic partner (e.g., Brodie et al., 2019; Dir et al., 2013; Döring, 2014; Drouin et al., 2013; Foody et al., 2021; Hudson, 2011; Klettke et al., 2014; Kokkinos & Krommida, 2022; Perkins et al., 2013; Shaughnessy & Byers, 2014; Strohmaier et al., 2014; Van Ouystel et al., 2020; Walker et al., 2013; Weisskirch & Delevi, 2011). This relationship context is likely unique from others, in part because of the added loyalty and interpersonal maintenance that informs motives, behaviours, and outcomes in a romantic relationship. Given the relatively high prevalence (compared to other relationship contexts) and distinctiveness of the committed romantic relationship context for sexting and cybersex, understanding these activities within romantic relationships represents a strong starting point for knowledge development. Therefore, in this dissertation, I focus my examination of TMSIs on people's experiences within committed romantic relationships.

The current dissertation advances knowledge on the TMSI behavioural domain and the ways in which approach and avoidance motives for TMSI predict the sexual, relational, and individual outcomes that people experience within committed romantic relationships. My four research objectives were as follows:

Research Objective 1: Provide an evidence-based grounding for the TMSI behavioural domain.

Research Objective 2: Identify limitations in current approaches to TMSI research and implement concrete steps and tools towards improving TMSI research.

Research Objective 3: Examine people's motivations for using TMSI with a committed romantic partner, informed by the approach-avoidance motivational framework.

Research Objective 4: Examine the association(s) between approach and avoidance TMSI motives, frequency of TMSI activities, dyadic sexual desire, and outcomes for people who engage in TMSI with a committed romantic partner.

Definitions of Technology-Mediated Sexual Interaction

Technology-mediated sexual interaction (TMSI) is a behavioural domain, referring to any interpersonal interaction with a specified other person(s) that occurs through communication technology and includes the exchange of self-created, sexually explicit content. TMSI includes activities such as sexting, cybersex, phone sex, avatar sex, virtual sex, and haptic sex; however, researchers have mostly limited their examinations of TMSI to either sexting or cybersex. Furthermore, almost no studies have examined both sexting and cybersex together, in an integrated way (for an exception, see Lefebvre et al., 2022). Yet, people may engage in other types of TMSI instead of, or alongside, sexting and cybersex; these experiences have yet to be examined. Separations and gaps in TMSI research have created fragmentations and limitations in

knowledge about the role of technology in people's sexual lives and relationships. Research that integrates all forms of TMSI, and that leaves room for new forms of TMSI, is required to gain a more accurate understanding of the behaviour itself, regardless of the technological medium through which the behaviour is conducted.

Within sexting and cybersex studies, researchers have used a wide variety of conceptual definitions to refer to each construct. For example, some researchers have conceptualized sexting as strictly involving photo/video content (e.g., Gordon-Messer et al., 2013) and others as including text content (e.g., Currin et al., 2016). Researchers studying cybersex have proposed more cohesive definitions of cybersex, but these definitions seem to overlap with some conceptual definitions of sexting (e.g., the exchange of sexually explicit content via the Internet; Cooper et al., 2004). The inconsistency in definitions used for both sexting and cybersex, combined with the overlap between the two, makes it difficult to accurately establish a prevalence estimate of people's TMSI behaviours across studies, people's development, and over time. Furthermore, researchers' conceptual definitions of both sexting and cybersex are not always reflected in their operational definitions of the construct. These issues related to conceptual and operational definitions across TMSI research are described in more detail below.

Conceptual Definitions

In the case of both sexting and cybersex, researchers have largely derived their conceptual definitions from clinical experiences or academic discussion; they have rarely empirically examined how participants define sexting or cybersex (Barrense-Dias et al., 2017; Cooper et al., 2016; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018; Mori et al., 2020; Van Ouytsel et al., 2018). As one exception, Shaughnessy and colleagues (2011) developed an empirical definition of the term 'cybersex' by examining participant-generated

definitions for the term. Overall, however, researchers have been inconsistent in the conceptual definitions they use to refer to sexting and cybersex. Across studies, the conceptual definitions used for each differ based on several factors – the inclusion/exclusion of particular: (i) technological medium(s), (ii) content, and (iii) interaction dynamics.

Technological medium(s). There are many types of technological mediums and platforms that people can use to engage in sexting and cybersex. Mediums can include various devices such as computers, mobile/smartphones, and tablets; platforms include short message services (i.e., texting), WhatsApp, Snapchat, Zoom, FaceTime – among many others. Across studies, researchers include and exclude different types of communication technology mediums in their conceptual definitions of sexting. For example, some only consider an activity ‘sexting’ when it occurs via mobile phone (e.g., SMS; Gordon-Messer et al., 2012); others include all mobile Internet-enabled devices (e.g., smartphone, tablet; Drouin et al., 2017); others still include all mobile and non-mobile Internet-enabled devices (e.g., desktop/laptop computer; Davis et al., 2016). This last conceptualization of sexting closely aligns with most researchers’ conceptual definitions of ‘cybersex.’ All conceptions of cybersex reviewed involve Internet-enabled devices (e.g., Daneback et al., 2005; Shaughnessy et al., 2011). Cybersex researchers have not generally distinguished between mobile and non-mobile devices; however, across studies, researchers have included and excluded different types of technological platforms in their conceptual definitions of cybersex. For example, some researchers conceptualize cybersex as occurring through specific online platforms, such as chat rooms, email, or instant messenger (e.g., Dijkstra & Barelds, 2011); others have indicated that it is a synchronous activity, meaning that it occurs in real-time (e.g., Carvalheira & Gomes, 2003); others still have completely excluded the forum for interaction from their definitions (e.g., Daneback et al., 2005).

Content. Definitions of sexting and cybersex can include a wide variety of content, including typed/text messages, audio recordings, photos, and/or videos. Across studies, researchers include and exclude different types of content in their conceptual definitions of sexting. For example, some only include content involving pictures (e.g., Crimmins & Seigfried-Spellar, 2015), and some include both pictures and videos (e.g., Bauermeister et al., 2014). Others only include content involving pictures, videos, and text (e.g., Dir et al., 2013); others still include live video in their conceptual definitions (e.g., Drouin et al., 2013). In cases where the conceptual definition involves images and/or videos, some researchers have included only fully nude depictions (e.g., Choi et al., 2016), whereas most others have included both semi-nude and fully nude images (e.g., Ricketts et al., 2015). In contrast, researchers' conceptual definitions of cybersex do not tend to differ based on media format – instead, some cybersex researchers have restricted cybersex to content intended to be sexually arousing (e.g., Griffiths, 2001). Additionally, some cybersex researchers' conceptual definitions only include content during which one or both participants masturbate or self-stimulate (e.g., Ferree, 2003); others do not (e.g., Daneback et al., 2005).

Interaction dynamics. Both sexting and cybersex involve at least two actors: one who sends content, and one who receives content. However, there may be different interaction dynamics across different groups of actors. For instance, in some cases, both actors may send and receive content in a reciprocal fashion, and in other cases, only one actor sends content, and the other receives content but does not send it. Across studies, researchers include and exclude different types of interaction dynamics between people engaging in the activity in their conceptual definitions of sexting. For example, some researchers' conceptual definitions only include the sending of content (e.g., Henderson, 2011); others only include the receiving of

content (e.g., Wolfe et al., 2016); others still include both the sending and receiving of content (e.g., Hudson et al., 2014). In contrast, most cybersex researchers include only the exchange (i.e., mutual/reciprocal sending and receiving) of content in their conceptual definitions (e.g., Shaughnessy & Byers, 2014). However, some have also included solitary-arousal online sexual activities (e.g., watching pornography) in their conceptual definitions of cybersex (e.g., Cooper et al., 2001).

The conceptual definitions of sexting and cybersex have clear points of overlap, and, in many respects, converge to the degree that they are not distinct behaviours. Indeed, all the sexting and cybersex definitions reviewed describe essentially the same set of behaviours: sending, receiving, or exchanging sexual content via technology. For instance, Drouin and colleagues' (2013) definition of sexting (transmission of sexual material via phone or Internet) and Delmonico's (1997) definition of cybersex (exchanging sexual content over the Internet) are virtually indistinguishable. This outdated and myopic separation of sexting and cybersex research has created and continues to perpetuate gaps in conceptual understanding and knowledge of the fundamental behaviour that underlies both constructs. It also does not easily allow for future research on similar behaviours with new, developing, and yet-to-be-conceived technologies (e.g., interactive virtual reality) to build on the existing literature. Focusing on people's behaviour – rather than the technology they use to enact it – and unifying activities under a single term will allow for a cohesive, developmental understanding of people's use of technology in their sexual lives. A key consistency across most conceptual definitions of sexting and cybersex is that the material is self-created, sexually explicit, and sent, received, or exchanged with a specified other person or people. Given these overlaps and similarities, I propose that sexting, cybersex, and similar activities all fall under the same behavioural domain.

I refer to this behavioural domain as technology-mediated sexual interaction (TMSI), which involves any interpersonal interaction with a specified other person(s) that occurs through technology and includes the exchange self-created, sexually explicit content.

Operational Definitions

In measuring both sexting and cybersex, many researchers have failed to turn their conceptual definitions into clear operational definitions. This issue has manifested in several different ways. First, some researchers use single-item measures – such as *Have you ever engaged in sexting?* (e.g., Walrave, et al., 2015) or *Have you ever had cybersex?* (e.g., Cooper et al., 2002) – without defining sexting or cybersex for participants. Relatedly, some researchers' measures refer to specific types of sexting or cybersex activities that are not defined. For example, to measure sexting, Ferguson (2011) asked participants how frequently they sent or received '*erotic or nude photographs*' of themselves or others, without defining what would constitute an 'erotic' photo. Similarly, to measure cybersex Træen and colleagues (2006) asked participants, '*Have you ever engaged in erotic chat?*' without defining what would constitute 'erotic chat'. In both cases, researchers essentially assume that all participants interpret terms (e.g., sexting, erotic photos, cybersex, or erotic chat) as referring to the same set of technology-mediated activities. However, it is likely that not all participants interpret these terms in the same way. For instance, researchers have found substantial individual variability in how people define many sexuality-related terms, including 'sex,' 'sexual partner,' 'having sex,' 'sexual desire,' 'sexual arousal,' 'abstinence' (Byers et al., 2009; Randall & Byers, 2003; Sanders & Reinisch, 1999; Trotter & Alderson, 2007), as well as 'cybersex' (Shaughnessy et al., 2011). To generate a coherent understanding of and knowledge about people's TMSI experiences, it is essential that researchers ensure they are indeed measuring the behaviours that they intend to.

Second, some researchers use measures that do not align with the conceptual definitions that they themselves delineate for sexting or cybersex. For example, Mitchell et al. (2012) defined sexting as “sending sexual images and sometimes sexual texts via cell phone and other electronic devices,” but their measure of sexting behaviour only asked participants if they had ever taken nude or nearly nude pictures or videos of themselves – and not if they had *sent* such pictures or videos. This discrepancy between conceptual and operational definitions is fundamentally problematic because it indicates that researchers may not be measuring the behaviours that they intend to; that is, the construct validity of these measures is poor.

Finally, across both the sexting and cybersex literature, researchers have not used construct valid measurement tools. The development of construct valid measures is an essential first step toward empirical research. Construct validity refers to the extent to which a given measure accurately quantifies the construct in question (Boateng et al., 2018; Cronbach & Meehl, 1955; Strauss & Smith, 2009). In the first “substantive phase” of construct validation, researchers define the breadth and bounds of the construct by synthesizing researchers’ and people’s understandings of what the construct is – that is, how they define the construct in conceptual words. Next, researchers must assess the structural and external validity of the measure they create (ideally across multiple studies; Flake et al., 2017; Mitchell, 2012); it is only when measures have been assessed for validity that they should be used in empirical examinations. However, many researchers examining sexting and cybersex have opted to create their own atheoretical measures that have undergone limited psychometric evaluations. This practice has resulted in many slightly distinct measures – all with unknown reliability and validity – used in different studies. This makes it more difficult to compare results across studies/samples and establish broader prevalence and patterns of TMSI behaviours. Given the

issues with operationalizing sexting and cybersex in the extant literature, one of the key objectives of my dissertation is to take a construct valid approach to develop key constructs and measures to examine people's TMSI behaviours in their committed romantic relationships.

Prevalence and Relationship Context of TMSI

It is currently unclear how widespread or common (i.e., how prevalent) TMSI is. Nonetheless, researchers have examined people's *lifetime prevalence* of sexting and cybersex, to determine whether participants have ever engaged in either activity. Findings suggest that the lifetime prevalence of sexting ranges from between 12.9 and 89.1%, and from between 8.0 and 77.0% for cybersex (Barrense-Dias et al., 2017; Cooper et al., 2016; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018; Mori et al., 2020; Van Ouytsel et al., 2018). More recent evidence from a meta-analysis examining sexting among young adults (18 – 29 years of age) suggests that the average sexting prevalence is 38.3% for sending, 41.5% for receiving, and 47.7% for reciprocal exchanges (Mori et al., 2020). To my knowledge, there is no research that specifically examines people's lifetime prevalence of phone sex, haptic sex, avatar sex, or virtual sex. Ultimately, these wide prevalence ranges for sexting and cybersex provide very little information about how many people have engaged in TMSI.

There are a few factors that explain the discrepancies in TMSI prevalence across studies. Some researchers have suggested that discrepancies in prevalence estimates for sexting are due to definitional and/or measurement problems in the literature (Barrense-Dias et al., 2017; Cooper et al., 2016; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018; Mori et al., 2020; Van Ouytsel et al., 2018); unfortunately, these reviews have focused solely on sexting and excluded other forms of TMSI. Nonetheless, it is likely that these non-specific ranges are due to inconsistencies in how researchers measure sexting and cybersex behaviours, particularly the

discrepancies between the conceptual and operational definitions used by different researchers across studies.

It is also likely that people's relationship status plays a role in the extent to which they engage in TMSI. Sexting and cybersex are both activities that occur between at least two people. According to Shaughnessy and Byers (2014), people engage in cybersex with (i) a committed romantic partner, (ii) someone who is known but not a committed partner (a 'known non-partner'), and (iii) a stranger. Some researchers have found that this also is the case for sexting (Crimmins & Seigfried-Spellar, 2014; Drouin et al., 2013; Henderson, 2011; Perkins et al., 2014; Samimi & Alderson, 2014; Strohmaier et al., 2014). Despite there being a variety of different types of partners with whom one can engage in TMSI, most researchers have rarely specified a relationship context when asking participants about their TMSI experiences. Of those who have examined the prevalence of TMSI across different relationship contexts, most have found that more people report engaging in TMSI with committed romantic partners compared to other types of partners (e.g., Brodie et al., 2019; Dir et al., 2013; Döring, 2014; Drouin et al., 2013; Foody et al., 2021; Hudson, 2011; Klettke et al., 2014; Kokkinos & Krommida, 2022; Perkins et al., 2013; Shaughnessy & Byers, 2014; Strohmaier et al., 2014; Van Ouystel et al., 2020; Walker et al., 2013; Weisskirch & Delevi, 2011).

People's TMSI experiences likely differ depending on the relationship context, for two reasons. First, the extent to which actors are readily identifiable to one another (level of anonymity) during a TMSI experience differs between relationship contexts. TMSIs that occur in high anonymity situations (e.g., with a stranger) do not necessarily require actors to disclose identifying information about themselves. In contrast, TMSIs in low anonymity situations (e.g., with a known other or committed romantic partner) typically involve the disclosure of more

identifying information (Brown et al., 2005; Shaughnessy & Byers, 2014). Because TMSIs necessarily involve the exchange of explicitly sexual content, a degree of trust (i.e., that sexual images or content won't be shared with others without consent) for the person that content is sent to is required – especially in low anonymity contexts (e.g., with a committed romantic partner), where disclosure of personally identifying information is typically unavoidable.

Second, the extent to which actors are emotionally intimate with and committed to one another differs across relationship contexts. TMSI that occurs with a stranger is often short-lived and likely has little impact on the lives of, or interpersonal relationships between, actors (Cooper et al., 2004; Daneback et al., 2005). In contrast, TMSI that occurs with a romantic partner likely involves a level of intimacy and commitment that extends beyond the single interaction. TMSI in the romantic relationship context is likely to influence the lives of, and interpersonal relationships between, the actors to a greater extent than TMSI in the stranger relationship context. This difference – whether the interaction may impact interpersonal relationships and/or lives – likely leads to different behaviours to some extent. Because of these potential differences, researchers should examine TMSI in each relationship context separately. Therefore, in the current dissertation, I focus on the committed romantic relationship context of TMSI, as it is the most common and, as such, the most likely to impact people's lives.

Outcomes of TMSI in Committed Romantic Relationships

People who engage in TMSI with a romantic partner likely experience a variety of outcomes related to sexual, relational, and well-being domains. Overall, researchers have found mixed results when examining the sexual, relational, and individual outcomes that people experience when they engage in TMSI with a romantic partner. Some researchers have found that, compared to those who have not engaged in TMSI with a romantic partner, those who have

engaged in TMSI with their partner report more positive outcomes, such as higher sexual (Brodie et al., 2019; Galovan et al., 2018; Oriza & Hanipraja, 2020) and relationship (Currin et al., 2016; McDaniel & Drouin, 2015; Parker et al., 2013) satisfaction. However, other researchers have found that, compared to those who have not engaged in TMSI with a romantic partner, people who have engaged in TMSI with their partner report more negative outcomes, including increased relationship conflict, ambivalence, and poorer relationship commitment levels (Galovan et al., 2018; McDaniel & Drouin, 2015). Others still have found no associations between relationship satisfaction and TMSI (Jeanfreau et al., 2019; Matotek et al., 2021), nor between TMSI and individual mental health outcomes (e.g., self-esteem, depression; Galovan et al., 2018). Overall, the extent to which engaging in TMSI with a romantic partner relates to sexual, relational, and individual outcomes is unclear. Most of these studies have focused only on examining outcomes in relation to sexting (rather than TMSI behaviour as a whole), which further adds to this lack of clarity. Moreover, it is likely that the association between TMSI behaviour and positive/negative outcomes is not direct. That is, there are likely other/additional intervening factors that explain why some people may experience positive, and others negative, outcomes when they engage in TMSI. Therefore, in the current dissertation, I examine the extent to which people's motivations for TMSI contribute to and explain people's experiences of TMSI outcomes in sexual, relational, and individual domains.

Motivations for TMSI in Committed Romantic Relationships

It is likely that examining people's motivations for engaging in TMSI with a romantic partner could clarify why some people benefit from TMSI, and others don't. Motives precede and are distinct from the enactment of behaviour. Specifically, motives are affective and drive-based tendencies that energize and orient behaviour; more simply, motives are the reasons people

engage in certain behaviours (Elliot et al., 2006). Like other behaviours, in-person sexual behaviours are guided by a variety of motives; indeed, researchers have documented a range of motives for in-person sexual behaviours. Some of these motives include (broadly): the pursuit of sexual pleasure, desire to please one's partner, promotion of intimacy in a close relationship, relief of sexual tension, gaining sexual experience, prevention of relationship conflict, and/or to impress one's peers (e.g., Carroll et al., 1985; Denney et al., 1984; Hill & Preston, 1996; Impett et al., 2005; Leigh, 1989). It is likely that these and/or similar motives also apply to TMSI.

Researchers have identified a range of motives for which adults engage in TMSI with a committed romantic partner (specifically, sexting – motives for cybersex are mostly absent in the existing literature). Drouin et al. (2013) examined the most frequently cited reasons for sexting among American college students (aged 18–26), across three different relationship contexts: with a (i) committed partner, (ii) casual sex partner, and (iii) partner with whom they were cheating on their committed partner. The motives most people cited for sexting with a committed partner were 'flirtation', 'a partner asking them', and 'wanting to initiate sex'. Currin and colleagues (2020) asked participants about their motives for sexting with a current romantic partner using an open-ended survey question. Common motives for sexting in this sample revolved around both 'sex-related motives' (e.g., 'romance', 'fun/enjoyment', 'excitement') and 'non-sex-related motives' (e.g., 'comforting', 'anxiety reduction'). Research using the atheoretical Sexting Motives Questionnaire (SMQ; Bianchi et al., 2017) also has revealed that most people engage in sexting with committed romantic partners for 'sexual purposes' (e.g., to 'feel sexually aroused' or to pursue 'passion' or 'intimacy' in a relationship), as well as for 'body image reinforcement' (Califano et al., 2022; Currin & Hubach, 2019). Similarly, using an adapted version of the Motivations for Sexting Scale (MSS; Drouin & Tobin, 2014) researchers have found that people

engage in sexting for both ‘relational purposes’ (e.g., ‘I wanted intimacy’ and ‘I wanted to fulfill my partner’s needs’) and ‘non-relational purposes’ (e.g., ‘I was lonely’ and ‘I wanted to avoid an argument’; Greer et al., 2022).

Across studies on motives for TMSI with a romantic partner, researchers have also (mis-) identified specific circumstances as ‘motives’ for which people engage in TMSI with a romantic partner. For instance, many researchers have identified ‘being in a geographically different location from one’s partner’ as a motive for engaging in TMSI (Currin et al., 2020; Drouin et al., 2013; Greer et al., 2022). The MSS includes items such as ‘I was taking drugs’ and ‘my partner was far away’; these also point to circumstantial elements that can occur in conjunction with sexting. However, people can still have distinct motives for engaging in TMSI while experiencing a particular circumstance. For instance, one person might be in a long-distance relationship (i.e., the circumstance) with their partner and engage in TMSI for ‘excitement’ (i.e., the motive); whereas, another person in a long-distance relationship (i.e., the circumstance) might engage in TMSI for ‘comfort’ (i.e., the motive). Overall, people appear to engage in TMSI with a romantic partner with a variety of motives and in a variety of circumstances. However, most of the research in this area remains descriptive, exploratory, and disconnected from the wider literature on motivation and sexual motives.

Motivational Theory and TMSI

Most researchers have not used motivational theory to differentiate, organize, or make evidence-based predictions related to people’s motives for TMSI with a romantic partner. Instead, researchers have focused on describing and identifying the prevalence of different motives (or circumstances) that people have for engaging in TMSI with a romantic partner. Typically, researchers in other domains use motivational theories to guide their examinations of

the motives that people use when enacting any given behaviour. Most motivational theories lead to evidence-based predictions about how specific types of motives for a behaviour predict the related outcome(s) that people will likely experience after engaging in that behaviour. When research questions are guided by theory, researchers can build on past knowledge about related behaviours and contribute to future knowledge in an immediate and sustainable way. The absence of theory in research makes it difficult to connect findings across studies and to explain behaviours beyond a single study or sample. Theoretical frameworks are especially important when examining technology-mediated behaviours like TMSI, because they allow researchers to identify ways in which such behaviours connect with and/or are distinct from in-person behaviours (Flanagin, 2020).

In my review of the literature, I identified two studies on TMSI motives in which researchers incorporated motivational theory. First, Le and colleagues (2022) used motivational perspectives from self-determination theory (Ryan & Deci, 2000; 2004; 2017) to examine sexting within a committed relationship. These researchers found that autonomous motivations for sexting (i.e., aligned with intrinsic or self-determined goals, such as personal enjoyment) predicted higher levels of relationship quality. Conversely, controlled motivations for sexting (i.e., aligned with extrinsic or non-self-determined goals, such as avoiding relational conflict) predicted lower levels of relationship quality. The dichotomy of autonomous versus controlled motivations is useful for understanding motives that pertain to the individual. However, aside from focusing only on sexting (rather than TMSI behaviour as whole), these researchers did not consider autonomous motivations that might directly relate to one's partner or their relationship. That is, the researchers only accounted for relational motives for sexting when describing controlled motivations. Yet, autonomous motives for sexual activity within the romantic

relationship context can likely also include one's partner/relationship in a positive sense. For instance, Cooper and colleagues (1998) found that people who used more partner-focused approach sexual motives were more likely to be in a long-term committed relationship. This finding suggests that people's relationships may benefit from sexual motives related to one's partner. Furthermore, Currin et al. (2020) found that common reasons for sexting with a romantic partner include pursuing 'romance' and/or 'intimacy' within one's relationship – which could be autonomous (i.e., self-determined) or controlled (i.e., non-self-determined) motivation(s), depending on the context.

Second, Lefebvre and colleagues (2022) used the approach-avoidance motivational framework (Elliot et al., 2006; Gable, 2006; Gable & Impett, 2012) to examine people's motives for engaging in some forms of TMSI. These researchers found that people who used approach motives for TMSI were more likely to report higher levels of sexual satisfaction, whereas people who used avoidance motives for TMSI were more likely to report lower levels of sexual satisfaction. Although the researchers did not focus on the committed relationship context, their findings suggest that approach and avoidance TMSI motives influence people's sexual outcomes. Based on research examining in-person sexual motives (e.g., Gewirtz-Meydan & Ayalon, 2018; Impett et al., 2005; Impett et al., 2008; Muise et al., 2013; Muise et al., 2018; Rosen et al., 2015), it is likely that Lefebvre et al.'s (2022) findings would extend to relational and individual outcomes, such that approach TMSI motives predict higher – and avoidance TMSI motives predict lower – levels of relationship and life satisfaction.

Approach-Avoidance Motivational Framework

The approach-avoidance motivational framework provides an underlying structure for specific motives that people give for interpersonal behaviours. It distinguishes between motives

that direct people toward positive outcomes (i.e., approach motives) and motives that are focused on avoiding negative outcomes (i.e., avoidance motives) (Elliot et al., 2006; Gable, 2006; Gable & Impett, 2012). Researchers have successfully used the approach-avoidance motivational framework to better understand interpersonal behaviours (e.g., friendship development; Gable, 2006), including behaviours in romantic relationships (e.g., perceived intimacy and conflict; Laurenceau et al., 2005, quality time; Impett et al., 2010), and sexual relationships (e.g., sexual behaviour, Cooper et al., 1998; sexual desire, Impett et al., 2005). In the romantic domain, approach motives focus on obtaining positive outcomes such as intimacy and growth in close relationships; conversely, avoidance motives focus on avoiding negative outcomes such as conflict and rejection (Gable, 2006; Impett et al., 2006; Impett et al., 2008). Similarly, in the sexuality domain, approach motives focus on obtaining positive outcomes such as one's own physical pleasure, a partner's physical pleasure, and/or enhanced intimacy in the relationship (Impett et al., 2008; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015). In contrast, avoidance motives focus on avoiding negative outcomes such as one's own sexual frustration, a partner's loss of interest in the relationship, and/or conflict in the relationship.

The distinction between approach and avoidance motives does not necessarily have implications for behaviours themselves, but rather the *reason for* engaging in certain behaviours. For example, a person with strong approach motives may agree to see a movie that they don't feel compelled to see, but that their friend is interested in, so that they can learn more about their friend's interests. Conversely, a person with strong avoidance motives may agree to see the movie so that their friend won't resent them for not being willing to see the movie that they were interested in. Although the behaviour in both examples is essentially the same (i.e., agreeing to see a movie), the way the individual frames their behaviour (i.e., their motives) is distinct.

This distinction does not necessarily exist on a single dimension; approach and avoidance motives are typically conceptualized as independent from each other (Carver, 2006; Cooper et al., 1998; Elliot, 2006; Elliot & Church, 1997; Elliot & Covington, 2001; Elliot et al., 2006).

That is, people who are low in approach motives are not necessarily high in avoidance motives.

Additionally, people likely have both approach and avoidance motives to varying degrees.

Whether a person is engaging in an activity or behaviour with either type of motive can fluctuate from day to day (i.e., at the state level), but most people tend towards one type of motive or the other (i.e., at the trait level) for a given behaviour (Gable & Impett, 2012; Impett et al., 2005).

The distinction between approach and avoidance motives has implications for understanding a variety of individual and interpersonal outcomes of enacting a behaviour. For instance, Gable (2006) used the approach-avoidance framework to explain a variety of processes and outcomes in close relationships (e.g., friendships). In a longitudinal study, participants were first asked to generate a list of goals, including three goals for any other aspects of their social life. Researchers later coded participants' goals as either approach-motivated or avoidance-motivated. Eight weeks after listing their goals, participants who listed more approach goals also experienced more satisfaction with their social life and less loneliness; participants who listed more avoidance goals also experienced higher levels of anxiety and loneliness. These findings indicate that the motives driving people's close relationship behaviours had implications for understanding aspects of both individual and interpersonal well-being. Consistent with Gable (2006), several other researchers have suggested a similar relationship between approach motives and positive outcomes, and avoidance motives and negative outcomes (e.g., Carver, 2006; Cooper et al., 1998; Elliot, 2006; Elliot & Church, 1997; Elliot & Covington, 2001; Elliot et al., 2006; Gable, 2006; Gable & Impett, 2012; Impett et al., 2005).

Similarly, researchers have found that engaging in sexual behaviour with a romantic partner using approach sexual motives may have positive outcomes, and engaging in sexual behaviour with a romantic partner using avoidance sexual motives may have negative outcomes. Here, the distinction in motives seems to prompt different outcomes particularly for the individual, relationship, and sexual aspects within the relationship. For instance, Impett et al. (2005) conducted a two-week daily experience sampling study with people in dating relationships. These researchers found that on days when people engaged in sexual activity with approach motives, they experienced more positive emotions, greater satisfaction with life, greater relationship satisfaction and closeness, and less relationship conflict than on days when they engaged with avoidance motives. Conversely, on days when people engaged in sexual activity with avoidance motives, they experienced more negative emotions, more relationship conflict, and less relationship satisfaction relative to days when they engaged with avoidance motives. These researchers also found that the more often participants engaged in sexual activity with avoidance motives, the less satisfied they were with their relationship and the more likely they were to have broken up with their partners one month later. Other researchers have found similar results using experience sampling methodologies, such that approach motives for sexual activity with a romantic partner predict higher – and avoidance motives, lower – levels of sexual desire (Impett et al., 2008; Muise et al., 2013), and both relationship and sexual satisfaction (Muise et al., 2013). Muise and colleagues (2017) conducted a study with people in committed relationships, in which sexual motives were experimentally manipulated. Participants were randomly assigned to one of two groups. In the “approach booster” group, participants read about the benefits of using approach sexual motives for sexual activities and were asked to employ them over the course of the following week. In the control group, participants were not

given any information about sexual goals, nor were they asked to do anything over the course of the following week. One week later, participants in the approach booster group scored higher on measures of sexual and relationship satisfaction relative to those in the control group. This last study suggests that the associations between approach sexual motives and outcomes may be causal, such that using approach motives for sexual activity causes higher sexual and relationship satisfaction for people in committed relationships.

Approach-Avoidance Motivational Framework and TMSI

It is likely that the approach-avoidance motivational framework can explain people's motives for engaging in TMSI with a romantic partner. Lefebvre and colleagues (2022) provide initial evidence for the application of the approach-avoidance framework to TMSI, although this research was not specific to the romantic relationship context. These researchers found that people who used approach motives for TMSI were more likely to report higher levels of sexual satisfaction, and people who used avoidance motives for TMSI were more likely to report lower levels of sexual satisfaction. It is likely that Lefebvre et al.'s (2022) findings would extend to relational and individual outcomes, such that approach TMSI motives predict higher – and avoidance TMSI motives predict lower – levels of sexual, relational, and life satisfaction.

People's motives for engaging in TMSI with a romantic partner may differ relative to their motives for engaging in in-person sexual activity. The technology-mediated nature of TMSI likely affords sexual opportunities that are distinct from in-person sexual opportunities. For instance, Shaughnessy and colleagues (2022) suggested that people high in social anxiety may prefer TMSI to in-person sexual interactions because TMSI allows them more (perceived) control over their social presentation – something that is less possible with in-person sexual interactions. Indeed, TMSI can conceivably allow people to explore (approach) aspects of their

(or their partner's) sexuality that they may not be able to engage with in person; or, it can allow people to avoid in-person sexual activity altogether. Yet, researchers have not considered the potential motives that stem from the unique sexual opportunities that TMSI affords. Instead, researchers examining TMSI motives from a theoretical standpoint (e.g., Le et al., 2023; Lefebvre et al., 2022) have modified existing measures of in-person sexual motives without adjusting or adding items for the technology-based context. To ensure construct valid measurement of TMSI motives, researchers instead must examine the extent to which motives for in-person sexual behaviour align with people's TMSI motives, and whether people report additional, TMSI-specific motives.

To best understand how the associations between approach/avoidance TMSI motives and outcomes work, researchers must also examine the underlying mechanisms that connect motives to outcomes. Two such mechanisms are the (i) frequency with which people engage in TMSI with their partner, and (ii) the extent to which people experience desire for sexual activities with their partner. Research findings generally suggest that people who engage in more frequent in-person sexual activity with a romantic partner experience higher sexual and relationship satisfaction (e.g., Call et al., 1995; Laumann et al., 1994; Muise et al., 2015). However, this association between sexual frequency and positive outcomes may only exist for approach-motivated sexual activity and not for avoidance-motivated sexual activity (Impett et al., 2005). People are more likely to engage in sexual activity with higher frequency when it is positively reinforced and less likely when sexual activity is negatively reinforced (e.g., McNulty et al., 2016; Schoenfeld et al., 2017). Indeed, Joudin and colleagues (2019) found that self-directed approach sexual motives predicted higher levels of in-person sexual frequency, which in turn predicted higher levels of sexual satisfaction, among romantic partners. Therefore, when people

experience positive TMSI outcomes, they will likely engage in TMSI more frequently relative to those who experience negative TMSI outcomes. In turn, people's TMSI frequency may strengthen their motives such that higher TMSI frequency will reinforce approach motives and positive outcomes, whereas lower TMSI frequency will reinforce avoidance motives and negative outcomes.

Researchers have also suggested that people who engage in in-person sexual activity for approach sexual motives experience higher long- and short-term sexual desire; conversely, those who engage in sexual activity for avoidance sexual motives tend to experience lower sexual desire (Impett et al., 2008; Muise et al., 2013). For instance, Muise and colleagues (2013) found that for adults in a romantic relationship, approach motives increased people's sexual desire, which in turn enhanced their relationship and sexual satisfaction. They also found that avoidance motives decreased people's sexual desire, which in turn decreased their relationship and sexual satisfaction. However, counter to their hypotheses, both Impett et al. (2005) and Muise et al. (2017) found that approach and avoidance motives did not have a significant impact on people's dyadic in-person sexual desire. Nevertheless, it is possible that approach and avoidance motives for TMSI prompt changes in sexual desire that, in turn fully or partially account for sexual, relational, and individual outcomes.

Current Dissertation

The overall goal of this dissertation is to improve knowledge about people's motives for engaging in TMSI with a committed romantic partner. Given that TMSI is a newly proposed concept, my first objective was to provide empirical support for its construct validity (Research Objective 1). In doing so, I also summarized key problems with research that focuses only on sexting, and presented solutions aimed at preventing the same problems in research that focuses

on the TMSI behavioural domain (Research Objective 2). In Chapter 2 (Article 1), I present a systematic literature review focused on defining the TMSI behavioural domain, and summarizing current knowledge about TMSI prevalence and the relationship contexts in which TMSI occurs. In Chapter 4 (Article 2), I summarize the history of sexting research and the problems with current approaches to conducting research on sexting (one subtype of TMSI behaviour); I argue that research focused on the TMSI behavioural domain will improve knowledge about people's use of technology for interpersonal sexual activity.

Reviews of the TMSI literature highlight the lack of theoretically driven studies on TMSI and sexting (e.g., Kosenko et al., 2017; Van Ouytsel et al., 2018). The absence of theory in research makes it difficult to connect findings across studies and contexts (e.g., in-person versus technology-mediated behaviour; Flanagin, 2020), and to explain behaviours beyond a single study or sample. I chose the approach-avoidance motivational framework to guide this dissertation because of its past application to interpersonal relationships (including sexual behaviour in the romantic relationship context; e.g., Impett et al., 2005; Impett et al., 2008; Muise et al., 2013; Muise et al., 2017) and its flexibility to capture novel motives that may be relevant to the technology-mediated components of TMSI. Since undertaking this dissertation, two empirical studies examining TMSI motives from a motivational theory standpoint have been published. Le et al. (2023) used Self-Determination Theory to examine motives for sexting, and Lefbvre et al. (2022) used the approach-avoidance framework to examine some subtypes of TMSI. However, both of these studies are limited by their use of measures developed to examine in-person behaviours; these researchers did not explore motives that may be novel to TMSI, nor did they assess the extent to which those measures fit the TMSI context. Therefore, I sought to examine people's motives for engaging in TMSI with a romantic partner, through the lens of the

approach-avoidance framework (Research Objective 3). In Chapter 6 (Article 3), I present findings from qualitative interviews with participants who were in a romantic relationship and who had engaged in TMSI with their current partner. This study presents initial evidence that people use approach and avoidance motivations for TMSI and that those motivations connect to their sexual, relational, and individual experiences. In Chapter 8 (Article 4), I used my findings from Article 3 to inform the development of a construct valid measure of approach and avoidance TMSI motives. I then used this measure to test my hypothesized model (see Figures 1.1 and 1.2), predicting associations between approach and avoidance TMSI motives and outcomes for people who engage in TMSI with a committed romantic partner (Research Objective 4). The research objectives, questions, and hypotheses associated with each article are summarized in Table 1.1. Overall, this dissertation contributes to improving research methods, applying and expanding theory, and developing knowledge about TMSI and interpersonal sexual behaviour.

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Tables and Figures

Table 1.1 Summary of Dissertation Articles, Objectives, Questions, and Hypotheses

Research Objective	Research Question/Hypothesis
Chapter 2 (Article 1): Technology-Mediated Sexual Interaction and Relationships: A Systematic Review of the Literature	
Research Objective 1: Provide a strong, evidence-based grounding for the TMSI behavioural domain.	Research Question 1: Are researchers' <i>conceptual</i> definitions of sexting and cybersex similar, such that they demonstrate overlap in specific technology-mediated behaviour? Research Question 2: What does the existing research indicate about TMSI use in committed romantic relationships?
Chapter 4 (Article 2): Four Problems in Sexting Research and Their Solutions	
Research Objective 2: Identify limitations in sexting research (the primary source of information on TMSI), and strategies to improve research on TMSI.	N/A
Chapter 6 (Article 3): Approach and Avoidance Motives for Technology-Mediated Sexual Interactions in Romantic Relationships: A Multi-Grounded Qualitative Examination	
Research Objective 3: Examine people's motivations for using TMSI with a committed romantic partner, informed by the approach-avoidance motivational framework.	Research Question 3: Do people describe approach and avoidance motives for engaging in TMSI with a committed romantic partner? Research Question 4: Can the approach-avoidance motivational framework explain people's motives for engaging in TMSI with a committed romantic partner?
Chapter 8 (Article 4): A Technology-Informed Approach Avoidance Motivational Framework for Technology-Mediated Sexual Interactions in Committed Romantic Relationship	
Research Objective 4: Examine the association(s) between approach and avoidance TMSI motives, frequency of TMSI	Hypothesis 1: People who more frequently engage in TMSI for approach motives will report higher (a) technology-mediated sexual,

activities, dyadic sexual desire, and outcomes for people who engage in TMSI with a committed romantic partner.

(b) in-person sexual, (c) relationship, and (d) life satisfaction.

Hypothesis 2: People who more frequently engage in TMSI for avoidance motives will report lower (a) technology-mediated sexual, (b) in-person sexual, (c) relationship, and (d) life satisfaction.

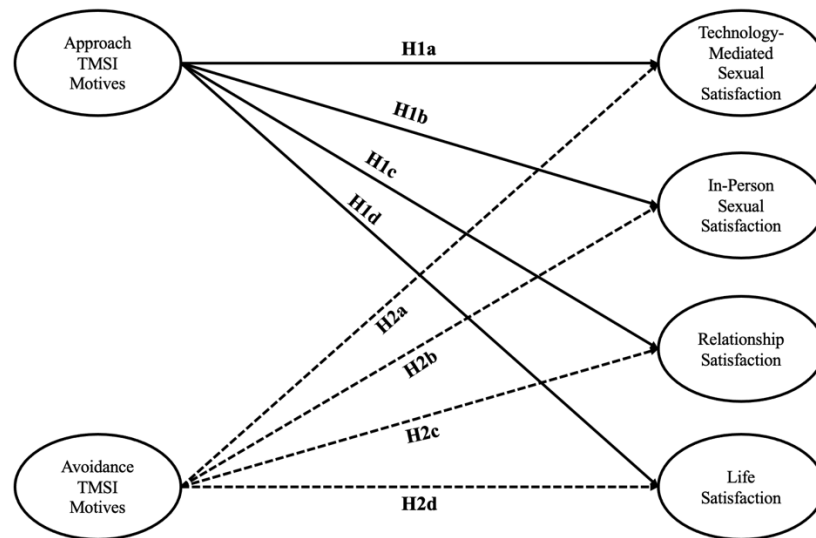
Hypothesis 3: People who more frequently engage in TMSI with their romantic partner will also more frequently use approach TMSI motives.

Hypothesis 4: People who less frequently engage in TMSI with their romantic partner will more frequently use avoidance TMSI motives.

Hypothesis 5: People who more frequently engage in TMSI for approach motives will report (a) higher dyadic sexual desire and, in turn, higher (b) sexual, (c) relationship, and (d) life satisfaction.

Hypothesis 6: People who more frequently engage in TMSI for avoidance motives will report (a) lower dyadic sexual desire and, in turn, lower (b) sexual, (c) relationship, and (d) life satisfaction.

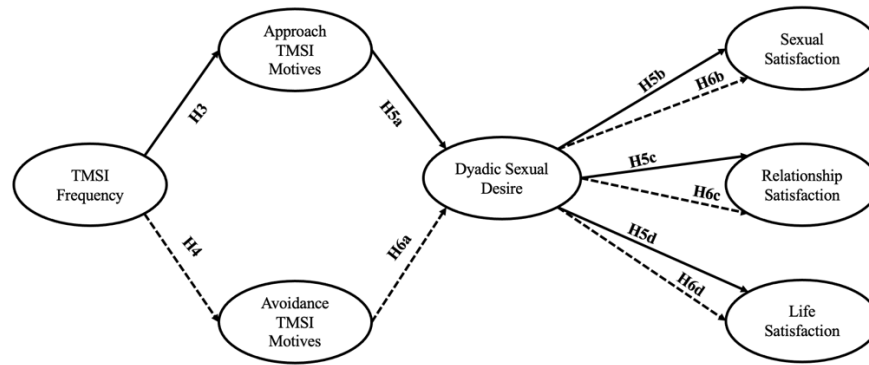
Figure 1.1 Hypothesized Relationship Between Approach and Avoidance TMSI Motives and Outcomes



Note. Dotted lines represent negative hypothesized predictive associations; bold lines represent positive hypothesized predictive associations. All paths are expected to be significant ($p < .05$).

TMSI = technology-mediated sexual interaction.

Figure 1.2 Hypothesized Relationship Between TMSI Frequency, Approach and Avoidance TMSI Motives, Sexual Desire, and Outcomes



Note. Dotted lines represent negative hypothesized predictive associations; bold lines represent positive hypothesized predictive associations. All paths are expected to be significant ($p < .05$).

TMSI = technology-mediated sexual interaction.

Chapter 2 (Article 1)

Technology-Mediated Sexual Interaction and Relationships: A Systematic Review of the Literature

This article was published in *Sexual and Relationship Therapy*, in 2017¹:

Courtice, E. L. and Shaughnessy, K. (2017). Technology-mediated sexual interaction and relationships: A systematic review of the literature. *Sexual and Relationship Therapy*, 32(3-4), 269-290. <https://doi.org/10.1080/14681994.2017.1397948>

Author's Note

This research was completed with the support of funding awarded to Erin L. Courtice, from the Ontario Graduate Scholarship (2017 – 2018).

¹ Because this article was published in 2017, the formatting does not reflect the standards outlined in the latest version of the American Psychological Association (APA) Publication Manual, which was updated to APA 7 in October 2019.

Abstract

In the previous decade, researchers have increased their attention to people's engagement in technology-mediated sexual interaction (TMSI) – the exchange of sexual material via computer and Internet technologies. Inconsistent terminology and measurement across studies, however, has hindered the development of a cohesive knowledge base to inform sexual and relationship clinicians and educators. In this paper, we provide a critical review of the current state of the research on TMSI to identify gaps, clarify terminology, and synthesize current findings in the research. To do this, we conducted a systematic search of empirical literature focused on sexting, cybersex, and phone sex (terms that are consistent with TMSI). To meet inclusion criteria, authors of the studies were required to report on the prevalence of sexting, cybersex, and phone sex in adolescent and/or adult populations. Our findings indicate that TMSI is more prevalent among adults relative to adolescents. We also found that a majority of the studies focused on problematic use of TMSI (e.g. “cybersex addiction”); with comparatively less research examining normative TMSI. Our findings also indicate that many of the studies we systematically reviewed did not specify or differentiate between relationship types in their analyses. We conclude by discussing trends in the results and gaps in the literature that are pertinent to sexual and relationship researchers and clinicians.

Keywords: sexting, cybersex, online sexual activities, digital technology, internet, relationships, sexuality.

Technology-Mediated Sexual Interaction and Relationships: A Systematic Review of the Literature

Within the past decade, information and research on the use of digital technology for the purposes of sexual communications and interactions has become increasingly prevalent in the popular media, as well as in legal, pedagogical, clinical, and psychological discourses. Much of this attention has focused on two phenomena in particular: *sexting*, the use of digital devices such as computers or mobile phones to create and exchange sexually explicit content (Ringrose, Gill, Livingstone, & Harvey, 2012) and *cybersex*, the interactive and real-time, Internet-mediated exchange of sexually explicit messages (Shaughnessy, Byers, & Thornton, 2011). Both sexting and cybersex refer to essentially the same behaviors: the use of digital technology to send, receive, and/or exchange self-created, sexually explicit content to another specified person(s). Despite this conceptual overlap in behavior, researchers have studied and discussed people's sexting and cybersex experiences separately. We refer to these and similar constructs (e.g., *phone sex*, sexually explicit audio conversations between two or more people via telephone; Kafka & Prentky, 1992) holistically as *technology-mediated sexual interaction* (TMSI): any interpersonal interaction that includes self-created, sexually explicit content (e.g., creating and exchanging photos, videos, or messages) and occurs through the use of digital technology. The purpose of this systematic literature review was to summarize and compare the empirical research on people's use of technology for their interpersonal sexual interactions, regardless of the terminology used.

There are three systematic literature reviews on sexting research (Döring, 2014; Klettke, Halford, & Mellor, 2014; Kosenko, Luurs, & Binder, 2017), but there currently are no systematic reviews of cybersex or phone sex research. Two of these previous reviews were focused on

prevalence and demographic correlates of sexting in both adults and adolescents (Döring, 2014; Klettke et al., 2014); the third focused on the link between sexting and sexual behavior (Kosenko et al., 2017). All of these researchers noted that the prevalence of sexting was difficult to concretely establish due to the variety of definitions and sampling techniques in the literature. In her review of 17 sexting studies, Döring (2014) found that prevalence of sexting behaviors was higher among adult samples relative to adolescent samples, and that the prevalence among adolescents increased alongside the age of the sample. Similarly, in their 2014 review of 31 studies reporting on sexting prevalence, Klettke et al. found that sexting was more prevalent amongst adult samples relative to adolescent samples; older adolescents were more likely to have sexted than younger adolescents; and that more people reported receiving sexts than sending them. Additionally, the researchers found that attitudes about sexting were more positive amongst those who had previously engaged in sexting behaviour, and that sexting was associated with a higher likelihood of being sexually active. Finally, in their critical review and meta-analysis of 15 studies, Kosenko et al. (2017) found that sexting was positively correlated with sexual activity, unprotected sex, and number of sexual partners.

Information about the relationship context of people's TMSI experiences is particularly pertinent to understanding the prevalence, correlates, and outcomes of TMSI because it is an interpersonal activity. Researchers can evaluate the relationship context of TMSI in at least three ways: (1) the prevalence of people's TMSI experience for those who are in a relationship versus those who are single, (2) the prevalence of people's TMSI experience with different types of partners, and (3) the extent to which engaging in TMSI predicts or is associated with different relationship outcomes, such as relational or sexual satisfaction. People can engage in TMSI with different types of partners; for example, a primary committed partner, known others who are not

committed partners (such as friends, acquaintances, new dating partner), and/or strangers (Shaughnessy & Byers, 2014). The partner context of TMSI may be a key factor in how TMSI fits within people's sexual lives (the correlates) and the extent to which it predicts positive and negative outcomes. For example, within the context of a primary committed relationship, TMSI might be used to sustain intimacy in a long-distance romantic relationship – a positive relationship outcome. On the flip side, TMSI with a non-partner or stranger may be used to facilitate acts of infidelity – a negative relationship outcome. Overall, TMSI experiences also may enhance or detract from relationship and sexual satisfaction. Therefore, we examined the relationship context of people's TMSI experiences in previous research. We did this by extracting information about (i) the prevalence of people's reported TMSI experiences with different types of partners, and (ii) the association between TMSI and relational outcomes, such as relationship and sexual satisfaction, intimacy, or commitment.

Methods

Systematic Literature Search

We conducted the present review in accordance with the evidence-based guidelines outlined by the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) statement (Liberati et al., 2009). We used the following six electronic databases for our literature searches: PsycINFO, MEDline, Sociological Abstracts, PsycARTICLES, Academic Search Complete, and SCOPUS. These databases were selected to reflect the range of fields in which TMSI research seems to occur – psychology, sociology, legal studies, and medicine. The search was conducted on November 23rd, 2016 and included peer-reviewed articles published up until that date that were written in English. We did not place any restrictions on the dates in which studies were published; that is, we were open to including studies that were published in any

year. This decision was based on the possibility that our search would yield empirical studies about early forms of TMSI, such as phone sex, that people may have engaged in as early as the early 1900's. However, the earliest article that met inclusion criteria (detailed below) was published in 2005 (Daneback, Cooper, & Månsson, 2005).

We conducted separate database searches using three different keywords: phone sex, sexting, and cybersex. These terms were selected based on an initial scan of the literature to reflect the most common digital modalities by which TMSI occurs (that is, by phone, text messaging, and the Internet). The abstracts of all returned articles were read and assessed for eligibility. The full article was retrieved only if the following inclusion criteria were satisfied:

- The focus of the article was the prevalence of phone sex, sexting, or cybersex, or variables related to the relationship context of these activities.
- Phone sex, sexting, or cybersex was defined by sending, receiving, and/or exchanging sexually explicit content (including audio, text, photos, or videos) via digital technology.
- The article presented original quantitative and empirical data, with sufficient information to allow for extraction of study methodology and results.

The initial keyword search for phone sex returned 223 unique articles. Of these, no articles presented quantitative empirical data on prevalence rates of phone sex activity. The initial search for sexting returned 327 unique articles. Of these, 89 were identified as potentially meeting inclusion criteria and, after evaluating the full text, 44 were retained for systematic review. Finally, the initial keyword search for cybersex returned 402 unique articles. Of these, 31 were identified as potentially meeting inclusion criteria, 9 of which were retained. The reference lists of these articles were examined and additional studies that appeared to satisfy our inclusion criteria, but were not captured by the initial search, were obtained and assessed. This search

yielded 4 additional eligible studies. In total, 49 articles on sexting and 8 articles on cybersex were included in the final review for a total of 57 articles.

Given previously reported differences in sexting prevalence based on age (Lounsbury, Mitchell, & Finkelhor, 2011), we separated our report on TMSI studies into two groups: those conducted with adolescents, and those conducted with adults. The three studies that included both adult and adolescent participants were grouped based on the mean age of the sample (Ferguson, 2011; Morelli, Bianchi, & Baiocco, 2016a; 2016b). In one study (Strohmaier et al., 2014) adult participants reported on their sexting experiences as adolescents; therefore, it was grouped with adolescent studies. This approach resulted in a total of 29 studies of adolescents and 28 of adults (see Tables 1 and 2 for citations of all articles included).

We reviewed researchers' definitions of sexting and cybersex within the selected studies prior to determining how to report and discuss prevalence rates. Consistent with previous sexting reviews (Döring, 2014; Klettke et al., 2014; Kosenko et al., 2017), both sexting and cybersex were defined in various ways across studies but consistent with our definition of TMSI. For instance, in some studies, sexting/cybersex was defined as the exchange of self-created, sexually explicit pictures and/or videos. In other studies, they were defined to include text messages as well as pictures and videos. Additionally, in some studies researchers differentiated sending and receiving behaviors; whereas in others, researchers assessed exchanging (i.e., both sending and receiving) behaviours. Given these inconsistencies, we sought to clearly describe specific information about reported TMSI behaviors when information was available.

Results

Study Characteristics

Details about the samples (sample size, population, age, sample location), definitions of TMSI, and the prevalence of TMSI for all included studies are presented in Tables 2.1 (adolescents) and 2.2 (adults). Sample sizes ranged from 51–17,016 for studies conducted with adolescents, and from 86–4,470 for studies conducted with adults. The majority (17; 58.6%) of studies conducted with adolescents drew from high school student populations; the majority (19; 67.9%) of studies conducted with adults drew from undergraduate student populations. About half (15; 51.7%) of the studies with adolescents and the majority (19; 67.9%) of studies with adults were conducted with participants solely from the United States. About half (15; 51.7%) of the studies conducted with adolescents focused on TMSI exchanges that occurred solely via mobile phone, and just under half (14; 48.3%) involved sending only sexually explicit photos and/or videos (not text messages). Similarly, half (14; 50.0%) of the studies with adults focused on TMSI exchanges that occurred solely via mobile phone, and a minority (7; 24.1%) involved sending only sexually explicit photos and/or videos (not text messages). In most (52; 91.2%) studies, researchers reported the prevalence of TMSI for the full sample; in 5 (8.8%) studies, researchers reported the prevalence of TMSI separately for women and men.

Prevalence of TMSI

TMSI in Adolescents. Of the 29 studies that focused on adolescent TMSI experiences, 28 were about sexting and 1 was about cybersex. Fifteen studies included a measure of TMSI behavior that occurred specifically via mobile phone and 9 of these reported on sending and/or receiving separately (but not exchanging). The other fourteen studies included TMSI behaviors that occurred on mobile phone and/or Internet platforms and 10 of these reported on sending and/or receiving separately (not exchanging). Between 0.9 and 30.7% of adolescents reported sending self-created sexually explicit photos/videos only by mobile phone; between 16.6 and

48.9% reported receiving these types of photos/videos by mobile phone only. Only one study measured the prevalence of exchanging photos/videos by mobile phone only (18.0%). In comparison, between 4.6 and 54.9% of adolescents reported sending photos/videos/texts by mobile phone only and 14.0 to 48.0% reported receiving photos/videos/texts only by mobile phone. There were no studies that reported on only the exchange (i.e. send and receive together) of photos/videos/texts by mobile phone only.

When the Internet was included (i.e., the measurement of TMSI included content sent via mobile and/or Internet-enabled devices), the prevalence of adolescents TMSI behaviours generally increased. The prevalence of adolescents sending photos/videos ranged from 2.5 to 36.4%. In only one study, adolescents reported on receiving photos/videos (7.1%); here, the reported prevalence was lower compared to studies that did not include the Internet in operationalizing TMSI. There were no studies that reported on only the exchange of photos/videos by mobile phone and/or Internet. With the inclusion of text messages, between 24.8 and 57.1% of adolescents reported sending sexually explicit content via mobile or Internet; 28.7 to 77.2% reported receiving such content; and 17.0–33.0% reported exchanging such content.

TMSI in Adults. Of the 28 studies that focused on adult TMSI experiences, 21 (75.0%) were about sexting and 7 (25.0%) were about cybersex. Fourteen studies included a measure of TMSI behavior that occurred specifically via mobile phone and 8 of these reported on sending and/or receiving separately (not exchanging). Six other studies included TMSI behaviors that occurred on mobile phone and/or Internet platforms and 6 of these reported on sending and/or receiving separately (not exchanging). Eight studies included TMSI behaviours that occurred

specifically via Internet platforms; 7 of these reported on exchanging content (i.e., did not differentiate between sending and receiving messages).

Between 34.5 and 40.8% of adults reported sending self-created sexually explicit photos/videos only by mobile phone; between 20.5 and 61.0% reported receiving these types of photos/videos by mobile phone only. In comparison, between 29.0 and 89.1% of adults reported sending photos/videos/texts by mobile phone only. There were no studies that reported on the prevalence of receiving photos/videos/texts by mobile phone only, but 60.8 to 65.4% reported exchanging such content by mobile phone.

When the Internet was included (i.e., the measurement of TMSI included content sent via mobile and/or Internet-enabled devices), the prevalence of adult's TMSI behaviours generally increased. The prevalence of adults sending photos/videos ranged from 46.6 and 60.0%. Only one study reported on the prevalence of receiving photos or videos, finding that 64.2% of people reported receiving such content. With the inclusion of text messages, between 54.0 and 78.0% reported sending sexually explicit content via mobile phone or Internet, and 63.1 to 80.3% reported receiving text content. In only one study, adults reported on the exchange of photos/videos/texts by mobile phone and/or Internet (80.9%).

Overall, between 13.0 and 69.4% of adults reported exchanging self-created sexually explicit photos/videos/messages only via the Internet. Specifically, this prevalence ranged from 13.0 to 34.6% for women and from 25.0 to 69.4% for men. In one study (Drouin & Miller, 2016), the researchers reported the prevalence of exchanging self-created photo or video (not text) content via only the Internet; here, reported prevalence of exchanging such content was 21.0% for women and 26.0% for men.

Relationship Context of TMSI

A summary of the findings from studies that reported information about the relationship context for people's TMSI experiences is presented in Table 2.3. In six studies, the researchers compared the prevalence of TMSI between those who were in a relationship and those who were single. These studies all focused on sexting. Five were conducted with adult populations and one with adolescents. In all of these studies, people who reported being in a romantic relationship reported a higher prevalence of TMSI experience than those who were single. However, none of the above studies appeared to specify whether participant's relationship partners were also their partners for TMSI engagement; as such, it is not clear whether or not the participants in relationships actually engaged in sexting with their primary romantic/sexual partners.

There were eleven studies in which the prevalence of TMSI within types of partner contexts was reported: 9 sexting studies and 2 cybersex studies. Three focused on adolescents and eight focused on adults. In nine of these studies, the researchers found that more people reported TMSI with primary romantic and/or sexual partners compared to other types of partners (e.g., friends, casual hook-ups, strangers). In two studies, the researchers found that there were no differences in reported prevalence of TMSI across partner contexts. These studies were conducted with specific samples: people who were married or in a relationship (Parker et al., 2013), and heterosexual men (Davis et al., 2016).

In three studies, the researchers reported on the extent to which having engaged in TMSI was related to, or predicted, relationship satisfaction. All of these studies focused on sexting, and all were conducted with adults. Only one of these studies reported TMSI prevalence for different partner contexts (Parker et al., 2013; reported above). One study (Parker et al., 2013) conducted with people who were married or in a dating relationship found that people who had engaged in sexting reported higher relationship satisfaction. The other two studies found that people with

insecure attachments (McDaniel & Drouin, 2015) and heterosexual men (Currin et al., 2016) who had engaged in sexting reported higher relationship satisfaction. There were no studies in which other types of relationship outcomes were examined (e.g., intimacy, commitment).

Discussion

The purpose of this systematic review was to collect and synthesize existing empirical literature on TMSI behaviors and factors associated with the relationship contexts of people's TMSI experiences. We identified 49 articles that examined sexting, 8 that examined cybersex, and none that focused on phone sex. An almost equal number of these 57 studies focused on the TMSI experiences of people under 18 years of age (29; 50.9%) and people over 18 years of age (28; 49.1%). Across these studies, we found a wide range of prevalence of TMSI experiences. It is likely that this range was due, at least in part, to the wide variety of definitions and sampling techniques used to study TMSI. The variety in definitions did not fall into distinct categories of cybersex and sexting; rather the definitions for these two concepts overlapped. This overlap supports TMSI as a useful overarching classification for interactive sexual behavior that occurs via technological platforms (including, but not necessarily limited to, mobile phones and Internet-enabled devices). Additionally, we found that few researchers examined or reported the relationship context of people's TMSI experiences; and, only 3 studies examined relational outcomes associated with TMSI. Overall, our findings point to gaps in the scholarly literature on TMSI, particularly with respect to the relationship context of people's TMSI activities.

TMSI Prevalence Ranges

Consistent with previous reviews of the sexting literature (Döring, 2014; Klettke et al., 2014; Kosenko et al., 2017), we found that reported prevalence of TMSI was higher in adult populations relative to adolescent populations. This is unsurprising, given prior research

demonstrating that adults generally report a higher prevalence of sexual activity relative to adolescents (Caspersen, Pereira, & Curran, 2000). Additionally, as people grow older, they likely encounter more opportunities to engage in TMSI. For example, in using digital technologies, adolescents are more likely to be monitored by their parents or guardians, which may inhibit their ability to engage in TMSI activities. As people grow older, they may gain more freedom in their ability to engage with digital technology and therefore with TMSI.

We also found that more people (both adolescents and adults) reported receiving self-created sexually explicit content than sending such content. This might be due to a variety of factors, such as a minority of people sending sexually explicit messages to a broader range of people, or people being less likely to reciprocate messages they receive, or that people are underreporting their TMSI activities (Klettke & Halford, 2011).

Finally, we found some evidence that more people report engaging in TMSI when the definition includes both mobile phone and Internet-enabled modalities, and the exchange of both photos/videos and/or text messaging. This could be because people are more likely to report engaging in a behavior if there are more opportunities (in terms of technological modalities) to do so. There is also greater legal risk for adolescents' engagement in TMSI. Being in possession of sexually explicit photos or videos of someone under 18 years old is a punishable offense in most Western nations (Mitchell et al., 2012). This may dissuade adolescents from engaging in – or reporting their engagement in – TMSI. Additionally, people may also be more likely to engage in text-based forms of TMSI because of the greater degree of anonymity that it may afford relative to sharing pictures or videos of oneself (Brown, Maycock, & Burns, 2005). Future research should examine whether sending and receiving more text-based than image-based TMSI

content may be a factor in understanding the role of TMSI behaviors in people's offline sexual lives and/or in developing problematic patterns of TMSI behavior.

Conceptual Validity of TMSI

The results of our systematic review confirm our proposal that the terms sexting and cybersex refer to similar behaviours. Across studies, sexting is generally operationalized as sending and/or receiving sexually explicit, self-created text and/or image content via mobile phone. Similarly, cybersex is typically operationalized as the exchange of sexually explicit, self-created text and/or image content via Internet-based platforms. These conceptual definitions overlap on the key behavioural components of technology-mediated exchange of self-created, sexually explicit content. Although they share many conceptual similarities, the literature on and empirical study of people's sexting and cybersex behaviors have largely existed and occurred separately, with little cross-citation. However, we found that the reported prevalence rates of sexting and cybersex are similar when measured using comparable definitions. In other words, the behavior itself appears to be the same, whether it is conducted via mobile phone or Internet-based platforms and thus the number of people who report the behaviour is also the same. These findings suggest that using TMSI – a single, unified term – is relevant, valid, and warranted for research and theoretical/conceptual discussions of sexting, cybersex, and other interactive interpersonal sexual activities that occur via technology. Using one term allows researchers to discuss a behavior (that is, exchanging self-created sexually explicit content via technology), regardless of the modality that people use to engage in it. Technology is changing quickly, and is already out-pacing scholarly research. For instance, in conducting this literature review, the first empirical study on cybersex that we identified was published in 2005; yet, the World Wide Web has been around since 1991. Additionally, there are already complications to

the present definitions of sexting and cybersex due to the advent of smartphones. Smartphones provide users with mobile, but Internet-based, applications through which people can (and do) exchange self-created sexually explicit content (Walrave et al., 2015). It is unclear whether these activities would fit under the definition of sexting or cybersex. Our definition of TMSI is general enough that it can apply not only to currently available tech, but also to future technologies that people will use to interact with other people sexually. Moreover, focusing terminology and scholarly discussions on the behavior itself (rather than the technological platform) allows for researchers to improve comparisons of TMSI behaviors across studies, people's development, and over time.

Partner Context of TMSI

There were a few studies that included the partner context of people's TMSI experiences. The majority of these found that people engage in TMSI more with primary romantic partners than with casual sex partners and/or strangers. These differences in prevalence underscore the importance of considering the partner context of people's TMSI behaviors. It is unlikely that TMSI has the same implications when it occurs between relationship partners as it does when it occurs outside of a relationship. For instance, people may trust a primary partner more than they do a non-partner. Therefore, people may be more likely to share explicit images within a committed relationship context.

Additionally, people may have different motivations for engaging in TMSI with a primary partner versus with a non-partner. TMSI might act as a gateway to other or different sexual activity, or it may simply be a part of a person or couple's sexual repertoire. Contextualizing TMSI activity within particular relationship contexts has implications in relational, communicative, and sexual domains of the behavior, and brings an important

interpersonal lens to the forefront. For instance, studies that associate TMSI with the primary committed relationship context have some, but limited, utility. It is useful to know the prevalence of TMSI behavior here, but research on the possible links between TMSI and other aspects of established relationships, such as relational stability and/or satisfaction, is of more value. We identified three studies that examined links between TMSI and relationship satisfaction, but the mixed findings across them highlight that additional research in this vein is needed.

Limitations

This systematic literature review was not without limitations. First, our literature search terms were limited to ‘phone sex’, ‘sexting’, and ‘cybersex’. Therefore, our database search may have missed relevant studies that did not use these terms to refer to TMSI behaviors. For instance, it is possible that studies on ‘online sexual activity’ may have embedded information about people’s cybersex activities. Our use of these terms did yield a large number and wide variety of studies on TMSI and is likely a good representation of the literature; however, future review studies could use multiple other terms to ensure all literature is captured. Second, because we are English speakers, we limited our review to studies that were published in English; this means we may have missed out on capturing data from non-English speaking countries. Indeed, the majority of studies included in our review were conducted with participants from the United States – it is possible we would have seen less of a skew if we had been able to include non-English studies. Third, we only included published, peer-reviewed, empirical studies in our review. It is likely more data could have been generated had we included grey literature (such as unpublished dissertations or informal reports). However, it is difficult to reliably determine whether or not the data presented these types of studies overlaps with peer-reviewed works; therefore, we invoked this criteria in order to avoid the possibility of inflating our data by

reporting on the same findings twice. Finally, the purpose of this systematic review was to descriptively summarize and compare the empirical research on people's use of technology for their interpersonal sexual interactions. As such, we did not provide a quantitative analysis (i.e., a meta-analysis) of people's TMSI activities or the partner context of them; this would be a valuable area of future work.

Implications

There are several implications stemming from this review that may be especially pertinent to sexual and relationship clinicians and educators. We found that researchers reported a wide range of TMSI prevalence for both adolescent and adult populations. It is clear that many – although not all – people do engage in TMSI. Therefore, it is important for sexual health educators to include a discussion of these behaviors in their professional practices. Adolescents should be aware of the legal risks associated with possession of sexually explicit images of others who are under 18 years old; adults should be aware of the personal risks of sharing sexually explicit images of themselves with partners. Additionally, we found that people engage in TMSI more with a primary committed partner than with non-partners and/or strangers, and that TMSI may be linked to relationship satisfaction. These findings are of particular relevance for clinicians working with couples, as it may highlight an opportunity for relationship interventions, particularly relating to sexuality. For instance, Parker et al. (2013) suggested the potential utility of sexting as a tool for relationship intervention. Others have pointed to the utility on online sexual activity more broadly, as part of a hierarchy of sexual exploration or experiences for people who have difficulty engaging in physical sexual activity (e.g., those with sexual disabilities; Fisher, Rosen, Eardley, Sand, & Goldstein, 2005). Because of the disinhibiting characteristics of electronic communication (e.g., asynchronic communication;

Suler, 2004), some people might find that engaging in TMSI is a more comfortable way to express their feelings and sexual desires than in-person communication (Klettke et al., 2011). Additionally, TMSI can be used by people as a tool for romantic or sexual flirtation, or for developing desire and/or arousal when partners are not physically together (Albury and Crawford 2012; Ringrose et al., 2013). TMSI can also be used to express or explore sexual fantasies with less fear of negative reactions from their partners, or fantasies that people may not wish to actualize in a real-life setting.

This review also suggests that, despite the growing amount of scholarly literature on TMSI, there are still many opportunities for further research within this domain. First, most studies included in this review did not explore – or even determine – the partner context of people’s TMSI experiences. Additional research is needed to more concretely establish and compare the prevalence of TMSI across partner contexts. Furthermore, many of the studies that did include measures of partner context for TMSI were conducted with heterosexual samples. Further research is necessary to better understand the relationship context and prevalence of non-heterosexual and non-cisgender populations. Second, the literature connecting TMSI to potential relational outcomes (such as relationship and sexual satisfaction) is still sparse and fairly inconclusive. More research is necessary to determine the association (if any) between TMSI and relational outcomes. Third, available information about the relationship context of TMSI are predominantly based on U.S. samples. Comparatively less is clear about the TMSI experiences of people living outside of the U.S. Future studies should aim to examine the relationship context of people’s TMSI experiences across countries, particularly because the legal regulations and cultural norms regarding TMSI differ between nations.

Conclusion

Overall, our review presents an overview of the empirical research on TMSI behaviors by bringing together studies on both sexting and cybersex. We provided evidence that the terms sexting and cybersex refer to conceptually similar behaviours, and should be considered within the unified classification of TMSI. This will improve synthesis of current and future research on these behaviors, without restricting researchers' understanding of behaviors to specific digital technology platforms. We also highlighted the reported prevalence of TMSI across studies, as well as findings pertaining to the relationship contexts of people's TMSI experiences. Given the dearth of information on the relationship context of TMSI, additional research is needed on contextualizing people's TMSI experiences within the framework of their romantic and sexual relationships. This will allow for greater precision in describing people's TMSI activities and, ultimately, greater understanding of how sexual interactions using digital technologies are and can be used to facilitate and enhance people's relationships.

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Tables

Table 2.1 Details About the Samples, Prevalence of TMSI, and Definitions of TMSI for Studies Conducted with Adolescents, Ordered Alphabetically by Author

Author	Type	Definition	Population	N (% Women)	Location	Age Range, M (SD)	Prevalence Rate
Baumgartner, Sumter, Peter, Valkenburg and Livingstone (2014)	Sexting	Sending/posting a sexual message (of any kind) on the Internet in the past 12 months	Internet sample	14946 (50.3%)	20 European countries	11 - 16, 13.49 (1.39)	1 - 12.9% (ranges across countries)
Beyens and Eggermont (2014)	Cybersex	Engaging in a live sexually explicit text- or video-based exchange with another person(s) via the Internet	High school students	594 (60.1%)	Belgium	15 - 18, 16.92	n/a
Choi, Van Ouystel, and Temple (2016)	Sexting	Frequency of sending/receiving nude photos via the Internet	Female adolescents	450 (100%)	United States	n/a, 19.02 (0.74)	Sent: 36.4%
Dake, Price, Maziarz, and Ward (2012)	Sexting	Sending/receiving sexually explicit messages and/or images of one's self or others via a cell phone, e-mail,	Middle & high school students	1279 (48%)	United States	12 - 18, n/a	Sent/received: 17%

		Internet, or social networking site					
Fleschler Peskin, Markham, Addy, Shegog, Theil, and Tortolero (2013)	Sexting	Sending/receiving sexually explicit pictures or videos and/or text-only messages	Black & Hispanic high school students	1034 (62.6%)	United States	14 - 19, 16.34 (.68)	Sent text: 24.8% Sent photo: 21.2% Received text: 31.5% Received photo: 31.0%
Houck, Barker, Rizzo, Hancock, Norton, and Brown (2014)	Sexting	Sending a personal sexual picture and/or sexual message via text message or email in the past 6 months	Seventh grade students	410 (47%)	United States	12 - 14, n/a	Total: 22% Texts: 17% Texts & photos: 5%
Kopecky (2012)	Sexting	Sending a “sexy” nude or seminude photograph to someone else	Primary & secondary school students	9353 (47.41%)	Czech Republic	11 - 17, n/a	Sent: 9.7%
Lee, Moak, and Walker (2016)	Sexting	Sending a sexually explicit picture/video of oneself or another via cell phone	Middle & high school students	1612 (64.3%)	South Korea	13 - 19, 16 (n/a)	Sent photo: 0.9%
Lippman and Campbell (2014)	Sexting	Sending/receiving a picture or video involving nudity via cell phone	Community sample	51 (49%)	United States	12 - 18, 14.55 (1.83)	Sent photo: 21% Received: 48%
Mitchell, Finkelhor,	Sexting	Sending/receiving a nude or nearly nude photo	Internet sample	1560 (50.3%)	United States	10 - 17, n/a	Sent: 2.5% (1.3% sexually explicit)

Jones, and Wolak (2012)							Received: 7.1% (5.9% sexually explicit)
Morelli, Bianchi, and Baiocco (2016a)	Sexting	Sending/receiving provocative text messages and pictures	Internet sample	610 (63.1%)	Italy	13 - 30, 16.8 (1.63)	Sent: 54.8% Received: 77.2%
Patrick, Heywood, Pitts, and Mitchell (2015)	Sexting	Sending/receiving a sexually explicit written text message and/or a nude or semi-nude photo/video, and/or using a social media site for sexual reasons	Secondary school students	2114 (61.6%)	Australia	Under 18, n/a	Sent text: 43% Sext photo: 26% Received text: 54% Received photo: 42%
Rice, Rhoades, Winetrobe, Sanchez, Montoya, Plant, and Kordic (2012)	Sexting	Sending a sexually explicit message or photo of oneself via cell phone	High school students	1839 (48.1%)	United States	14 - 17, n/a	Sent: 15.44%
Rice, Gibbs, Winetrobe, Rhoades, Plant, Montoya, & Kordic (2014)	Sexting	Sending/receiving a sexually suggestive text and/or photo content	High school students	1173 (48.5%)	United States	10 - 15, 12.73	Sent: 4.6% Received: 20.1%
Ricketts, Maloney,	Sexting	Sending a nude/semi-nude picture of oneself	Internet sample	1617 (51%)	United States	Under 18, 15.77	Sent: 13%

Marcum, and Higgins (2015)		via cell phone within the past year					
Sevcikova (2016)	Sexting	Sending a sexual message of any kind on the Internet in the past 12 months	Internet sample	17016 (50.3%)	Europe	11 - 16, 13.55 (1.68)	Total: 3%
Strassberg, McKinnon, Sustaita, and Rullo (2013)	Sexting	Sending/receiving sexually explicit pictures via cell phone	High school students	606 (45.9%)	United States	n/a	Sent: 17.8% Received: 41%
Strohmaier, Murphy, and DeMatteo (2014)	Sexting	Exchanging sexually explicit text messages and/or photographs	Undergraduate students ^a	175 (61%)	United States	18 - 22, 19.34 (1.35)	Total sent: 54% Sent photos: 28%
Temple, and Paul, Berg (2012); also reported in Temple and Choi (2014)	Sexting	Sending naked pictures through text or email	High school students	948 (55.9%)	United States	14 - 19, 15.8 (n/a)	Sent: 27.6%
Vanden Abeele, Roe, & Eggermont (2012)	Sexting	Exchanging sexually explicit content	High school students	540 (57%)	Belgium	n/a 16.07 (1.23)	Sent/received: 33%
Vanden Abeele, Campbell,	Sexting	Sending a naked or semi-naked picture/video of oneself via mobile phone	Internet sample	1943 (49.4%)	Belgium	11 - 20, 15.28 (1.89)	Sent: 6.3%

Eggermont,
and Roe
(2014)

Van Ouystel, Van Gool, Ponnet, and Walrave (2014)	Sexting	Sending a sexually suggestive picture (naked or semi-naked) of oneself using the Internet and/or a mobile phone	Secondary school students	1028 (58.0%)	Belgium	15 - 18, 16.68 (.67)	Sent: 11.1%
Van Ouystel, Ponnet, Walgrave (2014)	Sexting	Sending/receiving a sexually explicit message and/or picture/video about sex in the past 6 months	Secondary school students	329 (60.2%)	Belgium	15 - 18, 16.71 (.74)	Sent text: 57.1% Sent photo: 14.9% Received photo: 28.7%
Walrave, Ponnet, Van Oustel, Van Goole, Heirman, and Verbeek (2015)	Sexting	Engaging in sexting over the past 2 months	High school students	217 (61.8%)	Belgium	15 - 19, 16.72 (1.04)	Total: 18%
West, Lister, Hall, Crookston, Snow, Zvietcovich, and West (2014)	Sexting	Frequency of sending/receiving sexual text messages	High school students	949 (65.7%)	Peru	12 - 18, n/a	Total: 20%

Wolfe, Marcum, Higgins, and Ricketts (2016)	Sexting	Receiving a sexually suggestive nude or semi-nude photo/video of someone else via cell phone	High school students	625 (51.5%)	United States	12 - 17, n/a	Received: 16.6%
Wood, Barter, Stanley, Aghtaie, and Larkins (2015)	Sexting	Sending/receiving sexual messages/pictures either during a relationship or after the relationship had ended	Internet sample	4564 (n/a)	Europe	14 - 17, 14.73 - 15.29	Sent: 10 - 38% Received: 14 - 48%
Woodward, Evans, and Brooks (2017)	Sexting	Sending/receiving nude photos via cell phone	High school students	548 (58.21%)	United States	n/a, 16.0 (n/a)	Sent: 30.71% Received: 48.9%
Ybarra and Mitchell (2014)	Sexting	Sending sexual pictures of oneself (in-person, online, via cellphones) in the past 12 months	High school students	3715 (n/a)	United States	13 - 18, n/a	Sent: 7%

**Table 2.2 Details About the Samples, Prevalence of TMSI, and Definitions of TMSI for Studies Conducted with Adults,
Ordered Alphabetically by Author**

Author (Year)	TMSI Type	TMSI Measure/Definition	Population	N (% Women)	Sample Location	Age Range, M (SD)	Prevalence Rate
Benotsch, Snipes, Martin, and Bull (2013)	Sexting	Sending and/or receiving sexually explicit or suggestive photos via text message	Undergraduate students	763 (66%)	United States	18 - 25, 28.9 (1.35)	Sent and/or received: 44%
Bauermeister, Yeagley, Meanley, and Pingel (2014)	Sexting	Sending and/or receiving sexually suggestive nudes or nearly nude photos or videos of either party via cell phone	Gay men who have sex with men	1502 (0%)	United States	18 - 24, 20.8 (1.93)	Total sent and/or received: 87.5% Sent only: 1.3% Received only: 10.5%
Crimmins, and Seigfried- Spellar (2004)	Sexting	Sending seminude or nude photos or videos	Undergraduate students	88 (61%)	United States	19+, n/a	Total: 61% Sent seminude pic: 59% Sent nude pic: 38%
Currin, Jayne, Hammer, Brim and Hubach (2016)	Sexting	The exchange of any sexually suggestive or explicit text message, partially or fully nude photo or videos	Internet sample	1171 (48.3%)	United States	18-73, 32.24 (12.11)	Sent & received: women (64.9%), men (65.4%) Sent only: women (1.2%), men (0.9%) Received only: women (10.8%), men (8.7%)
Daneback, Cooper, and	Cybersex	Engaging in simulated sex talk with another person online	Internet sample	1485 (50.2%)	Sweden	18 – 65, n/a	Total: women (34%), men (30%)

Mansson
(2005)

Davis, Powell, Gordon, and Kershaw (2016)	Sexting	Exchanging sexually suggestive messages/photos/videos using any form of social technology with different types of partners	Heterosexual undergraduate men	119 (0%)	United States	18 - 25, 20.0 (1.97)	Sent: 54% Received: 70%
Delevi and Weisskirch (2013)	Sexting	Frequency of sending sexually explicit photos, videos, and/or text messages via cell phone	Undergraduate students	304 (58.6%)	United States	18 - 30, 22.64 (2.77)	Total: 89.1% Sent text: 75.7% Sent pic: 28.9%
Dijkstra and Barelds (2011)	Cybersex	Frequency of engaging in erotic chat with another person via the Internet	Heterosexual readers of a Dutch women's magazine	4470 (100%)	Netherlands	18 - 82, 42.2 (10.37)	Total: 8% (40% of these used a webcam)
Dir, Coskunpinar, Steiner, and Cyders (2013)	Sexting	Frequency of sending and receiving explicit texts and pictures via mobile phone or social networking sites	Undergraduate students	278 (50%)	United States	18 - 43, 21 (4.56)	Sent text: 67.4% Sent photo: 46.6% Received text: 80.3% Received photo: 64.2%
Doring, Daneback, Shaughnessy, Grov, and Byers (2015)	Cybersex	Exchanging sexually explicit text messages with another person via the Internet	Undergraduate students	2720 (53.4%)	Canada, United States, Sweden, Germany	18+, 24.65 (5.99)	Total: 30.8%
Drouin and Miller (2016)	Sexting	Sending sexually-explicit picture messages to people met only online	Random community sample	272 (4816%)	United States	18 - 69, 32.22 (8.32)	Total: women (21%), men (26%)

Drouin and Landgraff (2012)	Sexting	Sending sexually explicit pictures, videos, and/or text messages to relationship partners	Heterosexual undergraduate students in a committed relationship	744 (68.7%)	United States	18 - 36, 20.5 (3.67)	Sent text: 67% Sent photo: 54%
Drouin, Ross, and Tobin (2015)	Sexting	Sending sexually explicit text message and/or photo	Undergraduate students	480 (66.67%)	United States	n/a, 20.6 (4.73)	Sent photo: 47% Sent text: 68%
Drouin, Vogel, Surbey, and Stills (2013)	Sexting	Frequency of sending sex texts, pictures or videos via mobile phone and/or computer-mediated communication to different types of partners	Undergraduate students	253 (58.5%)	United States	18 - 26, 19.47 (1.54)	Sent text: primary committed partners (78%), casual partners (63%), cheating partners (55%) Sent photo: primary committed partners (49%), casual partners (37%), cheating partners (45%)
Ferguson (2011)	Sexting	Frequency of sending and/or receiving erotic photographs to/from another person	Undergraduate Hispanic women	207 (100%)	United States	16 - 25, 20.7 (2.22)	Sent: 20.5% Received: 34.5%
Gordon-Messer, Bauermeister, Grodzinski, and Zimmerman (2012)	Sexting	Sending and/or receiving sexually suggestive nude or nearly nude photos/videos via cell phone	Undergraduate students	760 (50.4%)	United States	18 - 24, 20 (1.77)	Sent: 30.1% Received: 40.8%

Henderson (2011)	Sexting	Frequency of sending nude or semi-nude pictures and messages using a cell phone, e-mail, social networking sites, or blogs	Undergraduate students	468 (50.2%)	United States	18 - 30, 20.59 (2.86)	Sent photo: 60% Sent text: 69%
Hudson, Fetro, and Ogletree (2014)	Sexting	Sending and/or posting sexy pictures, videos, and/or messages via mobile phone or computer-mediated communication	Undergraduate students	697 (50.2%)	United States	18+, n/a	Total: 80.9%
McDaniel and Drouin (2015)	Sexting	Frequency of sending sexy messages and/or sending nude/semi-nude photos via mobile device	Married couples	355 (50.7%)	United States	20 – 52, n/a	Sent photo: 20% Sent text: 29%
Morelli, Bianchi, and Baiocco (2016b)	Sexting	Sending or receiving sexually suggestive or provocative messages/photos/videos via mobile phone and/or Internet social networking sites	Internet sample	1334 (68%)	Italy	13 - 30, 20.9 (4.2)	Sent: 77.96% Received: 63.12%
Parker, Blackburn, and Perry (2013)	Sexting	Sending and/or receiving sexually explicit photos, videos, and/or messages to different types of partners	Heterosexual people in a relationship	86 (79.1%)	United States	18 - 53, 27.9 (7.4)	n/a
Perkins, Becker, Tehee, and Mackelprang (2014)	Sexting	Sending and/or receiving sexual pictures or videos via cell phone	Undergraduate students	287 (66.9%)	United States	18 - 24, 18.97 (1.085)	Sent: 25% Received: 32%

Samimi and Alderson (2014)	Sexting	Frequency of sending sexually explicit photos, videos, and/or text messages via cell phone	Undergraduate students	525 (49.9%)	Canada	18 - 50, n/a	Total: 60.8%
Shaughnessy and Byers (2013)	Cybersex	Exchanging sexually explicit messages with another person via the Internet	Heterosexual undergraduate students who have engaged in cybersex	376 (71.3%)	Canada, United States, Europe, Australia	18 - 72, 28.2 (9.0)	n/a
Shaughnessy and Byers (2014)	Cybersex	Exchanging sexually explicit messages with another person via the Internet	Heterosexual undergraduate students who have engaged in cybersex	369 (71.5%)	Canada, United States, Europe, Australia	18 - 72, 28.1 (9.0)	Total: primary committed partner (82.4%), known non-partner (45.8%), stranger (37.1%), all three (15.4%)
Shaughnessy, Byers, and Walsh (2011)	Cybersex	Engagement in sexual relationships and fantasy sharing with another person online	Heterosexual undergraduate students	217 (50.2%)	Canada	18 - 28, 19.5 (2.0)	Total: women (13%), men (25%)
Weisskirch and Delevi (2011)	Sexting	Frequency of sending sexually explicit photos, videos, and/or text messages via cell phone	Undergraduate students	128 (82.8%)	United States	18 - 30, 22.77 (2.8)	n/a
Zheng and Zheng (2014)	Cybersex	Engaging in cybersex	Heterosexual Internet users	460 (44.6%)	China	19 - 58, 30.5 (6.0)	Total: women (34.6%), men (69.4%)

Descriptive notes: TMSI measure/definition extracted based on the information provided in article text. All available information regarding age range, mean and SD of sample are reported where available. "n/a" indicates information was not reported in article text.

Table 2.3 Details of Studies Reporting on the Relationship Context of People's TMSI Experiences.

Author (Year)	Population	Summary of findings
Prevalence of TMSI and relationship status		
Delevi & Weisskirch (2013)	Adults	Higher prevalence of sexting among people in a relationship relative to people who are single
Dir et al. (2013)	Adults	Higher prevalence of sexting among people in a relationship relative to people who are single
Hudson et al. (2014)	Adults	Higher prevalence of sexting among people in a relationship relative to people who are single
Samimi & Alderson (2014)	Adults	Higher prevalence of sexting among people in a relationship relative to people who are single
Vanden-abeele et al. (2012)	Adolescents	Higher prevalence of sexting among women in a relationship relative to people who are single
Weisskirch & Delevi (2011)	Adults	Higher prevalence of sexting among people in a relationship relative to people who are single
Prevalence of TMSI and partner context		
Beyens & Eggermont (2014)	Adolescents	Higher prevalence of cybersex with dating partners
Crimmins & Seigfried-Spellar (2014)	Adults	Higher prevalence of sexting with committed relationship partners

Davis et al. (2016)	Adults (heterosexual men)	Higher prevalence of sexting with casual sex partners
Drouin et al. (2013)	Adults	Higher prevalence of sexting with committed relationship partners
Henderson (2011)	Adults	Higher prevalence of sexting with committed relationship partners
Lippman & Campbell (2014)	Adolescents	Higher prevalence of sexting with committed relationship partners
Parker et al. (2013)	Adults (in a relationship)	No differences in sexting prevalence for dating versus marriage partners
Perkins et al. (2014)	Adults	Higher prevalence of sexting with committed relationship partners
Shaughnessy & Byers (2014)	Adults	Higher prevalence of cybersex with committed relationship partners
Strohmaier et al. (2014)	Adults	Higher prevalence of sexting with committed relationship partners

TMSI and relationship/sexual satisfaction

Currin et al. (2016)	Adults	Heterosexual men who had engaged in sexting reported higher relationship satisfaction
McDaniel & Drouin (2015)	Adults	People with insecure attachment styles who had engaged in sexting reported higher relationship satisfaction
Parker et al. (2013)	Adults (in a relationship)	People who had engaged in sexting reported higher relationship satisfaction

Chapter 3 (Transition Text 1)

The results of the systematic literature review reported in Article 1 (Chapter 2) suggest that sexting and cybersex are both captured by the behavioural domain of “technology-mediated sexual interaction” (TMSI). My definition of TMSI extends beyond sexting and cybersex and conceptually includes other activities that involve the use of technology to exchange self-created and sexually explicit content with at least one other person. However, in Article 1 I did not identify existing empirical research examining other activities that fit within TMSI (e.g., phone sex, haptic sex, virtual sex, avatar sex) – perhaps because, compared to sexting and cybersex, these activities have not had a significant presence in popular media/culture. As technology continues to advance, it is likely that new, yet-to-be-conceived forms of interpersonal technology-mediated sexual activities will also be captured by the TMSI behavioural domain. Therefore, knowledge generated about TMSI as a whole will prove valuable in understanding how novel technologies may impact people’s lives. In Article 1, I also found that researchers examining various subsets of TMSI have yet to account for the relationship context in which these activities occur. This is problematic because people’s TMSI experiences – including their motivations for and outcomes of TMSI – likely differ depending on the relationship context in which they use TMSI. Across the existing TMSI literature, researchers have reported a wide range of TMSI prevalence. This wide prevalence range seems to partially result from inconsistent and poor methodological practices across studies. Therefore, the goal of Article 2 (Chapter 4) was to identify and examine common problems in sexting research, as well as to identify solutions to those problems. I chose to focus on sexting research because, as I found in Article 1, sexting appears to be the subtype of TMSI that has garnered the most research attention.

Chapter 4 (Article 2)

Four Problems in Sexting Research and Their Solutions

This article was published in *Sexes*, in 2021:

Courtice, E. L. and Shaughnessy, K. (2021). Four problems in sexting research and their solutions. *Sexes*, 2(4), 415–432. <https://doi.org/10.3390/sexes2040033>

Author's Note

This research was completed with the support of funding awarded to Erin L. Courtice, from the Ontario Graduate Scholarship (2017 – 2018) and the Social Sciences and Humanities Research Council (2018 – 2020).

Abstract

Despite over 10 years of research, we still know very little about people's sexting behaviours and experiences. Our limited and, at times, conflicting knowledge about sexting is due to researchers' use of inconsistent conceptual definitions of sexting, dubious measurement practices, and atheoretical research designs. In this article, we provide an overview of the history of sexting research and describe how researchers have contributed to the 'moral panic' narrative that continues to surround popular media discourse about sexting. We identify four key problems that still plague sexting research today: (1) imprudent focus on the medium, (2) inconsistent conceptual definitions, (3) poor measurement practices, and (4) lacking theoretical frameworks. We describe and expand on solutions to address each of these problems. In particular, we focus on the need to shift empirical attention away from sexting, and towards the behavioural domain of technology-mediated sexual interaction. We believe that the implementation of these solutions will lead to valid and sustainable knowledge development on technology-mediated sexual interactions, including sexting.

Keywords: sexting, cybersex, technology-mediated sexual interaction, computer-mediated communication, research methods, measurement.

Four Problems in Sexting Research and Their Solutions

Over the past decade, many researchers have turned their attention to people's use of communication technology for the purpose of sexual interactions. Both popular media and scholarly discourses have focused on sexting, originally defined as the use of mobile phones to create and exchange sexually explicit content (e.g., via Short Messaging Service or Multimedia Messaging Service; Weisskirch & Delevi, 2011). Despite over ten years of empirical studies examining sexting among adolescents and adults, little is known about the predictors, correlates, outcomes, or even the prevalence of sexting. This limited, at times conflicting, knowledge is partly due to researchers using inconsistent measurement practices and definitions of sexting. These inconsistencies have made it difficult to synthesize information about sexting across studies, across time, and across technologies (Barrense-Dias et al., 2017; Cooper et al., 2016; Courtice & Shaughnessy, 2017; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018, Van Ouytsel et al., 2018). Specifically, researchers have and continue to examine sexting in a way that focuses on particular formats, devices, and interaction dynamics, to the detriment of understanding the underlying behaviour that persists as technologies change. These conceptual and methodological limitations have created silos in our broader understanding of the essential behaviour that underlies sexting: sexual interactions via technology. It also limits knowledge about behaviourally similar activities that may actually coincide with or be prompted by "sexting" (e.g., phone sex, cybersex). Addressing these limitations is pressing; technology has already become an integral part of people's communication in an evolving digital world. Thus, researchers must adopt new and more appropriate approaches to understanding sexting and other forms of technology-mediated sexual interaction. In this paper, we review four key problems with the research on sexting: (1) imprudent focus on the medium, (2) inconsistent conceptual definitions, (3) poor measurement practices, and (4) lacking theoretical frameworks. We describe

and expand on solutions to address each of these problems. However, these solutions are unlikely to occur in sexting research; therefore, we recommend that researchers stop studying sexting altogether. Instead, we propose that researchers adopt the behavioural domain of technology-mediated sexual interaction to replace and improve upon sexting research (Courtice & Shaughnessy, 2017). We believe that the implementation of these solutions will lead to valid and sustainable knowledge development on technology-mediated sexual interactions, including sexting.

How Did We Get Here?: A Brief History of Sexting Research

People have long used analog technologies as a medium for engaging in sexual behaviour. For example, the invention of the printing press made the written word more accessible. Specifically, widespread access to the printed word led more people to learn to read and write (McLuhan, 1962). Subsequently, more people exchanged erotic letters with romantic and/or sexual partners. Similarly, the invention of photography and film development – including self-developing photo technology – allowed people to take intimate photographs of themselves to share with others. The development and widespread adoption of the telephone provided another new opportunity for sexual communication via technology, with the first ‘phone sex’ business beginning operation in the 1970s (Buck, 2017). Indeed, as telephone lines became private and common household technologies, it is likely that people increasingly used them to communicate sexually with others (outside the phone sex business context). However, the exchange of sexual letters, photographs, and sexual conversation via telephone were, and largely remain, relatively taboo activities. Moreover, there remain few empirical studies about these behaviours.

In the mid-1990s, two technological developments ushered in the so-called digital era: the affordability and accessibility of (i) personal computers, and (ii) the World Wide Web. These new developments subsequently presented new technologies to facilitate sexual interactions.

Alongside the upsurge in computer and internet access, online chat rooms – capable of hosting many different users – became popular; as did people's use of chat forums to specifically engage in computer-mediated sexual interactions with (usually) strangers. As online chat continued to grow in popularity, AOL, Yahoo, and MSN all launched their own respective internet chat environments. People quickly adopted these for interpersonal and sexual interactions with strangers, as well as with in-person acquaintances, friends, and romantic partners. This new medium for sexual interactions was initially described by the popular media as 'cybersex'² – a portmanteau of the words 'cybernetics' and 'sex' – referring to sexual activity between two or more people who are connected over a computer network (e.g., the internet). In the late 1990s, researchers began to empirically study cybersex (as well as other online sexual activities), largely describing these activities as 'addictive', 'compulsive', and generally 'problematic' (e.g., Cooper et al., 2000; Delmonico, 2007; Goldberg et al., 2008; Rimington & Gast, 2007; Schneider, 2000; Schwartz & Southern, 2000).

² The invention of this term has been attributed to Howard Rheingold (1991). However, in his description of 'cybersex', Rheingold specifically focuses on the use of teledildonics as a component of cybersex, which is not in line with current understandings of the term. Deborah Levine's definition of cybersex – debuted in her 1997 book, *The Joy of Cybersex* – more closely aligns with current understandings of the behaviour. The first empirically-derived definition of cybersex was proposed by Shaughnessy and colleagues (2011).

Cybersex is arguably a predecessor of sexting, even though the initial technologies looked quite different. As a term, ‘sexting’³ emerged as a combination of the words ‘sex’ and ‘text messaging’ and initially described the exchange of sexually explicit SMS messages exchanged between two (or more) people. Cell phones with SMS (Short Messaging Service) capability grew in accessibility – and therefore popularity – throughout the early 2000s as 3G (and then 4G) networks expanded throughout Western countries. Indeed, the earliest definitions of sexting focused on the exchange of sexually explicit text messages (Vogels, 2004). However, as mobile technology evolved, so did definitions of sexting. In the later 2000s and early 2010s, cell phones with cameras and MMS (Media Messaging Service) capabilities became accessible and popular. These allowed people to take and send their own photos to others via mobile phone. Alongside these capabilities, the definition of sexting evolved to include sexually explicit photos and videos (e.g., National Campaign to Prevent Teen and Unplanned Pregnancy & CosmoGirl.com, 2008). The first smartphones appeared on the mass consumer market in 2006 (the first iPhone in 2007), and quickly became popular worldwide as they became more affordable. Smartphones allowed people a mobile connection to the internet, including to websites, messaging services, email, and social media. This device created the opportunity for people to send messages via traditionally computer-mediated platforms (e.g., email, Facebook Chat), as well as established novel, internet-mediated smartphone applications (e.g., BlackBerry

³ The origins of this term can be traced to a 2004 article written by Josey Vogels for Canadian newspaper *The Globe and Mail*, about sexually explicit text messages exchanged between David Beckham and one of his assistants. The first peer-reviewed definition of sexting was proposed by Weisskirch and Delevi (2011).

Messenger, WhatsApp). Yet again, the definition of sexting evolved to capture these new mobile capabilities: sending sexually explicit content via any platform that could be accessed via mobile phone (Drouin et al., 2013).

Sexting as a Moral Panic

The media and researcher narratives on sexting follow the trajectory of a typical moral panic (Hasinoff, 2015). Moral panics are a common response to new technologies (Orben, 2020). A moral panic is a widespread movement based on an exaggerated perception that a ‘deviant’ cultural behaviour or group of people threatens the values, interests, or well-being of a community or society (Cohen, 2011). Typically, moral panics are perpetuated by the mass media, and exacerbated by politicians and lawmakers. Indeed, ‘sexting’ came into widespread cultural prominence alongside a few key events. In 2007, 18-year-old actress Vanessa Hudgens’ privacy was compromised when nude photos that she had taken of herself surfaced online and circulated across the internet. After facing criticism from fans and the popular media, Hudgens apologized for taking the photos (despite having had no control over their release). Soon after, in 2008, 18-year-old Jessica Logan died by suicide after her ex-boyfriend shared her self-taken nude images with classmates at their high school. Logan experienced severe bullying from her peers, which people close to her said contributed to her death. The popular media used both of these events to frame sexting as a death sentence, mostly for teenage girls – in Hudgen’s case, career death; in Logan’s case, death by suicide. Thus ensued the moral panic narrative surrounding sexting, especially among adolescents.

Formal studies on the prevalence of sexting among young people were conducted shortly after these key events. Most of the first studies were conducted by non-academic American organizations (Associated Press & MTV, 2009; Cox Communications, 2009; National Campaign to Prevent Teen and Unplanned Pregnancy & CosmoGirl.com, 2008). The first of these studies –

conducted in 2008 by CosmoGirl.com in collaboration with The National Campaign to Prevent Teen and Unplanned Pregnancy – found that 20% of teenagers reported they had, at least once, sent or posted a nude or semi-nude picture or video of themselves. The results of this study were widely publicized by mainstream outlets including The New York Post (“Sex ‘Cells’ for Naked Teenagers”), Chicago Tribune (“OMG – Sexting is Widespread”), The Seattle Post (“Is Sending Racy ‘Sexts’ Flirting, or is it Porn?”), NPR (“Sexting’: A Disturbing New Teen Trend?”), NBC (“Sexting: An Alarming Trend”), and The New York Times (“Sexting May Place Teens at Legal Risk”). In late 2009, Google searches for ‘sexting’ began to steadily climb, culminating in its label as one of Time Magazine’s ‘Top Ten Buzzwords’ of that year and a finalist for the New Oxford American Dictionary’s 2009 Word of the Year (ultimately losing to ‘unfriend’). The first academic empirical study was published by Weisskirch and Delevi, three years following the mainstream media attention in 2011. Many researchers followed suit shortly after.

Researchers did, and largely continue to, examine sexting from the perspective of crisis in a technological, legal, sexual, and moral sense. For instance, researchers often frame teenage sexting as a form of child pornography or as part of a cyberbullying epidemic⁴. Adult sexting is often discussed in terms of deviance (e.g., infidelity, addiction). Similarly, much of the scholarly literature on sexting assumes that there's something aberrant about the activity. For example,

⁴ Sexual images of underage people can indeed fall within some legal definitions of child pornography; similarly, the non-consensual circulation of sexual images has led to bullying for some adolescents. However, the act of sexting among teenagers does not always constitute ‘child pornography’ nor does it automatically lead to bullying. Much like other forms of underage sexual activity, these are complex issues and require nuance in all cases.

Weiss and Samenow (2010) called for academic research on “Smart Phones, Social Networking, Sexting and Problematic Behaviours”; Wiederhold (2011) asked academics, “Should Adult Sexting Be Considered for the DSM?” Many early sexting researchers examined the prevalence of sexting within particular populations (e.g., adolescents) and focused on the relationships between sexting and other perceived ‘risky’ or ‘unsafe’ behaviours (e.g., alcohol consumption, unprotected sex), or undesirable personality traits (e.g., impulsivity). In fact, Döring (2014) found that 79% of the studies published on sexting emphasized the risks and negative outcomes of sexting. However, more recent empirical studies have suggested that, for many people, sexting can be a form of interpersonal intimacy and communication (Courtice & Shaughnessy, 2017). Research on the potential benefits of sexting remains limited, particularly relative to the amount of research on the ‘problematic’ aspects of sexting.

The initial moral panic around sexting introduced researchers from multiple disciplines (e.g., psychology, communications, law) to a new area of study that required attention and information, especially in order to offset any potential harms. Because of the perceived urgency around the ‘crisis’ of sexting, this early research was exploratory and disproportionately focused on establishing the prevalence, ‘risks’, and negative outcomes of sexting. In combination, the exploratory and risk-forward research indirectly created methodological issues that are still present in current sexting research. Namely, questions developed to measure sexting were created without following proper measure development protocols, and geared towards pre-existing negative biases about sexting. Indeed, the history of sexting and sexting research shed light on the roots of the problems that still plague current sexting research. It is time for researchers to face and rectify these issues.

Problem One: Imprudent Focus on the Medium

Researchers tend to agree that sexting occurs via digital communication technology. However, they seem to differ on the specific types of digital communication devices that they include under the ‘sexting’ umbrella. For example, some researchers only consider an activity ‘sexting’ when it occurs via mobile phone (e.g., Gordon-Messer et al., 2013); others include all mobile internet-enabled devices (e.g., smart phone, tablet; Drouin & Miller, 2016); others still include all mobile and non-mobile internet-enabled devices (e.g., desktop/laptop computer; Davis et al., 2016). Over time, most internet-based platforms became accessible through both mobile and non-mobile devices. This technological evolution makes it difficult to limit a definition of sexting to any single device. By focusing only on people’s use of “mobile devices”, researchers have necessarily excluded the ways that people use non-mobile devices to engage in essentially identical behaviours. That is, people can send sexual content to others between and across mobile and static devices. For example, Person A can be using a desktop computer when they take and send a sexual image of themselves to Person B, who receives a notice first on their smart watch, and then the image on their phone. Moreover, Person A might also send a sexually explicit text message to Person B from their smartphone later that day. Most sexting research captures Person B's behaviour, and the second part of Person A's; but, most studies will miss the technology-mediated sexual interaction that occurred at the beginning of the example. As such, researchers have an incomplete picture of people’s technology-mediated sexual experiences. Moreover, communication technologies will continue to evolve; new devices will enter the market and current devices will become outdated. It is unclear whether the specific device is even relevant in an era where all internet-connected devices are so closely intertwined. This lack of clarity harkens to early questions about communication: is the medium itself an essential

component of sexting, or is it the behaviour – sexual communication via technology – that is essential (e.g., McLuhan & Fiore, 1967)?

Indeed, some researchers and theorists have argued that the behaviour is more important than the medium, especially when the goal is to create research that stands the test of time and shifts in technologies. Towards this end, Flanagin (2020) argued that researchers need to focus on behaviours that people enact via technology, as opposed to specific technological features themselves. That is, the medium is important in-so-far as the behaviours it allows users to enact. Furthermore, researchers need to target the capabilities of technologies that traverse specific devices (Flanagin, 2020). For example, people can send a sexual text message from many different devices; therefore, this is a behaviour that traverses technological tools.

Communications researchers have long discussed the affordances of the Internet and mobile communication technologies on a variety of behaviours (Schrock, 2015). The need to focus on behaviours and affordances over specific media are well exemplified in the case of studying specific social media platforms. Many researchers have studied the different experiences that people have when using specific social media platforms, such as Facebook or Instagram. However, these types of platforms and how people use them have evolved rapidly over time. A study about people's experiences using Facebook in 2015 is not necessarily relevant today because the platform, and what users can do on it, is not the same. However, a study examining the impacts of having others 'like' your content could still be relevant, because this function is still common across many different social media platforms. Similarly, sexting is a behaviour that will evolve depending on what the technology affords; however, the essential behaviours that people conduct remain the same, regardless of the device they use to enact it.

The evolution of behaviours in researchers' definitions of sexting has also created overlap between sexting and other previously distinct behaviours such as phone sex and cybersex. A comparison of sexting and cybersex presents a good 'case study' of this overlap. In their 2017 systematic review of sexting, cybersex, and phone sex, Courtice and Shaughnessy found that most researcher definitions of sexting and cybersex described essentially the same set of behaviours: sending, receiving, or exchanging sexual content via digital communication technology. For example, Drouin and colleagues' (2013) definition of sexting (transmission of sexual material via phone or Internet) and Delmonico's (1997) definition of cybersex (exchanging sexual content over the Internet) are only distinguishable by the addition of the phone in Drouin's (a technology that was predominantly tied to a landline in 1997). It seems that researchers have simply adopted the term that is trending, rather than consider the behaviours that comprise the trend itself. In fact, as the number of Google searches for 'sexting' increased in the United States (in 2009), the number of searches for 'cybersex' concurrently declined (see Figure 4.1). The practice of adopting popular terms has led to redundancies and gaps in empirical and theoretical knowledge. Indeed, researchers who examine 'sexting' have rarely used existing knowledge and theory from researchers who examine 'cybersex' – and vice versa. This fragmented science significantly hinders the ability to build a comprehensive and useful understanding of the core behaviour at the heart of both sexting and cybersex: exchanging self-created sexual content via internet-enabled technology, with at least one other person.

As communication technologies continue to evolve, it is likely that a new term will eventually supersede 'sexting' in popular discourse. It seems that 'sexting' gained linguistic notoriety because the term 'cybersex' did not automatically allow researchers to study the use of specifically mobile communication technology for sexual interactions. However, 'sexting' will

eventually face the same issue; this term is unlikely to adapt to new, yet-to-be-conceived technologies and their corresponding terms. For example, virtual reality is a rapidly advancing technology that will allow people to have interactions with others – including sexual interactions – in virtual space. Like sexting and cybersex, a virtual sex interaction would involve an interpersonal sexual interaction that occurs via technology, perhaps in real-time. Because of the distinct technologies that virtual sex will require, it is unlikely that it will be referred to as sexting; instead, it is likely that laypeople will invent a new term to describe this type of sexual interaction. When a new term becomes popular, researchers who follow the trendy term may choose to ‘reinvent the wheel’ once again, instead of building on the knowledge we already have about sexting, cybersex, and other technology-mediated sexual interactions (Orben, 2020). As an alternative, researchers could begin now to focus on people’s behaviours rather than the technology they use to enact them. Unifying those behaviours under a single term will allow for a cohesive understanding of people’s use of technology in their sexual lives, in the present and across time.

Problem Two: Inconsistent Conceptual Definitions

Conceptual definitions articulate the breadth and depths of behaviours that comprise an overarching construct or behavioural domain. A conceptual definition that clearly and accurately describes the content of a behavioural domain is the first step towards creating research measures with strong construct validity. Construct validity refers to the extent to which a given measure of a behavioural domain accurately quantifies the behavioural domain in question (Flake et al., 2017; Koller et al., 2017). In other words, a conceptual definition refers to the behavioural domain that a researcher is interested in; whereas, construct validity refers to how well that researcher’s measure accurately tests people’s experiences with that behaviour.

Construct validity is essential to building accurate and sustainable knowledge about a behaviour (Flake et al., 2017). It occurs over a three-stage process. In the first “substantive phase”, researchers define the construct by synthesizing researchers’ and people’s understandings of what the construct is – that is, how they define the construct in conceptual words. When researchers do not employ a strong conceptual definition of a construct, any attempt at measuring that construct will lack construct validity.

Unfortunately, there is little evidence that sexting researchers have created or adhered to a universal conceptual definition of sexting that accurately captures it from a behavioural domain or construct validation standpoint. Many researchers have noted inconsistencies in how sexting has been defined across studies with both adults and adolescents (Barrense-Dias et al., 2017; Cooper et al., 2016; Courtice & Shaughnessy, 2017; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018, Van Ouytsel et al., 2018). Specifically, the conceptual definitions used for sexting differ based on the inclusion/exclusion of particular: (i) formats (e.g., text, images, videos), (ii) interaction dynamics (e.g., sending, receiving, forwarding, etc.), and (iii) sexual characteristics (e.g., full or partial nudity, depiction of specific body parts).

Current researcher definitions of sexting include a wide variety of formats, such as text messages, audio recordings, photos, and/or videos. Across studies, researchers have varied in the types of media formats that they include in definitions of sexting. Some researchers have limited their definitions of sexting to include only text messages (e.g., Currin et al., 2016); whereas, others have included only images (e.g., Crimmins & Seigfried-Spellar, 2015). Others still have included different combinations of activities in their sexting definitions. For instance, some researchers have described sexting as involving both photos and asynchronous videos (e.g., Gordon-Messer et al., 2013), and others have included text, photos, and asynchronous or live

videos in their definitions (e.g., Dir et al., 2013; Drouin et al., 2013). Notably, most researchers have not included the exchange of audio messages (e.g., live conversation, voice memos), avatar sex (e.g., manipulating avatars on a screen or in virtual space), nor interaction via physical sensation (e.g., using teledildonic devices). Together, these varying conceptual definitions suggest that for some researchers, sexting is a specific set of sexual activities; whereas, for others sexting functions as an umbrella term that captures multiple – but not all – types of technology-mediated sexual activities.

There are various ways that people engage in sexual communication via technology: people can send content, ask someone for content, receive content, exchange content back and forth, share or forward content received from one person to another party, receive shared/forwarded content, watch other people exchange content, and more. Researchers have addressed the multitude of interaction dynamics that are available in sexting in a variety of ways. Some researchers have used conceptual definitions of sexting that focus on only one of the above actions, such as sending (e.g., Mitchell et al., 2012) or a back-and-forth exchange (e.g., Reyns et al., 2013). Others have used conceptual definitions of sexting that include several of the above actions; for example, Hudson and colleagues (2014) defined sexting as “electronically sending, posting, or sharing/forwarding sexually explicit messages or seminude/nude images” (p. 183). There also seems to be an implicit debate in the literature about whether forwarding, sharing, or online posting sexts created by someone other than the forwarder/sharer/poster (presumably without the original creator’s consent) constitutes *sexting*, or is something altogether different (Courtice et al., 2021). Indeed, some researchers have included non-consensual forwarding, sharing, and/or posting behaviours in their definitions of sexting (e.g., Mori et al., 2020), and

others have detailed that sexting involves sending a photo or video of yourself – implying that sexting excludes sharing content created by someone else (e.g., Ricketts et al., 2015).

Finally, researchers seem to disagree about which sexual characteristics must be present in order for a behaviour to constitute ‘sexting’. Some researchers have created definitions of sexting that include sexual terminology – such as sexy, sexually explicit, or sexually suggestive (Barrense-Dias et al., 2017). Other researchers have defined sexting based on the amount of nudity present in images. In their systematic review and meta-analysis of sexting research, Madigan and colleagues (2018) found that some researchers included only nude images in their definition of sexting; whereas, others included depictions of both partial and full nudity. Of those who specify that sexting requires partial or full nudity, some researchers further specify which body parts must be visible to constitute sexting (e.g., breasts, genitals, buttocks; Barrense-Dias et al., 2017). Of course, establishing the types or extent of nudity also then limits the definition of sexting to something that involves only images. Much like offline or in-person sexual activity (e.g., Peterson & Muehlenhard, 2007), there are a wide variety of characteristics that people may consider ‘sexting’. However, researchers have not clearly delineated the line that technology-mediated behaviours must cross in order to definitively be ‘sexting’.

The inconsistent conceptual definitions of sexting across studies is inherently problematic. We are not the first to suggest that the large differences in sexting prevalence is likely due to definitions that create more or less opportunity for participants to endorse sexting (Barrense-Dias et al., 2017; Cooper et al., 2016; Courtice & Shaughnessy, 2017; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018, Van Ouytsel et al., 2018). Inconsistent definitions of sexting make it challenging – if not impossible – for researchers to synthesize understandings of sexting correlates, predictors, and outcomes across studies. For example, some

researchers have found that sexting is related to negative emotional outcomes (e.g., Dake et al., 2012; Mitchell et al., 2012); others have found no association between sexting and negative emotional outcomes (e.g., Gordon-Messer et al., 2012; Hudson, 2011); others still have found an association between sexting and positive emotional outcomes (Englander, 2012). Moreover, the inclusion and exclusion of different types of media and sexual characteristics are likely to have different potential impacts and outcomes. For example, sending sexual text messages may lead to different outcomes than would sending sexual images or videos. Similarly, having had a ‘sext’ non-consensually shared with a stranger no doubt has different outcomes relative to consensually sending a ‘sext’ to a romantic partner. Furthermore, when researchers consistently do not adhere to a strong conceptual definition, the entire area of study is called into question. Without a shared understanding of what sexting is (and is not), researchers cannot accurately measure, and therefore understand, people’s experiences with, predictors of, and outcomes of the behaviour.

Problem Three: Poor Measurement Practices

It is only very recently that sexting researchers have begun to publish information on the development, reliability, and validity of measures of sexting. Most measures of sexting involve what Flake and Fried (2020) describe as “questionable measurement practices” (QMPs). QMPs are the decisions that researchers make (or don’t make), that raise doubts about the validity of a measure used in a study, and ultimately the study’s final conclusions. Across studies, sexting researchers have employed several QMPs: reliance on adhoc, single-item measures (instead of multi-item measures), not assessing internal or external validity, not using measures consistently, lack of item clarity, and not specifying context in measure instructions.

Many researchers have relied on ad-hoc, single-item measures to examine people’s sexting experience. This is likely because they are easier to create and lower in participant

burden relative to multi-item measures. Some researchers used global, single-item measures in which they include the term ‘sexting’ in their question. For example, researchers might ask, *Have you ever engaged in sexting?* (e.g., Walrave et al., 2015). These types of questions rely on all participants sharing the same understanding of the term ‘sexting’, thus leaving the term open to the interpretation of each individual participant. Shaughnessy and Byers (2013) describe how people can make two types of errors when responding to single-item measures of sexual behaviours: (i) errors of commission, and (ii) errors of omission. Errors of *commission* occur when people endorse experience with a particular activity, but their experiences do not fit with the researcher’s conceptualization of that behaviour. For example, a researcher may conceptualize ‘sexting’ as an activity that only involves the exchange of sexual photos and videos. However, a participant who thinks that sexting includes exchanging sexually explicit text messages might say that they have engaged in sexting, even if they have never exchanged sexually explicit photos or videos with another person. This error of commission – a participant saying they have engaged in sexting when, by the researcher’s definition, they have not – will likely cause the researcher to overestimate the incidence of sexual photo and video exchanges in their sample. Errors of *omission* occur when people fail to endorse experience with a particular activity, despite having had an experience that does fit with a researcher’s conceptualization of that behaviour. Using the same example, a person who believes that only exchanging sexually explicit photos counts as sexting may not say that they have ‘sexted’, even if they have engaged in a sexual video exchange (which would in fact fit with the researcher’s conceptual definition of sexting). This error of omission – a participant saying they haven’t engaged in sexting when, by the researcher’s definition, they have – will likely cause the researcher to underestimate the incidence of sexual photo and video exchanges in their sample.

Researchers have also used single-item measures that examine only one ‘type’ of sexting. Kosenko and colleagues (2017) examined the ways that researchers have measured sexting across studies, and identified several studies where researchers used single-item measures that addressed only one facet of sexting behaviour. For example, Temple and Choi (2014) only asked participants if they had ever sent naked pictures of themselves to another person; whereas, Jonsson et al. (2015) asked participants if they had ever posted sexual pictures of themselves to the internet. Other researchers used single-items that did not align with the conceptual definitions that they themselves delineated for sexting. For example, Gordon-Messer and colleagues (2013) used the following conceptual definition for sexting: “sharing sexually suggestive photos or messages through cell phones and other mobile media” (p. 301). However, their measure only asked participants if they had ever sent and received “sexually suggestive nude or nearly nude photo or video” of themselves or of someone they know (p. 302). These examples highlight the limited, if not poor, validity that single-item measures provide. Validity essentially refers to the accuracy with which a measure assesses what it intends to assess. Measures focused on a single facet of sexting, that do not align with the researchers’ conceptual definitions of sexting, are fundamentally problematic and raise questions about the validity of results and conclusions reliant on these measures.

Typically, multi-item measures provide a more accurate and psychometrically sound approach to measurement (e.g., Epstein, 1980; Nunnally & Bernstein, 1994). Multi-item measures for a behavioural group include a list of specific sexual activities that all fit within that domain. For instance, a researcher who uses a multi-item measure that includes separate questions about exchanging sexual (i) photos, (ii) videos, and (iii) text messages is less likely to encounter participant errors of commission and omission, compared to researchers who simply

ask about ‘sexting’. Moreover, multi-item measures allow researchers to calculate indicators of the measure’s reliability and internal consistency. They also provide greater ability to evaluate the measure’s validity across multiple dimensions including content validity (that the measure captures the breadth of content relevant to the construct). Multi-item measures are less open to differences of interpretation across participants, because each question asks about one specific behaviour that fits within a behavioural domain. Additionally, aggregating multiple items decreases the impact of bias and error. Therefore, any potential biases or errors will have less impact on both the reliability and validity of the measure – and ultimately the results and interpretations drawn from the findings.

Regardless of whether researchers have used single- or multi-item measures of people’s sexting experiences, most have not directly assessed the structural and external validity of those measures. Structural validity refers to the extent to which the scores of a scale are an adequate indication of the construct being measured (i.e., using item analysis, factor analysis, reliability coefficients, and measurement invariance; Flake et al., 2017). External validity refers to the extent to which a given measure assesses the construct with other samples and in other contexts (i.e., assessing convergent, discriminant, and predictive variables, and examining differences between groups or samples; Flake et al., 2017). Both structural and external validity must be examined to ensure that a measure has construct validity; in this case, that a given scale is able to provide an accurate assessment of people’s sexting experience. A key barrier to structural and external validity is the fact that researchers have not consistently used the same measures of sexting across studies. Instead, many researchers have opted to create their own measures that have rarely undergone any psychometric evaluations of their structural or external validity (for exceptions, see Molla Esparza et al., 2020 and del Rey et al., 2021). This practice has resulted in

many distinct single and multi-item measures of ‘sexting’. Even when researchers use multi-item measures, the types of devices, format, interaction dynamics, and sexual characteristics vary from study to study (Kosenko et al., 2017). Thus, it is not possible to evaluate the construct validity of any one of these measures over time. It also is not possible to have a strong foundation of knowledge about sexting.

Finally, important contextual elements are blatantly absent from the majority of research on sexting. In particular, most researchers have not addressed the (i) relationship, and (ii) consent context of people’s sexting experiences. Some research has suggested that patterns of participation in sexting may differ depending on the type of relationship between the partners (e.g., whether they are in a committed romantic relationship versus whether they are strangers; Drouin et al., 2013). Moreover, in studies that do include the relationship context of people’s sexting experiences, researchers consistently find that the majority of people engage in sexting only with a committed romantic partner (Delevi & Weisskirch, 2013; Drouin et al., 2013; Lippman & Campbell, 2014; Perkins et al., 2014; Strohmaier et al., 2014; Weisskirch & Delevi, 2011). Furthermore, most researchers do not address the consent context of peoples’ sexting experiences. Some research has suggested that, like offline sexual activities, sexting can be either: (i) desired and consensual; (ii) undesired and consensual; and/or (iii) undesired and non-consensual (Courtice et al., 2021; Döring, 2014; Krieger, 2017; Morelli et al., 2016). It is also likely that people have different motivations for, and experience different outcomes from, engaging in consensual, compliant, and non-consensual sexting. Yet, unless the relationship or consent context is a key component of the study, researchers don’t seem to report whether they have asked about sexting with any and all types of partners, or in any and all consent contexts. Therefore, it seems likely that researchers are not providing participants with clear instructions

about the types of relationship or consent contexts to consider when responding to questions about sexting. Without clear instructions, some participants may (and others may not) consider particular relationship and consent contexts when responding to questions about sexting. This not only creates inconsistent response patterns, but also leaves the data open to researcher biases in interpreting the contexts in which sexting occurs – and further, whether or not it is ‘problematic’. The only way to understand differences in sexting experiences and contexts is to provide clear instructions to ensure that participants understand the researcher’s questions.

Problem Four: Lacking Theoretical Frameworks

Most of the research on sexting has very little connection to existing theoretical frameworks. In general terms, theories about human behaviour have two key components: they (i) describe a behaviour, and (ii) make predictions about future behaviours. Theories are formulated and used in research to develop hypotheses and research questions, guide data collection, interpret the data, and propose explanations for observed phenomena, across a range of context, timeframes, and people. When research is guided by theory, researchers are able to build on past knowledge and create immediate and sustained contributions to knowledge. Furthermore, atheoretical research is more susceptible to Type I errors – that is, publication of findings that will not replicate (Oberauer & Lewandowsky, 2019). A theoretical framework lends structure to empirical research design, helps the researcher explain and provide context for their hypotheses, and can help to reduce potential researcher biases (for instance, focusing on the ways that sexting might be ‘problematic’ and disregarding potential positive outcomes). Yet, instead of conducting theoretically informed studies, researchers have focused on exploratory, atheoretical studies seeking to establish the prevalence and correlates of sexting among different demographic groups. For instance, both Kosenko and colleagues (2017) and Van Ouystel and

colleagues (2018) identified only two studies that used a theoretical framework. This research is essential for understanding how widespread ‘sexting’ is and for whom it is more or less common. Moreover, this initial exploratory approach is in line with research on new technologies generally and tied to a cycle of limited progress (see Orben, 2020). To better understand the role of technology in people’s sexual lives and relationships, we must also explain why people engage in sexting, and what outcomes they experience. To do this, theoretical grounding is necessary. Ultimately, the lack of theoretical framing in sexting research makes it difficult to organize findings across studies in a coherent way, to explain particular phenomena, and to make connections between people’s technology-mediated and in-person sexual experiences.

Using offline theories to guide sexting research has the benefit of connecting it to broader understanding of human sexual behaviour and relationship patterns. Flanagin (2020) argued that examining in-person experiences should be a starting point for researchers interested in technology-mediated human behaviours. Furthermore, theories about offline behaviours can spur further research into technology-mediated behaviours. Thus, researchers can and should apply well-developed theories of offline behaviour to sexting research. When researchers have used a theoretical framework to guide studies on sexting, they have relied on theories developed to explain offline sexual interactions and romantic relationships. For instance, researchers have used attachment theory (e.g., Weisskirch & Delevi, 2011; Weisskirch et al., 2017), ambivalent sexism theory (e.g., Morelli et al., 2016), social learning theory (Lee et al., 2013; Van Ouytsel et al., 2017), theory of planned behaviour (Walrave et al., 2015) and script theory (e.g., Symons et al., 2018) as frameworks to understand people’s sexting behaviours. However, it is currently unclear if – and generally unlikely that – these theories perfectly apply in new, technology-based contexts. Therefore, researchers must also examine how these theories may be further developed

to account for the different context(s) that technology affords. Indeed, sexting is not sexting without technology; yet, researchers have not examined how the use of technology itself might play a role in people's experiences of sexting.

Sexting researchers have not explored nor applied theories that have been specifically developed for online or technology-mediated contexts. Indeed, this is a problem common to research on sexual behaviours in general. Sexuality researchers have been slow to integrate technology-relevant theories into their understanding of sexual behaviours and phenomena, despite the rapid integration of "sex tech" in people's everyday lives (Shaughnessy & Braham, 2021). Yet, there are numerous theories on computer-mediated communication, information technology, human-computer interaction, and cyberpsychology that would also be of benefit to sexting researchers (see Shaughnessy & Braham, 2021 for a brief overview). Using existing theoretical frameworks that account for technological context to inform sexting research would improve the quality of these studies and deepen our understanding of people's technology-mediated sexual behaviours. Application of theoretical frameworks with a technological lens would necessarily require researchers to integrate technology considerations into all stages of the research process. For example, theories that integrate human behaviour and technology help to explain which technologies people use, how they use them, why they continue/discontinue use, and how technology-mediated behaviour relates to their offline experiences. Indeed, there are features of technology (e.g., anonymity, emotional expression, privacy, monitoring, etc.) that afford users something they cannot as easily access when engaging in offline sexual interactions. As such, using these theories will help sexting researchers (who typically come from disciplines that do not traditionally account for technology in human behaviour research) to identify novel

questions to examine, and tech-specific variables to include. Furthermore, theories that consider and integrate technology may offer novel interpretations of research findings.

How Do We Move Forward?: Proposed Solutions

These four problems are not without solutions. We are not the first to propose solutions to the methodological problems of sexting research. For instance, researchers previously have called for better conceptual definitions of sexting, stronger measurement practices, and the use of existing theoretical models to inform studies and interpret results (Barrense-Dias et al., 2017; Cooper et al., 2016; Courtice & Shaughnessy, 2017; Klettke et al., 2014; Kosenko et al., 2017; Madigan et al., 2018, Van Ouytsel et al., 2018). Furthermore, it appears that these recommendations have led to some positive changes in sexting research. For instance, more sexting researchers have used theory to guide their research (e.g., Lee et al., 2013; Morelli et al., 2016; Van Ouytsel et al., 2017; Walrave et al., 2014; Weisskirch & Delevi, 2011; Weisskirch et al., 2017; Symons et al., 2018). However, there remain serious limitations for researchers who seek to create knowledge that will outlast the inevitable obsolescence of ‘sexting’.

In light of the limitations still present in sexting research, we propose that researchers stop studying sexting altogether. Instead, we propose that researchers shift to examining the behavioural domain of technology-mediated sexual interaction (Courtice & Shaughnessy, 2017). As we describe below, adopting TMSI will address all four problems in sexting research. Moreover, it will put researchers on the path of understanding behaviours rather than amorphous buzzwords. We also provide concrete direction for TMSI researchers who seek to improve their measurement practices, and to use technology-focused theoretical frameworks.

A clear, and accurate conceptual definition of sexting would improve many of the problems in sexting research. Unfortunately, we do not believe that problems of defining sexting

are surmountable. Sexting did not originate as a researcher-derived concept; instead, researchers interpreted and adopted the term from popular culture and media discourse. Researchers can and should examine novel phenomena that stem from societal trends and observations. However, in doing so, researchers should also consider layperson opinions on what sexting is, and use that information to construct a conceptual definition that can then be measured in a reliable and valid way. Yet, this is not the approach that researchers have taken in understanding and defining sexting. Instead, researchers adopted many different and sometimes contradictory definitions of sexting, to the extent that it is now a nebulous term. Recently, a few researchers have created measures of sexting with a focus on construct validity (e.g., Molla Esparza et al., 2020). Yet, even in this context, it is likely researchers and laypeople will always carry individual biases about what sexting is because of the origins of the term in relation to mobile phones.

To create knowledge that stands the test of time and evolving technology, researchers must target the basic capabilities of technology that traverse technological devices (see Flanagan, 2020). Almost all conceptual definitions of sexting do include at least one person sending (via technology) something sexual to at least one specific other person, who may or may not send one back. Thus, sexting includes sending, receiving, or exchanging sexual content with a specified other person, via technology. Sexting also is self-created and sexually explicit content. Indeed, that sexting involves sexual content that is self-created may be the key factor that distinguishes this behaviour from other types of online sexual activities, such as sharing pornography (featuring separate actors), or non-consensual forwarding of another person's sexts. Thus, researchers could simply create and consistently use a conceptual definition of sexting that includes all of these elements. However, this would still leave 'sexting' research vulnerable to becoming outdated when the devices that people use to communicate inevitably evolve, or when

popular terminology changes. Furthermore, adopting this definition would keep sexting research detached from knowledge about other, related behaviours. The core components of sexting – engaging with at least one other person and self-created sexual content – clearly overlap with the core components of related behaviours. For instance, cybersex is the exchange (usually in real-time) of self-created sexual content and conversation between at least two people, via internet-connected devices. Phone sex (i.e., self-directed sexual conversation between at least two people over live audio), haptic sex (i.e., self-directed tactile sensations that can be sent and received between at least two people by control of a haptic device), and avatar sex (i.e., self-directed sexual activities and conversations that occur between at least two people, via personalized digital character) also share the core components of self-created sexual content shared with another person. Thus, the clear similarities across terms highlight conceptual reasons for connecting these types of interpersonal, technology-mediated sexual behaviours under one area of inquiry.

Technology-Mediated Sexual Interaction

To improve upon and unify our understanding of the essential behaviour at the core of all these specific terms, we propose that researchers adopt the behaviourally-focused conceptual definition of technology-mediated sexual interaction. Technology-mediated sexual interaction (or TMSI for short) refers to any interpersonal interaction with a specified other person(s) that includes self-created, sexually explicit content and occurs through the use of communication technology (Courtice & Shaughnessy, 2017). As a construct, TMSI is focused on an overarching behavioural domain that includes ‘sexting’. TMSI captures all types of interpersonal sexual interactions that occur via technology, as well as the different formats, interaction dynamics, and sexual characteristics that such interactions can include. As such, the definition of TMSI does not

need to change when novel, not-yet conceived technologies emerge and are adopted for sexual interactions. By adopting TMSI, researchers will immediately be better able to examine the full range of behaviours that include and are similar to sexting. Furthermore, research on a behavioural domain will improve knowledge and knowledge synthesis on the many ways that people use technology for sexual interactions; how these are similar and different; what factors predict, explain, or modify varying TMSI experiences; and how all of these lead to diverse outcomes. TMSI research will unify sexting, cybersex, phone sex, avatar sex, haptic sex, virtual reality sex (etc) in the present and in the future.

The successful use of computer-mediated communication provides a strong example of a technology-focused behavioural domain. Computer-mediated communication (CMC) refers to any human communication that occurs through the use of two or more devices (McQuail, 2005). This overarching behavioural domain captures many popular terms for specific types of behaviours, such as emails, instant messaging, text messaging, video chat – and their more popular counterparts, such as ‘texting’, ‘DMing’, or ‘FaceTiming’. By conceptualizing past, present, and emerging CMC under one umbrella, researchers were able to build on findings and theories even as technologies changed. Indeed, technological affordance theories – key components of much CMC research – are one of few technology focused theories that provide hypotheses, insights, and interpretation across specific types of technologies (Orben, 2020). Thus, using a behavioural domain to connect distinct research topics is beneficial for researchers because it provides a common, organizing term that allows researchers to examine what is essentially the same underlying behaviour – even as the terminology and technology evolves. Indeed, CMC research is relatively long-standing – dating back at least to 1984 (Kiesler et al., 1984). The successful use of CMC suggests that this same approach will work in the case of

TMSI, which captures old and new terms (e.g., phone sex, cybersex, sexting, haptic sex) while maintaining conceptual integrity.

Improve Measurement Practices

The extent of our knowledge about people's sexting behaviours and experiences hinges on the validity of the tools that researchers use to measure sexting. Specifically, researchers need to shift to TMSI research by developing a measure of TMSI from a construct validation and measurement standpoint (Flake et al., 2017). The first "substantive" phase of measure development from this perspective includes a thorough review of previous literature to define the parameters of the construct and create an appropriate conceptual definition. In fact, Courtice and Shaughnessy (2017) developed the conceptual definition of TMSI following a systematic literature review of sexting and cybersex research (note, there were no identified empirical studies on phone sex, avatar sex, virtual reality sex, or haptic sex at the time of their review). Researchers should then, in collaboration with other experts, create an item pool that taps into the different dimensions of TMSI. Ideally, these 'experts' would come from a variety of disciplines and perspectives, including sexuality and public health, as well as computer-mediated communication and cyberpsychology. These 'experts' should also include laypeople who have experience with sexting, who can provide valuable feedback about how future participants might interpret items comprising a measure (e.g., using cognitive interviewing methods; Willis, 2004). In fact, researchers have completed this phase, presented results at peer-reviewed conferences (Courtice et al., 2018), and are preparing the results for manuscript.

In the second, "structural" phase of measure development, researchers use quantitative analysis methods to examine the psychometric properties of the measure. These include item-level analysis, factor analysis, examination of reliability coefficients, and measurement

invariance testing (see Flake et al., 2017 for more details). In developing a measure of TMSI, this stage needs to occur in an initial sample of participants. In the third, “external” phase of measure development (Flake et al., 2017), researchers gather evidence for how well the measure does (or doesn’t) relate to other constructs and predict criteria. This involves comparing the measure to other, existing measures to examine convergent and discriminant validity. Researchers also need to examine the structural aspects of any new measure in multiple samples, especially as characteristics of the sample differ from those of the measure development sample. Although there are few validated measures (and many non-validated measures) of sexting, most researchers have not examined these measures against each other. Most researchers have also not examined these measures in multiple, distinct samples. Researchers who seek to create a measure of TMSI that has strong construct validity should plan to engage in ongoing and multiple studies of their construct validity.

The procedures and best practices summarized by Flake and colleagues (2017) are a result of decades of psychological research examining how best to measure behaviours (Benson, 1998; Clark & Watson, 1995; Crocker & Algina, 2006; Loevinger, 1957; Raykov & Marcoulides, 2011; Strauss & Smith, 2009). Employing these ‘best practices’ is a time- and resource-intensive endeavor. However, this endeavor is also a necessary one: this is fundamental work that simply has not been rigorously or consistently applied in sexting research. To improve confidence in future knowledge that is generated about TMSI, researchers need to invest time into building TMSI measures with strong construct validity. In doing so, researchers need to avoid redundancies in research. Instead of creating multiple, slightly different TMSI measures, researchers should use the same measures of TMSI. Consistency in measurement across studies

will lend itself to knowledge synthesis over time and across technologies, and will prevent TMSI research from falling victim to the same measurement issues as sexting research has.

Use Theoretical Frameworks in TMSI Research

The solution to the largely atheoretical lens that most researchers have applied to sexting research is, of course, to do the opposite. It is likely that the ‘publish or perish’ culture of academia has dissuaded many researchers from conducting high quality, theoretically-driven research. Indeed, high-quality research takes time and forethought to conduct; in comparison, it takes less time and effort to conduct exploratory research on ill-defined buzzwords, using ‘on the fly’ measures. When researchers take the time to consider and apply theoretical frameworks – especially frameworks that are technology-forward – we will see a considerable improvement in our empirical understanding of TMSIs (including sexting). Indeed, there are many fruitful lines of inquiry left unaddressed as a result of inadequate application of theory in sexting research. As a starting point, Shaughnessy and Braham (2021) recommend that TMSI researchers can make use of existing theory that accounts for technology, such as the Technology Acceptance Model (TAM; Davis, 1986), the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh & Davis, 2000), and the Technology Integration Model (TIM; Shaw et al., 2018). Researchers can also add new technology-focused elements to extend existing offline theories to the technology context. Finally, researchers may need to create new theoretical models that explain aspects of people’s TMSIs that are unaccounted for in offline or non-sexual technology theories.

Conclusion

Despite over 10 years of research, we still know very little about people’s sexting behaviours. The results of multiple literature reviews and meta-analyses indicated that sexting

research is marked by contrasting perspectives and contradictory findings, stemming largely from conceptual and methodological problems. Indeed, early sexting researchers did not take the time to agree upon a universal conceptual definition of sexting nor to develop and consistently use measures with strong construct validity. Furthermore, the definition of sexting remains amorphous – and will continue to be difficult to define, because of the ever-evolving nature of communication technology. Thus, researchers need to pay less attention to ‘sexting’ and focus on the core, underlying behaviours that occur in sexting and other similar activities: technology-mediated sexual interaction. In doing so, researchers will develop a lasting behavioural understanding of people’s use of technology for sexual interaction. We propose that researchers shift from sexting, cybersex, and other separate research streams to build a unified area of research on technology-mediated sexual interactions. This shift will necessarily incorporate sexting and its empirical findings. Researchers also need to move beyond exploratory research, and develop a deeper, theoretically-driven understanding of people’s TMSI behaviours. This theory-driven research should include and integrate existing frameworks that have a technological lens. People do and will continue to use technology for sexual interactions. In making the proposed changes, researchers will contribute a robust body of knowledge that stands the test of technological time.

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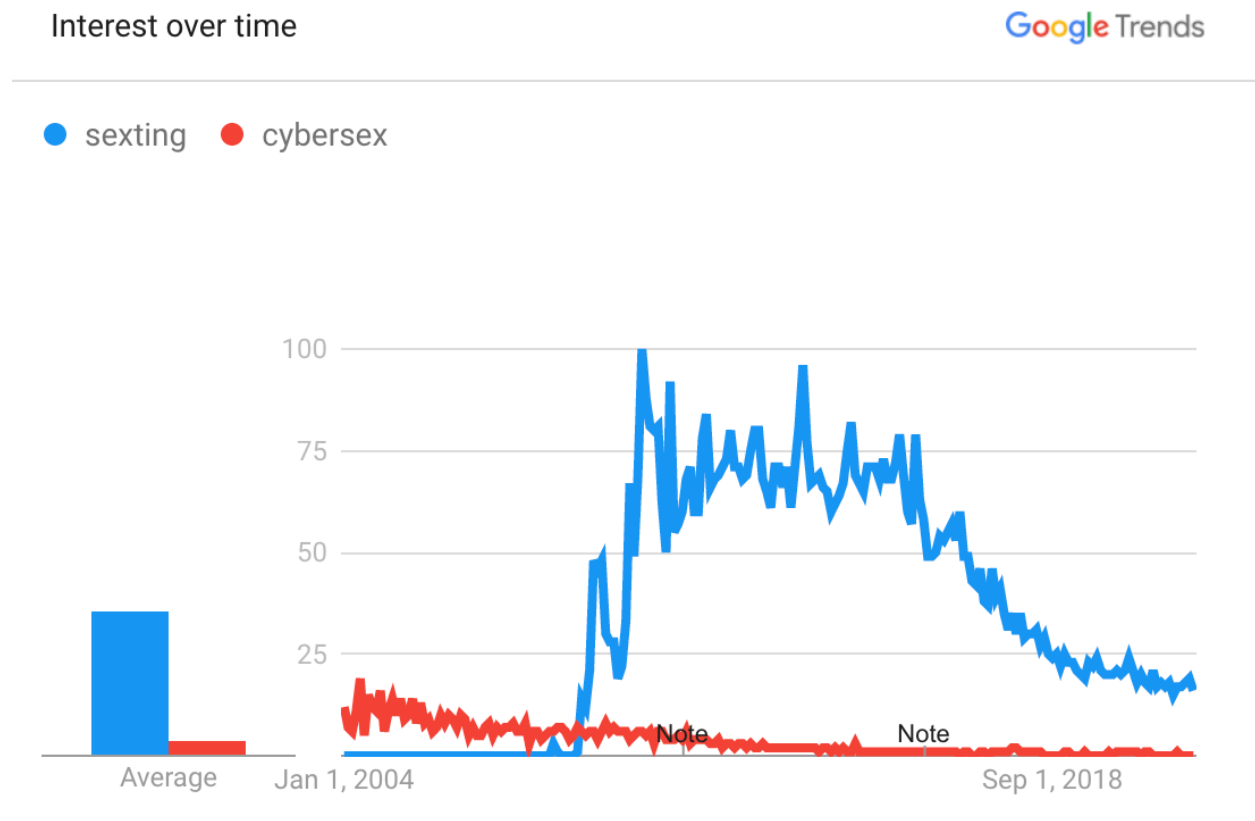
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Figures

Figure 4.1 Google Trends Output for Web Search Queries for the Terms “Sexting” and “Cybersex” in the United States from January 2004 to August 2021



Note. Data source: <https://tinyurl.com/388s77yp>

Chapter 5 (Transition Text 2)

In Article 2 (Chapter 4), I discuss the history of sexting research as rooted in moral panic and describe how this history has contributed to problems that continue to plague sexting research at present. These problems stem from (i) an imprudent focus on the medium, (ii) inconsistent conceptual definitions, (iii) poor measurement practices, and (iv) a lack of theoretical framing. I justified using the technology-mediated sexual interaction (TMSI) behavioural domain to rectify these first two problems. I suggest that by examining TMSI rather than sexting, researchers will generate knowledge about behavioural patterns that may better stand the test of time. I also proposed that by using multi-item, construct valid measurement tools and theoretical frameworks, researchers can expand and build a stronger foundation for TMSI research. In doing so, knowledge about TMSI will connect with existing understandings of in-person sexual behaviour. In Article 3 (Chapter 6), I implemented my own recommendations and began to build a theoretical foundation for examining TMSI motives by using the approach-avoidance motivational framework to guide my research. Alongside this dissertation, I contributed to the development of the TMSI Checklist: a multi-item self-report measure of people's experience with various forms of TMSI. I used the TMSI Checklist to collect data about people's TMSI experiences for the studies reported in Articles 3 (Chapter 6) and 4 (Chapter 8).

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Chapter 6 (Article 3)

**Approach and Avoidance Motives for Technology-Mediated Sexual Interactions in
Romantic Relationships: A Multi-Grounded Qualitative Examination**

Erin Leigh Courtice and Dr. Krystelle Shaughnessy

Author's Note

This research was completed with the support of funding awarded to Erin L. Courtice, from the Ontario Graduate Scholarship (2017 – 2018), the Social Sciences and Humanities Research Council (2018 – 2020), and the Society for the Scientific Study of Sexuality's Student Research Grant (2019).

Abstract

Technology-mediated sexual interaction (TMSI) is a behavioural domain that captures all interpersonal exchanges of self-created, sexual material via technology (e.g., sexting, cybersex, phone sex). Most people report TMSI with romantic partners. Yet, few researchers have conducted theoretically driven examinations of people's motives for TMSI within this context. We conducted semi-structured, in-person interviews with 25 participants (18–40 years old), focused on their motivations for engaging in TMSIs with their current romantic partner(s). We used multi-grounded theory to analyze the transcribed interviews; this approach allows researchers to incorporate existing theories into qualitative results. First, we used a general inductive method to identify a variety of TMSI motives that participants discussed. Second, we used the approach-avoidance motivational framework to organize and label motivational themes and categories. We identified four themes of approach and avoidance motives in participants' responses: self-, partner-, relationship-, and technology-focused motives. Participants also reported motives against using TMSI. People described their TMSI motives as connected to their outcomes: avoidance motives were described alongside negative TMSI experiences, and approach motives alongside positive experiences. We discuss implications for TMSI research and theory, and demonstrate the benefits of theory-driven qualitative methods to improve future research.

Keywords: technology-mediated sexual interactions, relationships, approach-avoidance motivations, multi-grounded theory, motives, sexting.

Approach and Avoidance Motives for Technology-Mediated Sexual Interactions in Romantic Relationships: A Multi-Grounded Qualitative Examination

Over the past two decades, people have increasingly used communication technologies to engage in sexual interactions with a committed romantic partner. We use the term technology-mediated sexual interaction (TMSI) to refer to interpersonal exchanges of self-created, sexual material via communication technology (Courtice & Shaughnessy, 2017). TMSI is a behavioural domain that integrates popular constructs such as sexting, cybersex, and phone sex; it also accounts for activities that may become more popular in the future, such as haptic sex and virtual sex (Courtice & Shaughnessy, 2021). Researchers have found that people report a variety of reasons for engaging in TMSI with a romantic partner, including for a range of sexual and relational purposes (Bianchi et al., 2018, 2021; Burkett, 2015; Califano et al., 2022; Currin et al., 2020; Currin & Hubach, 2019; Greer et al., 2022; Van Ouytsel et al., 2020). However, researchers rarely use theoretical frameworks – including motivational theory – to examine people’s motives for TMSI (for exceptions, see Le et al., 2023 and Lefebvre et al., 2022). This lack of motivational theory is problematic because it reduces the possibility of building on past knowledge about people’s motivations for engaging in sexual and relational behaviour. Researchers have used the approach-avoidance framework to explain people’s motivations for engaging in a range of behaviours with a committed romantic partner (e.g., Gable & Impett, 2008; Jakubiak et al., 2021; Muise et al., 2017). Thus, the purpose of this qualitative study was to explore people’s motives for engaging in TMSIs with their current committed romantic partners, through the lens of the approach-avoidance framework.

Technology-Mediated Sexual Interaction

The ‘technology-mediated sexual interaction’ (TMSI) behavioural domain is the best way to capture the multiple ways that people use technology to engage in sexual interactions with others. The majority of TMSI research has occurred in silos, with researchers separately and predominantly focused on examining either sexting (sending/receiving sexually explicit content via SMS or other messaging platforms; Weisskirch & Delevi, 2011) or cybersex (engaging in live sexual video chats; Shaughnessy et al., 2011). However, both sexting and cybersex – as well as similar activities, including phone sex, avatar sex, haptic sex, and virtual sex – refer to essentially the same underlying TMSI behaviour: using technology to send, receive, or exchange sexual content with another person (Courtice & Shaughnessy, 2017, 2021). By focusing on separate subtypes rather than examining TMSI behaviour itself, researchers have created inconsistent and disparate knowledge about people’s use of technology to engage in sexual interactions with others. Yet, it is likely that people engage in multiple subtypes of TMSI within a single interaction. For instance, partners might exchange sexually explicit text messages and images, and have sexually explicit phone or video call during one interaction. When researchers focus only on sexting, activities like live phone or video calls are missed – even though these activities are likely part of some people’s overall experiences. Similarly, the ways that people use technology to engage in interpersonal interactions have evolved over time – from landline telephones to internet-mediated computers, to mobile and internet-connected smartphones (see Courtice & Shaughnessy, 2021 for a historical overview). Knowledge about specific activities that are enacted primarily in the context of sexting (e.g., asynchronously exchanging nude images) is likely irrelevant when the most common medium for TMSI evolves (e.g., synchronous encounters via virtual reality). As such, TMSI is what Döring et al. (2021) refer to as ‘technology-inclusive,’ meaning that the term captures a variety of activities and therefore

prevents a surplus of disconnected and context-specific terminology. TMSI research will produce knowledge that translates to ongoing and future innovations in communication technologies because of its focus on behavioural patterns, rather than activities restricted to the technologies of the day (Courtice & Shaughnessy, 2021).

TMSI and Committed Romantic Relationships

People engage in TMSI in different relationship contexts. Research suggests that most people engage in TMSI, and do so more frequently, with a committed romantic partner; although, people can also engage in TMSI with others that they have a casual sexual relationship with, a friend or acquaintance, and/or an anonymous stranger (e.g., Courtice & Shaughnessy, 2018; Drouin et al., 2013; Shaughnessy & Byers, 2014). TMSI behaviours look similar in all these contexts. For example, someone could send sexually explicit photos or videos to both a committed partner and a casual sex partner. However, the TMSI experiences that people have in committed relationship contexts – including the motivations they employ and the outcomes they derive – are likely unique relative to other contexts. There are a few reasons why this may be the case. First, there are likely distinct contextual factors that prompt people to engage in TMSI in each relationship context. For instance, people who engage in TMSI with a committed romantic partner may be in a long-distance relationship, which in turn might prompt TMSI because it is the only form of partnered sexual behaviour available in that circumstance (Burkett, 2015). Conversely, people who engage in TMSI with someone they are dating but not in a relationship with might be prompted by behavioural norms held by themselves or their peers (Schreurs et al., 2020). Second, partners who are in an ongoing romantic relationship have, in most cases, established an expectation of trust, loyalty, and emotional intimacy with one another (Campbell et al., 2012; Norona et al., 2017; Øverup & Neighbors, 2016). Although people in uncommitted,

casual sex relationships can also share trust and emotional intimacy, the driving force behind the relationship is typically sexual fulfillment without ‘strings’ attached (e.g., Garcia et al., 2012).

Together, these contextual differences suggest that researchers need to study TMSI within committed romantic relationships separately from other relationship contexts.

Approach-Avoidance Motivational Framework and TMSI

Motives precede and are distinct from the enactment of behaviour. Specifically, motives are affective and drive-based tendencies that energize and orient behaviour; more simply, they are the reasons that people engage in certain behaviours (Elliot et al., 2006). Typically, researchers use motivational theories to guide their examinations of the motives that people employ when enacting a behaviour.

When researchers use motivational frameworks, they can make evidence-based predictions about how specific categories of motives for a given behaviour predict the outcome(s) that people will experience in relation to that behaviour. Unfortunately, researchers have rarely employed theoretical frameworks in general – nor motivational frameworks specifically – when examining people’s motivations for engaging in TMSI (Courtice & Shaughnessy, 2021; Kosenko et al., 2017; Van Ouytsel et al., 2018). When research questions and hypotheses are guided by theory, researchers can build on past knowledge and contribute to future knowledge in an immediate and sustainable way (Courtice & Shaughnessy, 2021). The absence of theory in research makes it difficult to connect findings across studies and to explain behaviour beyond a single sample. Theoretical frameworks are especially important in the case of newer phenomena such as TMSI because they allow researchers to make connections between people’s technology-mediated and in-person sexual behaviours (Flanagin, 2020).

The approach-avoidance framework distinguishes between motives that direct people toward positive outcomes (i.e., approach motives) and motives to avoid negative outcomes (i.e., avoidance motives; Cooper et al., 1998; Elliot et al., 2006; Gable, 2006; Gable & Impett, 2008). In their original application of the approach-avoidance framework to sexual motives, Cooper and colleagues (1998) identified two sub-categories of approach sexual motives (enhancement and intimacy) and four sub-categories of avoidance sexual motives (affirmation, coping, partner approval, and peer approval). These authors defined the enhancement sub-category of approach sexual motives as engaging in sexual activities to pursue one's own physical or emotional pleasure (e.g., one's own sexual pleasure or happiness), whereas the intimacy sub-category referred to engaging in sexual activities to pursue intimacy with another person (e.g., a partner's sexual pleasure or happiness). The affirmation sub-category referred to engaging in sexual activities to assuage negative feelings about oneself (e.g., one's own negative body image or self-esteem), whereas coping referred to alleviating negative emotions (e.g., to reduce stress or sadness). Motives related to partner approval referred to engaging in sexual activities to avoid a negative reaction from one's romantic or sexual partner (e.g., infidelity or an argument), and peer approval referred to avoiding a negative reaction from one's peers (e.g., being made fun of for a lack of sexual experience).

The approach-avoidance motivational framework is an appropriate theoretical lens for examining people's motivations for TMSI with a committed partner. Researchers have previously used the approach-avoidance framework to explain people's motivations for in-person sexual activity between romantic partners (e.g., Gewirtz-Meydan & Ayalon, 2019; Impett et al., 2005; Muise et al., 2013; Rosen et al., 2015). In all these cases, participants reported both approach and avoidance motives for sexual activity. Additionally, approach and avoidance

motives appear to predict people's experiences of positive versus negative outcomes of in-person sexual activity (Impett et al., 2008, 2010; Jakubiak et al., 2021; Muise et al., 2013, 2017).

It is possible that people's sexual motives for TMSI will align with an approach/avoidance structure similar to in-person sexual behaviors and non-sexual, technology-mediated behaviors. Indeed, researchers have found that people use approach and avoidance motives for some technology-mediated interactions. For instance, Strugo and Muise (2019) found that people report approach and avoidance motives when using Tinder – a mobile dating application – and that approach motives predict perceived dating success (e.g., going on in-person dates, going on a second date with someone). Others have suggested that people employ approach and avoidance motives when using social networking sites such as Facebook (e.g., Sheldon, 2008), although it is unclear if these motives are related to experiencing positive and/or negative outcomes. These technology-mediated examples illustrate how approach and avoidance motive categories can be extended to fit new, technology-based contexts – such as for TMSI.

Past research on sexting can also be interpreted with the approach-avoidance motivational framework. For example, Currin and colleagues (2020) asked participants about their reasons for sexting with a current romantic partner using an open-ended survey question. Participants described reasons for sexting that align with approach motives (e.g., for romance, flirtation, fun/enjoyment, excitement) and avoidance motives (e.g., to reduce anxiety, reduce discomfort). The atheoretical Sexting Motives Questionnaire (SMQ; Bianchi et al., 2018) also includes reasons related to approach motives (e.g., the 'sexual purposes' subscale includes 'to feel sexually aroused' and to pursue 'passion' or 'intimacy' in a relationship) and avoidance motives (e.g., the 'body image reinforcement' subscale includes to test 'attractiveness' and 'sexual attractiveness'). Similarly, using an adapted version of the Motivations for Sexting Scale

(MSS; Drouin & Tobin, 2014) researchers have found that people engage in sexting for both ‘relational purposes’ and ‘non-relational purposes’ (Greer et al., 2022). Most items on the ‘relational purposes’ subscale relate to approach motives (e.g., ‘I wanted intimacy’ and ‘I wanted to fulfill my partner’s needs’); whereas items on the ‘non-relational purposes’ subscale relate to avoidance motives (e.g., ‘I was lonely’ and ‘I wanted to avoid an argument’).

Using the approach-avoidance framework to guide research on TMSI motives may also shed light on the distinction between what constitutes a ‘motivation’ for TMSI, versus a ‘context’ in which TMSI occurs. In their qualitative research, Currin et al. (2020) identified being geographically distanced or physically apart from one’s partner as a common reason for sexting. However, within this category, there were more specific reasons that align with approach motives, such as maintaining intimacy or closeness with one’s partner. Similarly, the MSS also includes some items that relate to the context of sexting rather than the motives behind sexting, such as ‘I was taking drugs’ and ‘my partner was far away.’ In both cases, the researchers labelled contexts in which sexting may occur (e.g., in a long-distance relationship, under the influence of drugs) as motives. However, it is likely that people still report a variety of reasons for engaging in TMSI when they encounter these specific contexts.

The Current Study

The purpose of this study was to build theoretical knowledge on TMSI by describing people’s approach and avoidance motivations for engaging in TMSI with a committed romantic partner. Most of the research examining people’s motives for engaging in TMSI is atheoretical and exploratory. Little is known about the approach and avoidance motives that people use when engaging in TMSIs with a committed romantic partner. Researchers have primarily used survey studies that include open-ended questions and researcher-derived scales and have focused mostly

on sexting (rather than the behavioural construct of TMSI). These methods have not captured the depth, breadth, or nuances of people's motives for TMSI, nor provided a useful organizational structure for understanding them. To address these gaps in the TMSI research, we conducted qualitative interviews with participants who had engaged in TMSIs with their current committed romantic partner. Our objectives were twofold: (1) present an overview of people's self-reported motivations for their TMSI experiences with a committed romantic partner; and (2) examine the extent to which these participant-described motivations qualitatively fit with the approach-avoidance motivational framework. The research questions guiding the current study were:

1. Do people describe approach and avoidance motives for engaging in TMSI with a committed romantic partner?
2. Can the approach-avoidance motivational framework explain people's motives for engaging in TMSI with a committed romantic partner?

Position Statement

There are some empirically derived biases that influenced our research design. First, we assume that people can and do use TMSI in a healthy way that benefits them. In this way, our approach may be viewed as contrarian to the dominant (albeit changing; Döring, 2020) narratives imposed on TMSIs (e.g., sexting), which positions these activities as negative and/or harmful (Burkett, 2015; Courtice & Shaughnessy, 2021; Döring, 2014). Second, we assume that some people engage in TMSI as a form of sexual interaction with their romantic partners. Indeed, some researchers have argued that TMSIs are, in the era of digital media, ordinary and routine – especially in the context of dating and romantic relationships (Burkett, 2015; Courtice & Shaughnessy, 2021; Hasinoff, 2013, 2014). Although we were conscious of these biases and assumptions, it is possible that they influenced our interpretations of the data in the current study. Therefore, we included mitigating structures in our research design to decrease the impact of these biases. First, we included questions that look for disconfirming information in our

interview schedule (e.g., are there reasons that you *don't* engage in TMSI with your partner under particular circumstances?; see Appendix E). Second, we engaged in extensive discussions about the data and its multiple potential interpretations before and during data analyses.

Method

Participants and Procedure

Our procedure was approved by the University of Ottawa Research Ethics Board. We recruited participants from a large city in Ontario, Canada. Eligibility criteria required participants to be over 18 years old, in a committed romantic relationship, and to have engaged in TMSI with their current romantic partner. Some participants took part in this study in exchange for course credit for an Introduction to Psychology course; others were recruited from the community and compensated with \$20 (CAD) cash. To reach community participants, we placed posters around a large university campus, in local coffee shops, adult sex stores, and on community boards. These posters promoted an in-person interview study about “sex and technology,” and outlined participant eligibility criteria and compensation. We prioritized participant diversity by conducting targeted recruitment for LGBTQ+ people, people over 25 years of age, and cisgender men once we had reached data saturation with non-LGBTQ+ people, people under 25, and cisgender women. People who registered for this study were sent a brief online eligibility screener prior to participation (see Appendix A). All participants were required to complete this screener before their interview session. One participant met inclusion criteria when they completed the screener, but not at the time of the interview; their data was not included in the analyses.

All interviews were conducted in person by the first author⁵, in a private interview room on a large university campus. Only the interviewer and participant were present during the interviews. Upon arrival, participants were given an informed consent form to read and sign (see Appendix B) that included information about the study goals, procedure, potential positive and negative consequences, and their rights as participants. The interviewer also verbally explained key points to each participant. Next, the interviewer provided participants with compensation (course credit or \$20 cash). Participants then completed a brief demographic questionnaire that included questions about their age, gender, sexual orientation, ethnicity, education, current relationship length, and in-person sexual experiences with their current partner using pen and paper (see Appendix C). They also completed an adapted version of a 26-item TMSI Checklist by pen-and-paper, through which they indicated which TMSI activities they had/had not engaged in with their current partner (see Appendix D). The activities included represented activities that have historically been captured by terms like sexting, cybersex, and phone sex. From these responses, we created a total ‘variety of TMSI experiences’ score by adding all the ‘yes’ responses (out of 26) for each participant. Higher scores represent a greater number of different TMSI experiences with a current partner.

The primary method of data collection for this study was in-depth, semi-structured interviews using an interview schedule (see Appendix E). The topics explored in each interview corresponded with the questions outlined in the interview schedule; however, the wording and order of the questions remained flexible during the interviews. We used this approach to allow

⁵ The first author is a white, bisexual, cisgender woman with prior qualitative research training and interviewing experience.

participants to determine the pace of the interview and provide them with control over the direction of the process (Kvale, 2012; Rubin & Rubin, 2011). The questions focused on each participant's personal and relational context of, and their experiences with, motivations for, and outcomes of using TMSI with their current committed romantic partner. Interviews lasted between 30 and 90 minutes, with most around 45-60 minutes. All interviews were recorded with a digital audio recording device. At the end of each interview, participants were given a debriefing form explaining that data would be analyzed through the approach-avoidance framework lens (see Appendix F). The first author and volunteer research assistants transcribed the interviews. We removed identifying information from the interview transcript prior to analyses to protect participant anonymity; we also reported participant data using aliases (see Appendix G).

Our final sample consisted of 25 people. Of these, 10 were cisgender men and 15 were cisgender women; 16 identified as heterosexual, and nine identified as someone with a minoritized sexual identity (e.g., bisexual, gay, lesbian). The majority ($n = 16$) of participants identified their ethnicity as white, and the remaining nine reported a variety of ethnicities including African, Arabic, Chinese, and South Asian. Participants ranged in age from 18 to 42 years of age ($M = 23.84$, $SD = 5.43$). The average relationship length among our participants was 30.17 months ($SD = 17.66$) or about 2.5 years, with relationship durations ranging from 4 – 60 months. Additional sample demographic and background characteristics are reported in Table 6.1. On average, participants endorsed 13.64 ($SD = 6.71$) TMSI activities with their current partner (ranging from 2 – 25; see Table 6.2 for prevalence of each activity). Almost all (96.2%) participants reported that they had exchanged sexual typed messages with their romantic partner.

Most participants also endorsed sending semi-nude images (76.9%), engaging in sexual live video chats (65.4%), and engaging in sexual live audio chats (57.7%).

Qualitative Analytic Approach

We used a multi-grounded theory approach to investigate people's motivations for and outcomes of engaging in TMSI with a committed romantic partner. Multi-grounded theory is a qualitative research method aimed at generating theory that is grounded both in data and in established theoretical frameworks (Freeman, 2018; Goldkuhl & Cronholm, 2003, 2010). The multi-grounded approach was built from the traditional grounded theory developed by Strauss and Corbin (1994, 1997, 1998) and expanded upon by Goldkuhl and Cronholm (2003, 2010). As such, multi-grounded theory maintains some of the inductive elements of traditional grounded theory, while still permitting the influence of existing theories that do not conflict with the data at hand (Goldkuhl & Cronholm, 2010). Typically, the goal of researchers using traditional grounded theory is to use qualitative data to *develop* an explanatory theory about a given topic (Annells, 1996; Goldkuhl & Cronholm, 2010; Strauss & Corbin, 1997). Because our interpretations of the data were partially informed and guided by our knowledge of the approach-avoidance framework, we could not employ a purely grounded theory analytic approach. In multi-grounded theory, researchers aim to use qualitative data to ground theory development in (i) empirical data (ideally collected in an inductive way), (ii) pre-existing theoretical frameworks (well-selected for the theorized phenomena at hand), and (iii) an explicit congruence between the data and the selected theoretical framework. In this method, researchers use both inductive and deductive approaches in their analyses (Cronholm, 2003). Qualitative researchers have noted that multi-grounded theory allows researchers to both critically examine data and take previous research into consideration during analyses (Freeman, 2018; Goldkuhl & Cronbach, 2010)

In this study, we collected data on people's motives using a relatively open interview schedule; our questions about people's TMSI motives were not specific to any motivational theory. We completed the first cycle of analyses from a data-driven (inductive) standpoint. Then, in a second cycle, we revisited the data with the approach-avoidance framework in mind. Specifically, in this second cycle of coding we examined the extent to which our data corresponded with and added to the approach-avoidance framework, in the context of TMSIs within committed relationships. We have depicted this process visually in Figure 6.1.

Results

In our first cycle of coding, we organized participant interview responses as describing one of the following: (i) answers to background questions, (ii) TMSI motives, or (iii) TMSI outcomes. Next, we generated an exhaustive list of all motives for TMSI that participants described by reading through and labelling all the responses related to TMSI motives. Some of these labels included: "personal sexual arousal," "body image," "partner's sexual arousal," "connect with partner," "stress," "loneliness," "avoid upsetting partner," "feel better about relationship," and "replace in-person sexual activity." We then combined some of the labels that were conceptually related; for example, we combined "stress," "loneliness," "sadness," and "missing one's partner" within the broader category of "coping with negative emotions." We also noted that some participants described motives for not engaging in TMSI with their current partner. This grouping initially captured responses related to "privacy/security concerns," "shame," and "stress" (however, only one participant each described shame and stress as a motive for non-behaviour; therefore, we dropped both from our results section).

In our second cycle of coding, we examined each of the motives that participants described with each code and identified them as falling into categories of either 'approach,'

‘avoidance,’ or ‘other.’ At this stage, we identified an approach-avoidance bipolarity within some of our initial codes. For example, some participants discussed motives relating to their “partner’s sexual arousal” in terms of approach motives (i.e., “to pursue partner’s sexual gratification”) and others described such motives in terms of avoidance motives (i.e., “to avoid partner’s sexual disappointment”). As such, we refined our initial codes to capture these two distinct approach and avoidance TMSI motives. Finally, we refined our organization of the approach and avoidance TMSI motive categories into overarching themes related to self-, partner-, relationship-, and technology-focused motives. Specifically, we placed the approach and avoidance motives that were self-directed into the “self-focused TMSI motives” theme, those that related to one’s partner into the “partner-focused TMSI motives” theme, and so on. We present our final coding structure in Figure 6.2.

Self-focused TMSI Motives

Participants discussed self-focused motives for engaging in TMSI with a committed partner; this overarching theme reflected motives related to the participants’ own physical and emotional state, as well as their perceptions of themselves. Participants’ self-focused TMSI motives fell into one approach, one avoidance, and one bipolar (capturing both avoidance and approach motives) category: approaching sexual gratification, avoiding negative emotional states, and both approaching positive and avoiding negative body image.

Approaching Sexual Gratification

Many participants described the pursuit of sexual gratification or arousal as something that motivated them to either send a TMSI to their partner or to reciprocate when their partner initiated a TMSI with them. Participants who described this category of motive did so in terms

that reflected approach motives; that is, engaging in TMSI to pursue a positive outcome (i.e., sexual gratification). For example, Jake discussed:

Jake: I would say obviously it was mostly just me, like, being horny.

Interviewer: Was there ever a time where you initiated an interaction when you weren't horny?

Jake: No. I don't think so. We've done it, I would say, plenty of times. But I can't recall a single time in which I've done that not because I was horny.

Jake clearly states that his motive for initiating TMSI with his partner is to satisfy a state of existing sexual arousal. Similarly, when asked to describe his motives for initiating TMSI with his partner, Denis said, "I think it's just, a typical guy and girl, being young, very horny".

Lindsay echoed this sentiment in response to the same question by stating, "Pure sex drive, pure horniness..." Many other participants also expressed that their motives for TMSI at least partly involved pursuing sexual gratification, often in response to an initial state of sexual arousal.

For other participants, receiving an initial TMSI from their partner created sexual arousal, which in turn motivated them to achieve sexual gratification by reciprocating with a TMSI of their own. For instance, Delila discussed situations where her partner initiated a TMSI as follows: "it's like, 'okay yeah, like, you want this, okay, let's do it.' And then it's like, 'yeah, I'm horny now'." Delila describes how receiving a TMSI from her partner creates sexual arousal for her – it seems that Delila's desire to pursue or gratify her own sexual arousal motivates her to continue TMSI exchanges. Similarly, Shayne described:

Interviewer: And so, are there ever times where she's initiated, let's say, and you're not really in the mood, but you do it anyway?

Shayne: Mm. Not really, I dunno. Personally, I'm like kinda easy to put in the mood by the other person.

In this exchange, Shayne suggests that receiving a TMSI from his partner puts him 'in the mood' to continue the exchange. Delila and Shayne both describe reciprocating their partner's TMSI because they were aroused by their partner's initial message. Conversely, Jake, Denis, and Lindsay described sending a TMSI when they already felt sexually aroused. But overall, both groups of participants describe TMSI motives related to pursuing sexual gratification in response to sexual arousal.

Avoiding Negative Emotional States

Several participants described engaging in TMSI to assuage negative emotions – particularly those related to missing their romantic partner. Participants who described this category of motive did so in terms that reflected avoidance motives; that is, engaging in TMSI to avoid experiencing a negative emotional state. For instance, Keeley described:

Interviewer: What usually motivates you or prompts you to initiate [TMSI]?

Keeley: To start it? Probably just that longing to see him. Like [...] for me it's like, really just when I haven't seen him in a while and like, I miss him and I'm really thinking about it. That's probably when I would start it.

Keeley describes these feelings not as loneliness per se, but as a desire to see her partner that she can't fulfill in the moment. Similarly, when asked about what motivates him to initiate TMSI with his partner, Sam replied:

Yeah, when I miss her. Most often when I miss her, yeah, I try to have conversation with her about it. [...] So like for a week we didn't really have a conversation, so then two nights before I was just in bed, just thinking about her, and then the events that we did

when we were [together] and it caused me to be a bit aroused so I sent her a message that [said], ‘blah blah blah and I’ve missed you so I was thinking about you. What are you doing?’ Something like that.

Here, Sam expresses how missing his partner is a strong motivation for him to initiate a TMSI exchange. Sam also links missing his partner to feeling sexually aroused, which might be why he is motivated to initiate TMSI, rather than a non-sexual conversation.

A few participants engaged in TMSI to avoid or assuage other negative emotional states. For example, Lindsay described: “I mean for, I think for the both of us, it’s probably always horniness and stress because it was an extremely stressful time, and so needing to have some sort of release. And it was also like, it was so bad in winter, right, you’re like, sad and lonely and cold.” Lindsay describes several negative emotional states that drive engaging in TMSI with her partner: stress, sadness, and loneliness. Lindsay’s response is also like Sam’s in that she identifies sexual arousal as an undercurrent, which may be why TMSI is the chosen avenue for assuaging her negative emotions. Similarly, Spencer discussed:

Interviewer: Are there any circumstances that encourage you or your partner to use TMSI more than is typical?

Spencer: Maybe if one of us has had more of a stressful day, or something went wrong, or something bad happened that they don’t, we don’t like. Cause then we wanted to be with each other more and I guess being with each other leads more to, like, sexual stuff.

In this exchange, Spencer notes that negative emotional states during the day motivate her desire to be with her partner, which in turn is related to engaging in sexual activities – therefore, TMSI becomes a viable outlet for assuaging negative emotions.

Approaching and Avoiding Body Image

Several participants – the majority of whom were in relationships with men – described TMSI motives related to their body image or their experience of their physical appearance. Some participants described being motivated to engage in TMSI by their own personal enjoyment of their body, and/or a desire to express their own positive body image in a sexual way. These descriptions reflected approach motives because they implied pursuing the expression of one's positive body image. For example, Bianca expressed:

I guess earlier I said it's never really for me, but I guess sometimes for me – it's like nice to, like, enjoy my own body and just be like, 'hey let me do something for myself also.' Showing me in a nice light kind of thing, and just showing that I appreciate and I'm confident in my body at this moment.

Here, Bianca expresses that she can be motivated to send a TMSI to her partner because she wants to pursue the enjoyment and appreciation that she has for her body. Nari described similar motivations:

Nari: ...if I send a picture it's because I wake up and I'm like 'oh I look nice' or I feel good so I want to send a picture or something... it's more like 'I look good, you should look at this', or like, 'you can enjoy this'. It's definitely more, like, it's not insecurity driven, like I'm not sending these pictures to be like please you have to... (long pause).

Interviewer: 'Love me'?

Nari: Exactly. It's more just like, 'enjoy this'

In this excerpt, Nari is clear that her motive is about sharing the positive thoughts that she has about her body, rather than seeking reassurance about how her body looks.

Conversely, some participants described engaging in TMSI to prevent or evade negative thoughts about their body. These descriptions were reflective of avoidance motives because they

appeared to be a way of receiving reassurance from their romantic partner about their physical desirability, thereby aiding them in preventing or alleviating negative thoughts about their body.

For instance, Jennifer discussed:

Jennifer: ... which is what I want, just like a short-term compliment, then you feel self-gratification, like, 'oh okay', you know, 'they do find me attractive still'. And then I'm fine, then I, you know, we'll talk about oh what did you do today, I don't need to, it's not like an ongoing thing.

Interviewer: You don't need to continue a sexual exchange or anything like that, once you've gotten the compliment?

Jennifer: Mmhm, yeah.

Jennifer describes being motivated to send a TMSI to her partner to receive a 'short-term compliment' that would provide reassurance of her partner's attraction to her. Indeed, the goal for Jennifer appears to be the reassurance in and of itself, rather than sexual expression.

Similarly, when asked about his motivations for initiating TMSI with his partner, Gregory described the following: "I, like, I don't want to say I'm fishing for the compliment, but sometimes I'm, like, I dunno, I just want him to compliment how I look or something like that..." Gregory does not express initially feeling positive about his body image; instead, he seems to be seeking a positive reaction from his partner, perhaps to reassure himself of his partner's attraction.

Partner-focused TMSI Motives

The partner-focused TMSI motives theme reflected motives related to peoples' perception of how their own engagement in TMSI would impact their partner. Within this theme, participants' motives fell into two avoidance, one approach, and one bipolar category: avoiding

their partner's loss of romantic or sexual interest, approaching their partner's sexual gratification, avoiding their partner's sexual disappointment, and approaching and avoiding aspects of their partner's emotional state.

Avoiding Partner's Loss of Interest

Only a few participants described engaging in TMSI to prevent their partner from losing sexual or romantic interest in them. Participants who described this motive did so solely in avoidance terms – no participants discussed pursuing their partner's loss of interest. For example, when discussing the frequency with which she engaged in TMSI with her partner, Nari reflected on the following:

... pretty frequently, and then in that first bit and when I was at university in second year, I would say it was more like a 'once a week' type thing, something like that. 'Cause you are trying to keep, at least my motivation was trying to keep him interested but not coming across as too needy.

Later in the interview, Nari specified that her partner hadn't pressured her to engage in TMSI – but she believed that she needed to engage in TMSIs to prevent his interest from waning:

If anything, it would be, like, me initiating [...] because I would be in my head thinking [...] 'why would he like me?' and things like that, so trying to keep him on the line. But he never would be like, give me any inclination or anything, like, that if I don't do this he is going to move on, or be like, 'other girls do it like why don't you do it?' [...] It was more like, in my own head putting the pressure on myself.

Based on these two excerpts, Nari's primary motivation was to 'keep [her partner] interested'; to try and 'keep him on the line'. Furthermore, she 'put pressure on [her]self', that if she did not engage in TMSI he was 'going to move on' – even though it seems her partner never indicated

that this would be the case. However, regardless of whether the pressure related to relationship dissolution was real or imagined, it did drive Nari to engage in TMSI with her partner.

Approaching Partner's Sexual Gratification

Several participants also described TMSI motives related to their partner's sexual arousal or gratification. Many of these participants discussed initiating or reciprocating a TMSI because they wanted their partner to experience sexual arousal or gratification. Those who described their TMSI motives in this way did not indicate that they were engaging in TMSI to the detriment of their own well-being. Rather, participants were driven towards TMSI because they gained enjoyment when their partner experienced sexual arousal or pleasure – and sought to pursue those positive benefits (approach motive). For example, Jarett discussed:

Interviewer: What sort of reasons would you go along with [your partner initiating TMSI] even if you weren't super in the mood? What would motivate you to do it anyway?

Jarett: Oh, cause she, you know, it's fun no matter what, you know what I mean? It's fun for her too and so we would go with it. And she's got needs too, so sometimes you just gotta, kind of, go for it.

Here, Jarett describes that, even in instances where he's not personally in the mood for TMSI, he is still motivated to do so because 'it's fun for her' and 'she's got needs too'. It seems that in some instances, Jarett is driven by the pursuit of fulfilling his partner's sexual needs. Similarly, Denis shared that, despite not enjoying TMSI, he and his partner engaged in it with each other because they were motivated to bring each other pleasure:

Interviewer: And so, if you didn't really, like it, maybe after the first time or the second time, what motivated you to keep doing it, for a certain period of time? Did you get the sense that she enjoyed it? And you didn't want to...

Denis: Yeah, I think so, but then when we spoke about it a little while after and she was like, ‘I was doing it mostly for you’ and I’m like, um, I told her the same thing for me, to her, I was like ‘I was doing it mostly for you as well’.

Interviewer: (Laughs) Right. So you were both mostly doing it...

Denis: Yeah, just to pleasure the other person without realizing that the other person was actually doing, like had the same mentality, that’s why I guess no one said anything.

Throughout the interview, Denis disclosed that he didn’t enjoy engaging in TMSI with his partner. However, he thought that his partner enjoyed and derived pleasure from TMSI and was therefore motivated to engage in TMSI with her sexual gratification in mind.

Avoiding Partner’s Sexual Disappointment

A few participants described engaging in TMSI because they sought to appease or please their partner, without consideration of their own desires (or lack thereof). We categorized these descriptions as avoidance motives because they seemed to imply a concern that there could be a negative outcome for their partner – namely, sexual disappointment – if they did not fulfil their partner’s perceived desire. For example, Spencer recalled, “I think I’ve done it and I’m like, I’m not super in the mood. Like when I’m doing— like I wish I could be in the mood so then I could enjoy it more but I’m just not, probably cause of stress from school.” Spencer clarified this experience as follows:

Interviewer: So, what sort of reasons did you have to, kind of, continue [engaging in TMSI] even though you were like, ‘I’m stressed’?

Spencer: I think because he is enjoying it so much and I know, like, he is enjoying it so I don’t want to like take it away from him just because I’m not in the mood or something.

Here, Spencer describes engaging in TMSI with her partner despite not being in the mood because she wanted to avoid taking sexual gratification or enjoyment away from her partner in the moment. Bianca discussed similar motivations:

Interviewer: When your partner is initiating [TMSI]—do you ever kind of go along with it even though you're not in the mood?

Bianca: I suppose, yeah. Particularly with the pictures 'cause I feel like those few times that he does send them I should be appreciative of them, because I know it's still effortful on his part and nice that he sends them. So even if I'm not super in the mood I'll still be like encouraging and like yeah, I guess going along with it.

Throughout our conversation, Bianca discussed that she sent more TMSIs to her partner than her partner sent to her. In this exchange, she suggests that she 'should be appreciative' of TMSIs that her partner sends regardless of her own 'mood,' presumably to avoid her partner feeling unappreciated or discouraged from engaging in TMSI in the future. In contrast, some participants stated that they did not engage in TMSI when they weren't in the mood. For instance, when the first author asked Delila if she ever engaged in TMSI when she wasn't in the mood, Delila replied with the following: "I don't, yeah, if I'm not feeling it I don't do it."

Approaching and Avoiding Partner's Emotional State

Finally, some participants described motivations for TMSI related to their partner's emotional state. Several participants indicated that they had engaged in TMSI because they wanted to make their partner happy. Participants did not suggest that this motive occurred alongside a detriment to their own well-being; instead, participants were motivated to engage in TMSI because they enjoyed and pursued the experience of making their partner happy. For example, Stella described: "I guess it's to make him happy, but I don't like how that sounds

because it's not like I'm forcing myself to do it. It's just 'why not?' I'm happy if I can do that kind of thing in that moment, yeah." Here, Stella is quite clear that she is motivated to engage in or reciprocate TMSIs with her partner because she enjoys providing happiness to her partner – and not because she's 'forcing [her]self to do it.' Tamara described a similar sentiment: "And then I feel like [TMSI] is more for him – to make him happy is more important to me. So even when I'm not really interested, I'm still happy and willing to do it." For Tamara, making her partner happy is one of her goals for engaging in TMSI – and achieving this goal appears to bring her happiness, even when she's 'not really interested.'

In contrast, a few participants described motives directing them away from causing their partner negative emotions (i.e., avoiding the negative emotion). For instance, Thomas discussed the following: "... I do it because I know she would feel quite frustrated and she would act upset and say we should change our relationship and blah blah blah. So then, reluctantly, but I still do it to avoid [having] any crisis to manage right after." He expanded on this later:

Interviewer: ... have you ever initiated TMSI when you weren't really in the mood but you thought, 'I'm going to initiate anyways?'

Thomas: Yes, I did it, but more on the, with a strategy called argument, to decrease potential tensions.

Interviewer: Okay, so to decrease tensions?

Thomas: Yeah, yeah, yeah, better do that, it's a signal, she would feel less worried and she won't annoy me later with kind of questions about our relationship that I hate.

Interviewer: Right, has that happened before, that it's been a while, and...?

Thomas: Oh yes, oh god, not so much anymore but at some point it was like every two months or something, it was like, oh fuck, again?

Thomas expresses that one of his motivations for engaging in TMSI with his partner is to avoid his partner feeling ‘frustrated’ or ‘worried,’ and to ‘decrease potential tensions.’ Thomas also seems to be speaking from experience, suggesting that not engaging in TMSI with his partner has led to conflict in the past. Similarly, Bianca described engaging in TMSI on special occasions or dates to prevent her partner from feeling disappointed: “Then there would be those dates where I felt like I should send it. If it’s like his birthday or something, that would be a big motivator. Not wanting to disappoint him, I suppose, especially on those dates.” Indeed, for a few participants, preventing their partner from feeling negative emotions appeared to go hand in hand with avoiding conflict or tension in their relationship.

Relationship-focused TMSI Motives

Participant’s relationship-focused TMSI motives related to their perceptions of how engaging in TMSI would impact aspects of their relationship. Within this theme, participants discussed two approach and one avoidance category: approaching emotional and sexual connection, approaching relationship preservation/maintenance, and avoiding doubt about the relationship and/or its preservation.

Approaching Emotional and Sexual Connection

Many participants indicated that they were motivated to engage in TMSI because they wanted to pursue a stronger emotional and/or sexual connection. For instance, Jarett described that his motivations for engaging in TMSI with his partner were both about the sexual and emotional connection; that he was driven by both components: “It was the sex combined with, ‘you’re pretty, you’re beautiful,’ and... but much more of an emotional side that was like, attached to it.” Similarly, Peppa described:

I would say this might be like a far stretch but like [...] with previous people I've gone out with and they've like asked for pictures or texts or stuff, like, I never like wanted to? So I never did? But like, with my current partner, I want to have that connection with him, so it's like, it makes me feel good that it's something that I want to share.

Peppa suggests that the emotional connection motivates her to engage in TMSI whereas without that component, she would (and did) not. Some of our participants discussed motives related to maintaining an emotional connection separately from any sexual intonations. For example, Emily described: "Somehow connecting, it is still connecting – not necessarily resulting in sex, but a connection nonetheless. And it's something that, like, we only do – like nobody else, I don't send those to anybody else." And as Elise put it, "It's totally like, sending each other love poems. And being like, 'I'm thinking about you in all of those ways.' I feel like that's all part of sexting. I don't know. For us. Yeah. It's like romance."

Approaching Relationship Preservation/Maintenance

Some participants indicated that they engaged in TMSI with the goal of preserving or maintaining their relationship (approach motive). Specifically, these participants described TMSI as a means of sustaining existing emotional and sexual components of their relationship – particularly during periods when they were geographically separated from their partner (e.g., long-distance relationship). For instance, Keeley noted:

So before, I like probably wouldn't put much value on [TMSI] but now that it's like the only thing we have when like I'm not going to visit him, like it probably has a lot more value than it did initially. But, yeah. Like it's an adequate replacement. Like, it semi fills the void. Like it's not the best obviously but it, kind of, does its job.

Here, Keeley discussed that TMSI is ‘the only thing [she and her partner] have’ in terms of maintaining a sexual connection. Even though, for Keeley, TMSI only partly ‘fills the void’ when she and her partner aren’t physically together, it still ‘does [the] job’. Keeley appears to be motivated for TMSI because it helps her and her partner maintain their relationship. Similarly, Delila described, “It’s very – it’s very different from being in person and so I think... video chatting and having sex is like, kind of trying to maintain some kind of, like, mm, normal.” Indeed, Delila puts this idea into clear terms – part of why she engages in TMSI with her partner is to maintain normalcy in their relationship.

Avoiding Doubt About the Relationship

Several participants described engaging in TMSI to reassure themselves and/or their partner that the sexual and emotional aspects of their romantic relationship were stable. These participants described instances where they engaged in TMSI to avoid negative feelings of doubt about their relationship (avoidance motive). For example, Stella described:

Stella: ... I think it helps us overall.

Interviewer: What do you mean by ‘helps you overall’?

Stella: I guess, yeah, keeps us close and stops it from deteriorating. Like, I think there’s just a lot of – yeah, maybe it gets rid of like, unnecessary doubt because when you don’t see each other and you don’t necessarily talk all of the time, at least for me and I think maybe for him, there’s always some completely unreasonable doubt, about like, ‘what’s going on? Are we still—you know, the last time I saw you we were so happy together but, like, now we don’t talk a lot.’ And I think it just helps to reaffirm where we are if someone can send a picture and then get a response back. It’s like, ‘right, we still feel the same way,’ and stuff.

Stella discusses that she is motivated to engage in TMSI with her partner as a means of getting 'rid of unnecessary doubt' that stems from being in a geographically different location from her partner. For Stella, the act of exchanging TMSIs with her partner is driven by affirming that she and her partner still 'feel the same way' about each other. Similarly, Bianca discussed:

Bianca: And then at the time we were sending more text type of messages I felt kind of obliged to like, send something every night, like something long so he knew that I was thinking about him for all those hours of the day where he was sleeping and I was awake. Yeah, so that he would just have something to look at in the morning that was exciting.

Interviewer: Would you call that, like, reassurance for him?

Bianca: Perhaps, yeah. To know that like I'm not investing my time in, like, other people and stuff, yeah.

Here, Bianca discussed that some of her motivations for TMSI related to reassuring her partner that she was 'thinking about him' rather than 'investing [her] time in other people'. Bianca's aim appears to involve preventing her partner from experiencing doubts about her feelings for him and her devotion to their relationship.

Technology-focused TMSI Motives

Technology-focused motives emerged as a novel theme of motives that was not part of Cooper et al.'s (1998) original approach-avoidance sexual motives framework. We identified this as a standalone theme because it appeared to address aspects of sexual interactions that could not otherwise be achieved without the use of technology. This theme was comprised of a single, bipolar category of motives: approaching or avoiding aspects of in-person sexual activities.

First, many participants described TMSI motives related to engaging in in-person sexual activities. Some participants described this motive in ways that were reflective of approach

motives; that is, they used TMSI to generate and pursue excitement about future sexual activities that they could engage in together. For example, Eve described: “So, a lot of [our TMSIs are] like, him and me exchanging ideas or like things we like, or things we want to try out – stuff like that.” As Eve describes, for some participants, engaging in TMSI helped them identify or explore new sexual fantasies that they sought to enact in person. For example, Delila described her most recent TMSI experience with her partner that occurred when her partner was in a semi-public space: “But so, that experience led us to being like, ‘oh, we keep meaning to, like, have sex in, like, in a public place’ – like, go to some bathroom, like, ‘we gotta do this’ [...]. So it kind of like, we draw those experiences back into like, the physical.” Delila’s experience with her partner opened the door to a new fantasy that she and her partner hoped to explore in-person.

Similarly, a few participants discussed using technology to explore sexual scenarios that they and/or their partners were interested in, but not necessarily comfortable enacting with each other in-person. These participants were driven to use TMSI to pursue specific sexual activities that they might not have otherwise explored without the availability of technology. For example, Tamara discussed that she and her partner had wanted to try anal sex together, but “...we would always say like, ‘I want to do that,’ but when we tried [in-person] it didn’t work and I’m, like, not ready for it, so. But then in texting I can just say – ‘oh yeah, we can do that.’ But, in real life – no.” Here, Tamara describes how she and her partner are still able to comfortably explore a sexual activity that they are interested in without having to physically enact the behaviour before she’s ready. Other participants also suggested that they engaged in these types of excitement-generating TMSIs without the intention or expectation of fulfilling the activities discussed in an in-person situation. That is, for some, the motivation to generate sexual excitement via

technology was more important than the desire to ensure that the scenarios discussed would occur in-person. For example, Stella discussed:

It's not like we're upset that we didn't meet our objectives, because the only reason we set those, kind of, fantasy goals is to just like get us through the few months, and then when we're together it doesn't end up mattering that much what we do, or if it's like the same thing that we always do... Like, I just know that when we're apart, I know it helps to, like, dream stuff up and think about things. When we're together it just helps to just, like, take it easy and not have goals that we're trying to meet.

Stella refers to using TMSI as a way for her and her partner to set sexual 'fantasy goals' – objectives for sexual activities that they would like to enact when they're together in-person – to 'get through' the months that they were not in the same location. However, she also notes that they do not necessarily strive to achieve those 'objectives' when they are together in-person; rather, this exercise helps them to pursue sexual activity even when they're physically apart.

Second, a few participants discussed motives for engaging in TMSI that focused on using technology to avoid or put off in-person sexual encounters (avoidance motives). For example, in the following exchange, Spencer discussed how she sometimes engaged in TMSI when she was too stressed to enjoy an in-person sexual interaction with her partner:

Interviewer: I just have a follow-up question about something you said earlier. You said the TMSI would be a stress reduction tactic [for you], right? Would you say it's also a way to, not avoid having sex later in the week, but to sort of make up for not having it or something like that?

Spencer: Hmm... like, probably a little because I know – I know that I'm going to be stressed and I know that I will try [to have sex in-person] but like, in case I can't like, make myself do it I guess, not like make myself do it but, like, you know?

Interviewer: Get in the mood?

Spencer: Yeah. Like, I guess it's kind of to make up for it, yeah, even though I know it doesn't make up for actual sex. Yeah, I think so.

Spencer referenced how stress had impacted her in-person sex life with her partner, but not her ability to engage in TMSI. Indeed, Spencer agreed that, at times, she used TMSI to make up for instances when she wouldn't be in the mood for 'actual [in-person] sex.' Engaging in TMSI seemed to be a way for Spencer to manage her disinterest with in-person sexual activities with her partner. Alternatively, Sam discussed how engaging in TMSI was a way for him and his partner to avoid negative consequences that could arise from in-person sexual activities:

Oh yes, I've read a couple of times where – maybe they use Viagra or whatever – but there have been times where the one person dies [when they have sex]. So I don't want to be known as this person having sex and then everybody knows—and when in my country because of the culture we come from – if people have sex before marriage... and then something happens and one of you dies, which is extreme – or later on she gets pregnant – I think it would be a big embarrassment. So that has also been another reason. And I'm not yet ready to be a father. So yeah, we can do anything – we have phone sex and you still have your satisfaction as a guy you still can touch the two of you sexually. Kind of – so I think that's also the reason why I'm more comfortable with phone sex than actual sex because you can do anything with phone sex yet she doesn't get pregnant when she's turned on. Yeah.

Engaging in phone sex was a way for Sam and his partner to explore their sexuality while also avoiding potentially lethal or shameful in-person sexual encounters before they were married.

Connections Between TMSI Motives and Outcomes

Some participants made natural links between their motivations for engaging in TMSI and the outcomes that they experienced. Overall, the pattern of responses suggested that participants enjoyed engaging in TMSIs less when they used avoidance motives relative to approach motives. When discussing these connections, participants typically contrasted their negative experiences with their positive experiences; as a result, our data represents the impact of their avoidance motives on their experiences more than their approach motives. For example, Jarett indicated the following:

Interviewer: Under what circumstances would you say you enjoyed those TMSI experiences the most?

Jarett: When we were really horny, we were alone so we wouldn't have to whisper, and yeah, that's it. If we were both really into it, then it was always great.

Interviewer: Were there times where you weren't both really into it?

Jarett: Yeah. Sometimes you know, her or I will say 'c'mon just FaceTime me for a sec, I'm lonely in bed' it will go on for five minutes and it will be like alright well...little time out cause neither of us are really...we are in tune with each other so if one person isn't into neither of us really are.

Here, Jarett explains that he most enjoys engaging in TMSI with his partner when they're both approaching sexual gratification. In contrast, he least enjoys experiences when he or his partner initiates TMSI to assuage feelings of loneliness or when one of them is appeasing the other. Brit expressed similar sentiments:

Interviewer: Do you think your TMSI exchanges go a little bit differently when you're more in the mood versus when you're not in the mood?

Brit: Yeah.

Interviewer: Okay! What are the differences?

Brit: 'Cause like, whenever I'm not, I'm not gonna, like, want to [engage in TMSI] that bad. So it's not gonna be good [laughs].

Interviewer: Versus when you're really into it [...]?

Brit: [laughs] Yeah, exactly! It'll be better.

Thomas provided another example, stating: "well obviously when I do it as a preventive idea [to prevent an argument], it's not really enjoyable, or it is but in the sense, like, of the potentiality of having that discussion again has decreased." When Thomas engaged in TMSI to avoid his partner's negative emotional state, it wasn't as enjoyable – except in the sense that it diffuses potential conflict. Bianca also indicated that engaging in TMSI to appease her partner was not a positive experience: "I didn't enjoy them when I felt a pressure to send them. Like in those times that we had that list, for example, and I was trying to like do that every day, and it was just – I didn't like the pressure." Here, feeling an obligation or 'pressure' to engage in TMSI with her partner was not an enjoyable experience for Bianca. Nari – who discussed engaging in TMSI primarily to keep her partner interested in a relationship throughout our interview– summarized her perception of the connection between TMSI motives and outcomes in the following way:

I don't really think it's a bad thing but I think when I'm talking to my cousins and things like that, it's the motivation for doing it that is the bad thing. The act itself, whatever, we have technology, we are the first generation that is able to do this. [...] but in terms of the activity I don't think it's necessarily bad, it's something that people do. I think the

motivation for doing it can be negative and so when I'm talking to my cousins I try and emphasize that, if you're doing it because you actually want to and it's fun for you then go ahead, be smart about it but go ahead. But if you're doing it as a means of trying to keep someone or exercise some control or something like that then I don't think it's something that's very smart.

Motives Against Engaging in TMSI

When we conceptualized this study, we did not consider that people might also have motives that prevented them from engaging in TMSI. We began each interview by asking participants for an overview of their TMSI experiences with their partner. Some participants discussed reasons for their initial hesitancy, or for why they and their partner stopped engaging in TMSI. Overall, our participants' motives against TMSI related to worries or fears that another person would see the media that they sent to their partner. Most participants described developing these privacy/security concerns over time, which eventually prevented them from continuing to engage in TMSI. For instance, Jake described:

I enjoyed [engaging in TMSI] absolutely. But, then I got scared, right. I got scared of what could go wrong, if like – we messed this up, if we send it to the wrong person accidentally, right. So I got really fearful about that, so eventually I just encouraged her to stop, even when she would bring it up, I would just like not be interested.

Similarly, Denis mentioned, “So that's another, ya that could be another reason as well why I stopped doing it, cause I don't want my pictures going around.” A few participants described privacy/security concerns as something that initially prevented them from engaging in TMSI, despite their eventual doing so. For example, Jennifer described the following:

... one of my main concerns was that [...] you hear that photos get out and think you might trust a person they might send a photo to your friends or post it on Facebook, so I think that was one of the biggest hesitations for me, and probably why I waited so long.

Similarly, Jennifer described the following:

But then there's the whole thing with, like, you may not feel all that comfortable with [TMSIs] being on your phone. But at the same point I feel like everyone is sorta doing it so you stop caring about that a little bit, but still you don't want to expose too much of yourself. And so that started, like, not immediately, a few like months into the relationship [...] that's just getting comfortable with the media itself, like, not the partner.

Although Jennifer described trust for her partner as a component of her privacy/security concerns, most participants clarified that these concerns did not relate to fear that their partner would purposefully distribute images or media of the participant without the participants' consent. Rather, participants were generally concerned about privacy violations at the hands of strangers or corporations. For instance, Tony described his concerns as follows:

And uh, when I realize that those things stay in the system, they don't disappear, those internet guys can still see you... Those NSA guys, it just, ah damn, so those guys can see me! [laughs] ... I watch news too much. So when you realize NSA can still see these things over internet you're just like ugh...

He further expanded on this later in our conversation, stating:

I, uh, as a grown man I don't wanna send a picture, and then that picture can go to another person, and to another one, to another, to another, to another, and then one day onnnnn, Pornhub...And then you go and maybe like ughhhh, what's happening here...

For a few participants, privacy/security concerns prevented them from engaging in certain types of TMSIs but did not prevent the activity overall. For example, Lindsay described her concerns about using teledildonic devices as follows:

... Like, around the time I was buying it I read about the data leaks... and I was buying it because I was going away... I was like, I'm taking this, and I thought about using – I wasn't as concerned about the app but I just wanted a good vibrator and I thought about the app and then I read about the data leaks and I was like... no...

Jennifer was particularly hesitant about using live video for TMSI:

I guess it's called like, webcamming, where you can have like, webcam sex, I wouldn't want to engage in that, just because, again, you don't know like, if the person can record the screen of their own computer and then it's hard to obscure of your face and your belongings whereas in a video I can watch it back and see, oh I don't know, my tattoo is showing or something like that, where like in a video chat you can't really watch your- well you're watching yourself but you don't, like, you're also watching the other person so you don't pick up on things like, I don't know, you might move out of frame a little bit and show half of your face and, while you know I trust my partner, you just don't know, there's always possibilities of like, he might record it for like his own personal pleasure, like he has no intention of sharing it, but I don't know, he forgets his computer one day in the library and it gets hacked and ...

Additionally, some participants identified that they had privacy/security-related motivations against engaging in TMSI, but that they were still driven towards engaging in TMSI. For example, Lindsay described how her privacy/security concerns were superseded by her desire to maintain her relationship via TMSI:

... there was this moment where I was like my extremely digital literacy in judgement was like, overpowered by, and you know we didn't lock down using these data apps but like, these are encrypted apps I feel pretty good about it, these are fairly low, we're like low, I'm not gonna be targeted by anyone, I don't think, you know? [...] I kind of stopped worrying about it, I was just like... I gotta keep my relationship together.

For Lindsay and others, privacy/security concerns were not enough to stop them completely from TMSI, but they did create hesitation. It seems that if there had not been more powerful motivations driving these participants towards TMSI, privacy/security concerns might have driven them away from TMSI.

Discussion

The goal of this study was to build theoretical knowledge on TMSI by describing people's approach and avoidance motivations for engaging in TMSI with a committed romantic partner. Using multi-grounded theory, we identified themes and categories of TMSI motives that align with and extend prior conceptualizations of approach and avoidance motives for in-person partnered sexual activity. Some of these motives are consistent with previous research on sexting and cybersex (e.g., Currin et al., 2020; Currin & Hubach, 2019; Greer et al., 2022); others are novel, reflecting the breadth and depth of our interview data. It is likely that our qualitative research methodology allowed us and our participants to more deeply examine their TMSI motives, thereby identifying motives that researchers have not previously described.

Furthermore, our use of multi-grounded theory provided us with additional guidance when interpreting our findings, such that we could tease out approach and avoidance themes in our participants' responses. Our findings suggest that the approach-avoidance framework is an appropriate theoretical model to guide TMSI research. Our findings also suggest that people

engage in a wide variety of TMSIs with their romantic partners, many of which are not captured by specific activity labels such as sexting or cybersex. For instance, over 50% of participants reported that they had engaged in live sexual audio (e.g., phone calls) and/or video (e.g., via webcam) exchanges with their partner. These activities are not captured in sexting research – nor in sexuality research more broadly (Shaughnessy & Braham, 2021). As such, our findings underscore the importance of examining TMSI as a behavioural domain, rather than focusing on specific activities that do not fully portray the extent to which people use technology for sexual interactions. Overall, these findings extend and improve upon the small body of research examining TMSI motives and connect this research to a broader body of theoretical knowledge.

Approach-Avoidance Motivational Framework and TMSI

Our findings contribute to and extend research on the approach-avoidance motivational framework in several ways. First, we found support for the applicability of the approach-avoidance framework to the novel TMSI context. Specifically, we found that participants reported both approach and avoidance TMSI motives across self-, partner-, relationship-, and technology-focused themes. Many of the motives align with those identified in previous research on approach and avoidance motives for in-person sexual activity. For example, researchers have identified “enhancement” and “intimacy” approach motives for in-person sexual activity that align with our “sexual gratification” and “emotional and/or sexual connection” approach motives (e.g., Cooper et al., 1998; Impett et al., 2005, 2008; Muise et al., 2013, 2017; Rosen et al., 2015). Similarly, avoidance motives about assuaging one’s own or their partner’s negative emotional state and preventing a partner’s loss of sexual/romantic interest align with coping, affirmation, and partner approval motives (Cooper et al., 1998). Researchers have suggested that people’s technology-mediated sexual experiences both influence and are influenced by their in-person

experiences, and vice versa (Shaughnessy & Braham, 2021). Indeed, our findings suggest that people's TMSIs are an extension of their in-person sexual lives, rather than a categorically separate facet of sexual behaviour.

Second, we found preliminary evidence that people's TMSI motives played a role in the outcomes that they experienced. When we asked participants about the circumstances under which they most enjoyed engaging in TMSI, the majority indicated that they enjoyed TMSI less when they used avoidance motives and enjoyed TMSI more when they used approach motives. This finding is consistent with in-person sexual activity research; researchers have consistently found that people experience enhanced relationship and sexual satisfaction when they use approach sexual motives, and reductions in relationship and sexual satisfaction when they use avoidance motives (e.g., Impett et al., 2005, 2008; Muise et al., 2013, 2017; Rosen et al., 2015). As such, our findings suggest that the approach-avoidance framework is a useful theory to guide further understanding of how people's TMSI motives may play a role in their experience of positive versus negative outcomes.

Third, our findings point to the unique nature of sexual activity conducted via technology. We extended the approach-avoidance motivational framework to the TMSI context by identifying new themes and categories of motives. The approach-avoidance framework provided us with language and a general structure that was flexible enough to capture novel motives related to technology, as well as other domains. It is not surprising that we identified novel motives related to the technological context of TMSI: the vast majority of researchers have only ever examined approach and avoidance sexual motives for in-person sexual contexts (for an exception, see Lefebvre et al., 2022). It is possible that there are technology-focused motives for other relational and non-sexual interactions as well. For example, researchers have found that

couples who enjoy playing massively multiplayer online role-playing games (MMORPGs) together also experience enhanced relationship satisfaction (Ahlstrom et al., 2012). Indeed, people might be motivated to play multiplayer video games with their partners because it allows them to explore different environments ‘together’ in technology-mediated spaces, rather than relying only on geographical travel as a means of adventure. As such, when studying technology-mediated behaviour, researchers need to extend in-person theories and test their applicability to technological contexts.

Finally, we extended the approach-avoidance framework to capture motives for not engaging in TMSIs with a romantic partner. We found that our participants reported that they employed avoidance motives related to privacy/security when deciding against engaging in TMSIs with their committed partners. This finding suggests that the approach-avoidance framework could explain people’s decisions not to partake in certain sexual activities, regardless of whether they are technology-mediated or conducted in-person. Indeed, some aspects of privacy and security concerns are not exclusive to technology-mediated domains. For instance, researchers have found that some people choose not to have condomless sex with a romantic partner because they are motivated to avoid physical health/security risks, such as contracting an STI (e.g., Hock-Long et al., 2013). Our ability to capture motives for non-behaviour demonstrates an additional strength of the approach-avoidance framework; other motivational theories (e.g., self-determination theory; Deci & Ryan, 2012) are designed to capture people’s motives for behaviour – not for the absence of behaviour.

Implications for TMSI Research

Our findings contribute to knowledge about people’s TMSI experiences. We found that participants reported engaging in a variety of TMSI activities, several of which go beyond what

researchers who study ‘sexting’ or ‘cybersex’ have previously captured. For instance, 57.7% of our sample indicated that they had engaged in a sexual live audio exchange (e.g., phone sex) and 65.4% had engaged in a sexual live video exchange (e.g., cybersex) with their partner.

Furthermore, at least one participant had engaged in each of the 26 activities included on the TMSI Checklist (see Table 6.2). Unlike sexting or cybersex, the TMSI behavioural domain captures all interpersonal sexual activities conducted via technology. Much like people can engage in various behaviours that fall under the umbrella of “partnered sexual activity,” people can and do engage in a variety of activities within the TMSI behavioural domain. Using TMSI rather than sexting/cybersex produces a better understanding of people’s behaviours overall. It also is more likely to translate to future uses of new technology for similar, interpersonal sexual purposes (Courtice & Shaughnessy, 2021).

Our findings also suggest that it is important to distinguish contextual catalysts from motivated behaviour. Some of our participants reported engaging in TMSI mostly or exclusively during periods of physical distance from their partner. Previously, researchers have included being geographically separated from one’s partner as a TMSI motive (e.g., Currin et al., 2020; Greer et al., 2022). However, our participants also described a wide variety of motives that drove them towards TMSI while physically apart from their partner. These findings suggest that geographical distance is a circumstance that may catalyze (but not guarantee) motivations for TMSI, but that it is not a motive in and of itself. None of our participants described intoxication as a motive or a circumstance for TMSI; however, in contrast to other research (Drouin & Tobin, 2014; Greer et al., 2022), we believe that substance use would also constitute a contextual catalyst (not a motivation). Overall, our findings provide clarification on the distinctions between contexts in which TMSIs can occur, versus the motives that drive TMSIs with a partner.

Strengths, Limitations, and Future Directions

There are many strengths to this study, including our use of the approach-avoidance framework to enhance our qualitative methodology and to better understand TMSI as a behavioural phenomenon. These findings contribute to theoretical and empirical knowledge broadly and in relation to TMSI, which has rarely been studied in a theoretically driven way. However, our findings must be understood within the context of a few limitations. First, our inclusion criteria required participants to currently be in a committed relationship with someone whom they had engaged in TMSI with, at some point in their relationship. Presumably, all our participants were still at least somewhat satisfied with their current relationship. As such, we did not necessarily capture the motives that people who are no longer satisfied in their relationship have for TMSI. Indeed, we found that participants reported more approach motives for TMSI relative to avoidance motives. That said, we still captured avoidance motives in our findings – but they were endorsed by fewer participants overall. Future research on motives for engaging in TMSI with a past partner may generate additional avoidance motives that we were not able to capture in this study. Second, most of our participants did not express discomfort when discussing TMSI or their sexual lives; as such, it is likely that our findings are somewhat biased toward people who are comfortable discussing these topics. It is possible that people who are less comfortable discussing these topics have different TMSI motives than those that we identified. It is challenging to recruit participants who are uncomfortable with discussing sexual behaviour for studies of this nature (e.g., Dawson et al., 2019; Wiederman, 1999); however, future researchers should make every effort to do so. Furthermore, despite our efforts to recruit diverse participants, all our participants were cisgender people, and most were in monogamous, mixed-gender relationships. Future researchers should prioritize examining TMSI motives in diverse samples.

Conclusion

To our knowledge, this is the first study to use multi-grounded theory to examine people's motivations for engaging in TMSI with a committed romantic partner. Our findings indicate that people employ a wide variety of approach and avoidance motives related to self-, partner-, relationship-, and technology-focused themes when engaging in TMSI with their romantic partner. Furthermore, we found that people's TMSI experiences differed depending on the motives that they employed, such that people enjoyed engaging in TMSI less when they used avoidance motives compared to when they used approach motives. As such, our findings demonstrate that the approach-avoidance framework may help us better understand how people's TMSI outcomes can be improved through motivational interventions. Our findings also extend the approach-avoidance framework by demonstrating that the theory is robust enough to capture novel approach and avoidance motives, including those related to technology-mediated contexts of sexuality. Moreover, our findings demonstrate the value of incorporating and testing theoretical frameworks when examining TMSI. Technology is, and will likely continue to be, an important modality through which people in relationships engage in sexual activity with each other; as such, we require strong, theory-driven science to better understand how to improve people's TMSI experiences.

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Tables and Figures

Table 6.1 Participant Sociodemographic and Relationship Information

	Subsample size (<i>n</i>)	Proportion of total sample (%)
Gender		
Cisgender man	10	40
Cisgender woman	15	60
Sexual orientation		
Heterosexual	16	64
Sexual minority	9	36
Ethnicity		
White	16	64
Non-white	9	36
Highest level of education		
Some college or university	15	60
Degree from college or university and/or post-graduate degree	10	40
Average amount of in-person non-penetrative sexual activity with partner		
Between “a few times per year” and “once or twice a month”	8	33.3
Between “a few times a month” and “once a week”	7	29.17
Daily or almost daily	9	37.5

**Average amount of in-person
penetrative sexual activity with
partner**

Between “never” and “once or twice a month”	6	25
Between “a few times a month” and “once a week”	6	25
Daily or almost daily	12	50

**Relationship status with current
partner**

Ever in long-distance relationship	19	76
Currently in long-distance relationship	8	32
Currently living together	10	40

	Mean (<i>M</i>)	Standard deviation (<i>SD</i>)
Age	23.84	5.43
Length of current relationship (in months)	30.17	17.66
Number of TMSIs with current partner (of 26)	13.64	6.71

Note: *N* = 25.

Table 6.2 Prevalence of TMSIs Among Participants

Type of TMSI	Prevalence of TMSI (%)
Exchanged sexual typed message(s)	96.2
Sent sexual typed message(s)	92.3
Received sexual typed message(s)	92.3
Exchanged sexual semi-nude picture(s)	76.9
Exchanged sexual nude picture(s)	57.7
Exchanged sexual picture(s) displaying sexual actions	26.9
Sent sexual semi-nude picture(s)	88.5
Sent sexual nude picture(s)	69.2
Sent sexual picture(s) displaying sexual actions	30.8
Received sexual semi-nude picture(s)	80.8
Received sexual nude picture(s)	57.7
Received sexual picture(s) displaying sexual actions	30.8
Exchanged sexual semi-nude video(s)	38.5
Exchanged sexual nude video(s)	30.8
Exchanged sexual video(s) displaying sexual actions	34.6
Sent sexual semi-nude video(s)	50.0
Sent sexual nude video(s)	38.5
Sent sexual video(s) displaying sexual actions	30.8
Received sexual semi-nude video(s)	57.7
Received sexual nude video(s)	42.3
Received sexual video(s) displaying sexual actions	38.5

Exchanged sexual audio message(s)	< 20.0
Sent sexual audio message(s)	< 20.0
Received sexual audio message(s)	< 20.0
Engaged in sexual live audio exchange(s)	57.7
Engaged in sexual live video exchange(s)	65.4

Note. To maintain the anonymity of participants, we do not report exact percentages when they fall below 20%.

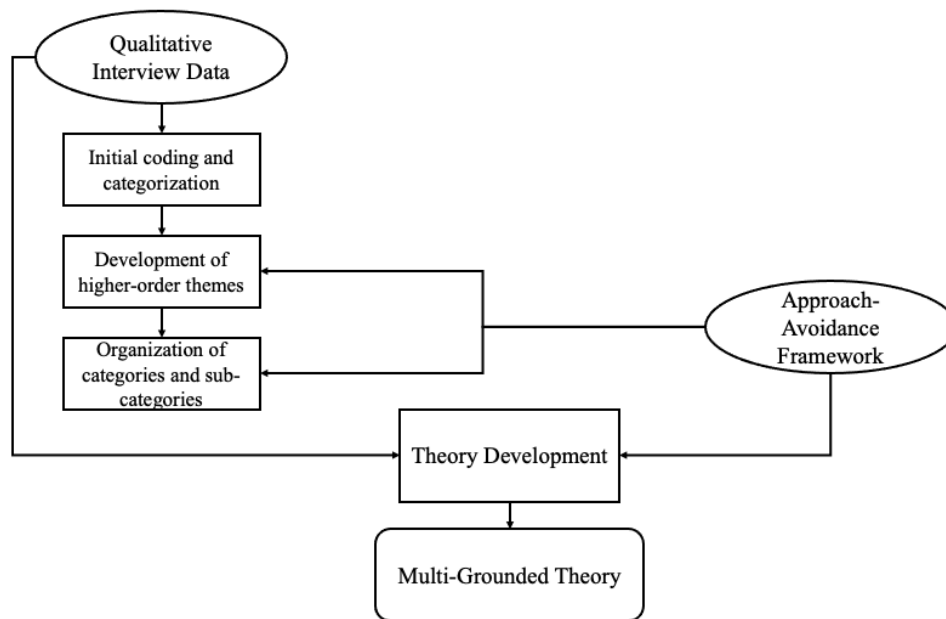
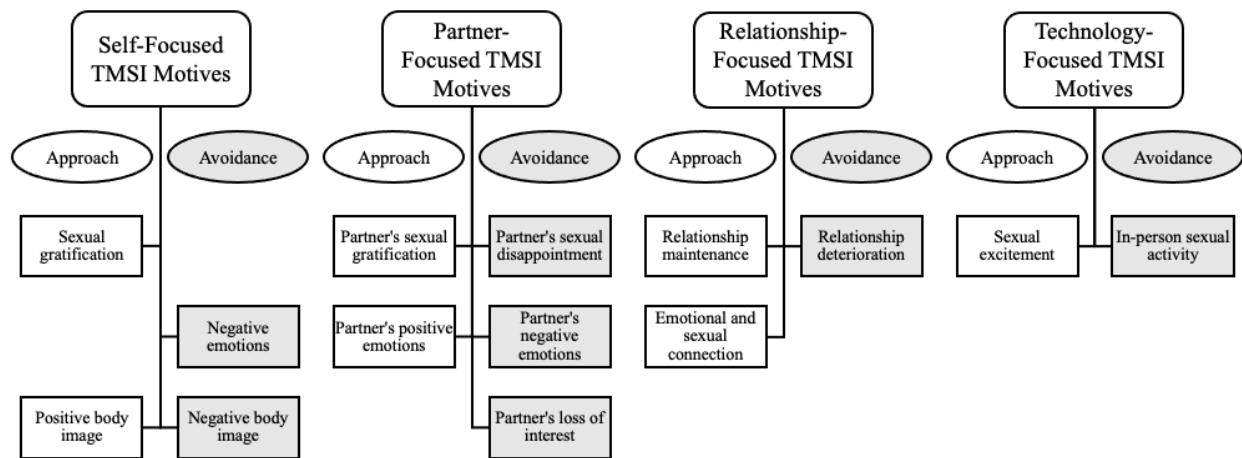
Figure 6.1 Multi-Grounded Theory Development in the Current Study

Figure 6.2 Final Theoretical Model Resulting from Multi-Grounded Analytic Approach

Chapter 7 (Transition Text 3)

The results of Article 3 (Chapter 6) suggest that people have a variety of motives for engaging in TMSI with a committed romantic partner and that these motives largely fit within the broad categories of ‘approach’ and ‘avoidance.’ My participants’ motives for TMSI fell within four distinct themes. Within each theme, I identified both approach and avoidance motives for TMSI, suggesting that approach and avoidance motives relate to individual (self-focused motives), interpersonal (partner- and relationship-focused motives), and contextual (technology-focused motives) dimensions. My participants also discussed that they tended to enjoy TMSIs less and were more likely to experience negative outcomes when they engaged in TMSI for avoidance motives. Conversely, they tended to enjoy TMSIs more and experience more positive outcomes when they engaged in TMSI for approach motives. Overall, these findings provide support for the approach-avoidance motivational framework as an appropriate theoretical lens through which to examine people’s TMSI motives and outcomes in the romantic relationship context. Together, Articles 1, 2, and 3 lay a strong substantive foundation for the TMSI behavioural domain. The themes and categories that I identified in Article 3 provide clear information relevant to the substantive phase of a self-report measure of TMSI. Specifically, the results support an approach-avoidance motivational framework for measuring TMSI motives, and the themes and categories point to the factors and items that need to be included in further measure development work. Therefore, in Article 4, I developed a scale (the Technology-Mediated Sexual Interactions Motives Scale; TMSIMS) to measure the frequency with which people use both approach and avoidance TMSI motives. In line with the approach-avoidance framework, I then used the TMSIMS to examine the extent to which using approach and avoidance TMSI motives predict people’s sexual, relationship, and life satisfaction.

Chapter 8 (Article 4)

A Technology-Informed Approach Avoidance Motivational Framework for Technology-Mediated Sexual Interactions in Committed Romantic Relationship

Erin Leigh Courtice and Dr. Krystelle Shaughnessy

Author's Note

This research was completed with the support of funding awarded to Erin L. Courtice, from the Ontario Graduate Scholarship (2017 – 2018), the Social Sciences and Humanities Research Council (2018 – 2020), and the Society for the Scientific Study of Sexuality's Student Research Grant (2019).

Abstract

Technology-mediated sexual interactions (TMSIs) are interpersonal exchanges of self-created, sexual material via communication technology. Few researchers have applied theoretical frameworks to examinations of TMSI within romantic relationships. In this study, we used the approach-avoidance motivational framework to assess the extent to which TMSI motives predict related outcomes. Our objectives were to (i) develop a construct valid scale to measure people's approach and avoidance motives for TMSI with a current romantic partner, and (ii) examine the extent to which people's TMSI motives would predict sexual, relational, and individual outcomes. In Study One, participants ($N = 269$) completed measures of TMSI motives, online and in-person sexual satisfaction and dyadic sexual desire, and TMSI frequency. We found that the TMSI Motives Scale had three factors (approach, avoidance, affirmation). For measures of sexual satisfaction and desire, online and in-person items loaded on separate factors, suggesting that in-person constructs are distinct from their technology-mediated counterparts. In Study Two, participants ($N = 459$) completed refined versions of Study One measures and measures of relationship and life satisfaction. Structural equation modelling revealed that more frequent TMSIs predicted more frequent approach and avoidance motives. More frequent approach motives predicted stronger – and avoidance motives, weaker – dyadic sexual desire, which in turn predicted higher sexual, relationship, and life satisfaction. These results contribute to and extend past research on sexual motives and TMSI by proposing a theory-driven measure of TMSI motives and demonstrating the utility of the approach-avoidance framework in a technology-mediated context.

Keywords: technology-mediated sexual interactions, approach-avoidance motives, sexting, measure development, romantic relationships.

A Technology-Informed Approach Avoidance Motivational Framework for Technology-Mediated Sexual Interactions in Committed Romantic Relationship

Technology-mediated sexual interaction (TMSI) is a behavioural domain that integrates activities such as sexting, cybersex, phone sex, and virtual sex (Courtice & Shaughnessy, 2017; 2021). People can engage in TMSI within different relationship contexts (e.g., with a committed romantic partner, a casual sex partner, and/or an anonymous stranger); however, researchers have found that most people engage in TMSI with a committed romantic partner (e.g., Brodie et al., 2019; Dir et al., 2013; Döring, 2014; Drouin et al., 2013; Foody et al., 2021; Klettke et al., 2014; Kokkinos & Krommida, 2021; Perkins et al., 2013; Shaughnessy & Byers, 2014; Strohmaier et al., 2014; Van Ouystel et al., 2020; Walker et al., 2013; Weisskirch and Delevi, 2011). This relationship context is unique from others, in part because of the added loyalty and interpersonal maintenance that informs TMSI motives, behaviours, and outcomes (Courtice & Shaughnessy, Chapter 6 of current dissertation). Researchers have found that people report a variety of reasons for engaging in TMSI with a committed romantic partner (Bianchi et al., 2018; Califano et al., 2022; Currin & Hubach, 2019; Currin et al., 2020; Drouin et al., 2013; Drouin & Tobin, 2014; Greer et al., 2022), as well as a range of positive and negative outcomes from their TMSI experiences (e.g., Brodie et al., 2019; Currin et al., 2016; Galovan et al., 2018; Jeanfreau et al., 2019; Matotek et al., 2021; McDaniel & Drouin, 2015; Parker et al., 2013). However, few researchers have examined adults' motives for and outcomes of TMSI with a theory-driven, motivational framework. Furthermore, researchers have not accounted for possible underlying mechanisms that may inform the connection between TMSI motives to outcomes, such as frequency of and sexual desire. The approach-avoidance motivational framework posits that people experience more positive outcomes when their motives direct them towards a positive

outcome (approach motives; Elliot et al., 2006; Gable, 2006; Gable & Impett, 2012). Conversely, people experience more negative outcomes when their motives direct them away from a negative outcome (avoidance motives). Approach and avoidance motives for TMSI could explain why some people experience more positive – and others more negative – TMSI outcomes. Therefore, the overarching goal of this study was to use the approach-avoidance motivational framework to better understand how people's motives for TMSI predict their experience of sexual, relationship, and individual outcomes.

Theoretical Frameworks and Measurement Practices in TMSI Research

A theory-driven approach is essential for advancing knowledge about people's TMSI motivations, behaviours, and outcomes. Theory-driven research can connect TMSI to broader understandings of human behaviour. Researchers use theoretical frameworks to develop research questions and hypotheses, guide data collection and analyses, and propose explanations for observed phenomena (Courtice & Shaughnessy, 2021; Oberauer & Lewandowsky, 2019; Orben, 2020). Researchers use motivational theories to describe what drives behaviour and to make predictions about how people's motivations relate to behavioural outcomes. An approach to research that is driven by motivational theory helps researchers explain their findings with less bias by rooting them in evidence-based understandings of motivation and behaviour. In contrast, atheoretical and exploratory studies allow researchers to observe and describe phenomena, but only to speculate about the explanations for their findings. These speculations may point towards relevant theories, but they cannot be used to identify overall patterns of behaviour in the same way that theory-driven research can. Atheoretical research is also more susceptible to spurious findings that will not replicate in other contexts or with other samples (Type I error; Oberauer et al., 2019). Of course, atheoretical and exploratory studies are often the starting point for research

on new phenomena; this is how researchers begin to establish new or distinct patterns forming in human behaviour. Indeed, researchers have identified that people employ a variety of motivations for and experience a variety of outcomes related to TMSI (e.g., Brodie et al., 2019; Bianchi et al., 2018; Califano et al., 2022; Currin & Hubach, 2019; Currin et al., 2016, 2020; Drouin et al., 2013; Drouin & Tobin, 2014; Galovan et al., 2018; Greer et al., 2022; Jeanfreau et al., 2019; Matotek et al., 2021; McDaniel & Drouin, 2015; Parker et al., 2013). However, most of the research about people's motives for TMSI is atheoretical (for an exception using self-determination theory, see Le et al., 2022; for an exception using attachment theory in combination with approach-avoidance theory, see Lefebvre et al., 2022). Indeed, after decades of research on TMSIs, almost no researchers have used a motivational theory as a lens to connect people's TMSI motives to the outcomes that they experience.

The development of construct valid measurement tools is an essential first step toward theory-driven, empirical research. Construct validity refers to the extent to which a given measure accurately quantifies the domain in question (Boateng et al., 2018; Cronbach & Meehl, 1955; Strauss & Smith, 2009). There are several steps to ensure construct validity in measurement. First, researchers must define the construct they wish to measure. At this stage (sometimes referred to as the “substantive phase”) of measure development, researchers create a conceptual definition from a synthesized understanding of how both researchers and people understand the construct in question (Boateng et al., 2018; Cronbach & Meehl, 1955). As such, the development and refinement of items comprising a measure of TMSI motives should be informed by both theory and data. Researchers who skip this step and instead generate their own list of possible TMSI motives may miss important information that calls the validity of their measure into question. Second, researchers assess the structural validity of measures. Structural

validity (also referred to as criterion validity) is the extent to which the scores of a scale are an accurate indication of the dimensionality of the construct being measured (i.e., item analyses, factor analyses, reliability coefficients; Boateng et al., 2018; Flake et al., 2017). Researchers must also test the extent to which scale responses could be influenced by social desirability bias and examine differences between groups or samples (Boateng et al., 2018; Flake et al., 2017). Third, researchers must assess the external validity of their measure(s). External validity refers to the extent to which a measure assesses the construct with other samples and in other contexts (i.e., examining differences between groups or samples; Mitchell, 2012). Our review of the research revealed that researchers who study the components of TMSI (e.g., sexting, cybersex) rarely attend to construct validity while creating measures of TMSI motives and outcomes. Therefore, one objective of the current research was to create construct valid, theory-driven scales to measure people's motives for engaging in TMSI with a romantic partner.

Approach-Avoidance Motivational Framework and TMSI

The approach-avoidance motivational framework is the most appropriate theoretical lens for examining and linking people's motivations for TMSI with their outcomes related to engaging in TMSI with a romantic partner. The approach-avoidance framework posits that the motivations driving people to engage in a behaviour are associated with the outcomes that they experience (Elliot et al., 2006). Specifically, people can engage in a behaviour for approach motives (that direct them towards positive outcomes) or avoidance motives (that direct them away from negative outcomes). In the domain of sexual behaviour, researchers have consistently found that engaging in partnered sexual activity for approach motives (e.g., to pursue physical pleasure or relational intimacy) is associated with experiencing positive outcomes including greater well-being, enhanced relationship satisfaction, and more positive sexual experiences

(Cooper et al., 1998; Impett et al., 2005; Impett et al., 2008; Impett et al., 2010; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015). Conversely, researchers have found that engaging in partnered sexual activity for avoidance motives (e.g., to prevent negative emotions or relational conflict) is associated with negative outcomes, including more negative feelings about sex, lower levels of sexual and relationship satisfaction, and more relationship conflict (Cooper et al., 1998; Impett et al., 2005; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015). Le and colleagues (2022) applied self-determination theory – another theoretical framework that connects people’s motives to relevant outcomes – to people’s sexting behaviours; however, these researchers focused on applying this perspective mainly to individual motives and outcomes and did not fully account for the interpersonal nature of TMSI. That is, this research does not fully account for motives related to people (e.g., a romantic partner) other than oneself. Because TMSI is an interpersonal (i.e., it requires at least two people) and sexual behaviour, it is likely that the same patterns of approach/avoidance sexual motives and positive/negative outcomes for partnered in-person sexual activity will hold.

Researchers have found some evidence that supports applying the approach-avoidance framework to people’s motives for and outcomes of TMSI. Courtice and Shaughnessy (Chapter 6 of current dissertation) conducted qualitative interviews with 25 participants in romantic relationships and analyzed the results using multi-grounded theory, which incorporated both grounded theory and the approach-avoidance framework. These researchers found that participants described reasons for engaging in TMSI that fit with approach and avoidance categories of motives. Consistent with research on in-person sexual behaviour, participants also described links between their TMSI motives and outcomes, such that avoidance motives appeared related to more negative TMSI experiences and approach motives to more positive

experiences. Courtice and Shaughnessy only reported on participants' overall perception of their TMSI outcomes in relation to their motives; they did not examine if and how people's approach and avoidance TMSI motives predicted specific outcomes. Lefebvre and colleagues (2022) also suggested that there are similar patterns of associations between approach-avoidance motives for TMSI and sexual satisfaction among romantic partners. These researchers found that people who used approach motives for TMSI also tended to report higher levels of sexual satisfaction, whereas people who used avoidance TMSI motives reported lower levels of sexual satisfaction. However, these researchers did not appear to assess construct validity when developing their measures of TMSI motives; instead, they modified existing measures of in-person sexual motives. In doing so, they did not include motives or outcomes that may be unique to the technology-based context. Therefore, the extent to which their findings are accurate is unclear. In the current study, we expected that people who more frequently use approach motives for TMSI with their romantic partner would report higher sexual, relationship, and life satisfaction (H1). We also expected that people who more frequently use avoidance motives for TMSI with their romantic partner would report lower sexual, relationship, and life satisfaction (H2).

The Role of TMSI Frequency and Desire

There are likely additional variables that help explain why approach and avoidance TMSI motives may predict positive and negative outcomes (respectively). Two such variables are the (i) frequency with which people engage in TMSI with their partner; and (ii) the extent to which people desire sexual activity with their partner. Research findings suggest that people who engage in more frequent in-person sexual activity with a romantic partner also experience higher sexual and relationship satisfaction (e.g., Call et al., 1995; Galovan et al., 2018; Laumann et al., 1994; Muise et al., 2015). However, this association between sexual frequency and positive

outcomes may only exist for approach-motivated sexual activity and not for avoidance-motivated sexual activity (Impett et al., 2005). People are more likely to engage in sexual activity with higher frequency when it is positively reinforced and less likely when sexual activity is negatively reinforced (e.g., McNulty et al., 2016; Schoenfeld et al., 2017). Indeed, Joudin and colleagues (2019) found that self-directed approach sexual motives predicted higher levels of in-person sexual frequency, which in turn predicted higher levels of sexual satisfaction among romantic partners. Therefore, when people experience positive TMSI outcomes, they will likely engage in TMSI more frequently relative to those who experience negative TMSI outcomes. In the current study, we expected that people who more frequently engage in TMSI with their romantic partner would more frequently use approach TMSI motives (H3) and that those who less frequently engage in TMSI would more frequently use avoidance TMSI motives (H4).

Researchers also have suggested that people who engage in in-person sexual activity for approach sexual motives experience higher long- and short-term sexual desire; conversely, those who engage in sexual activity for avoidance sexual motives tend to experience lower sexual desire (Impett et al., 2008; Muise et al., 2013). For instance, Muise and colleagues (2013) found that for adults in a romantic relationship, approach motives increased people's dyadic in-person sexual desire (i.e., desire for in-person sexual activity with one's romantic partner), which in turn enhanced their relationship and sexual satisfaction; avoidance motives decreased people's dyadic sexual desire, which in turn decreased their relationship and sexual satisfaction. However, in a separate study, Muise and colleagues (2017) found that approach and avoidance motives did not predict people's dyadic in-person sexual desire. Nevertheless, we expected that people who more frequently engage in TMSI for approach motives would report greater dyadic sexual desire, and in turn, higher sexual, relationship, and life satisfaction (H5). We also expected that people who

more frequently engage in TMSI for avoidance motives would report lower dyadic sexual desire, and lower sexual, relationship, and life satisfaction, in turn (H6).

Current Study

The purpose of this research is to identify the ways in which motives for TMSI with a romantic partner can contribute to people's TMSI outcomes. Little is known about people's approach and avoidance motives for TMSIs with their committed romantic partner(s), nor about the ways in which these motives predict the outcomes that people experience from TMSI with a romantic partner. Furthermore, most of the measures of people's TMSI motives are atheoretical and therefore do not address approach and avoidance motives. To address these gaps, we conducted two studies. The objectives for Study One were to: (i) examine the psychometric properties of the newly developed TMSI Motives Scale, and (ii) adapt measures of sexual satisfaction and desire to the TMSI context. The objective of Study Two was to use these measures to examine the extent to which approach and avoidance TMSI motives predict sexual, relationship, and life satisfaction (see Figure 8.1), as well as to test the mediating effects of dyadic sexual desire on the associations between these TMSI motives and outcomes (see Figure 8.2). Specifically, we hypothesized that:

1. People who more frequently engage in TMSI for approach motives will report higher (a) technology-mediated sexual, (b) in-person sexual, (c) relationship, and (d) life satisfaction.
2. People who more frequently engage in TMSI for avoidance motives will report lower (a) technology-mediated sexual, (b) in-person sexual, (c) relationship, and (d) life satisfaction.
3. People who more frequently engage in TMSI with their romantic partner will also more frequently use approach TMSI motives.
4. People who less frequently engage in TMSI with their romantic partner will more frequently use avoidance TMSI motives.
5. People who more frequently engage in TMSI for approach motives will report (a) higher dyadic sexual desire and, in turn, higher (b) sexual, (c) relationship, and (d) life satisfaction.

6. People who more frequently engage in TMSI for avoidance motives will report (a) lower dyadic sexual desire and, in turn, lower (b) sexual, (c) relationship, and (d) life satisfaction.

Study One

Currently, there are no existing measures that assess people's approach and avoidance TMSI motives, nor sexual satisfaction and dyadic sexual desire specific to the TMSI context. It is also unclear if existing measures of in-person sexual satisfaction and dyadic in-person sexual desire are appropriate for technology-mediated contexts of sexual behaviour. However, researchers have suggested that different behavioural contexts may influence the construct validity of measurement (Flake et al., 2017). Therefore, our goal in Study One was to create and examine the initial structural validity of self-report measures of approach/avoidance TMSI motives, technology-mediated sexual satisfaction, and dyadic technology-mediated sexual desire.

Methodology

Participants

A total of 526 people consented to participate in this online survey study. To be included in analyses, participants were required to speak and write English well, be 18 years of age (or turning 18 in the calendar year that the study was conducted) and be in a committed relationship with someone with whom they had engaged in TMSI. Of the 438 participants who consented and were eligible to participate, we excluded 40 who did not answer any questions after consenting to participate, 67 who did not complete questions after establishing their eligibility, and 16 participants who quit the survey without completing measures beyond the sexual desire inventory, which was the first key variable of interest that appeared in the survey. We also excluded an additional 40 participants whose responses indicated insufficient effort (i.e., directed questions, survey response timing, and self-reported levels of effort and attention; see Ashley & Shaughnessy, 2021).

We present detailed participant sociodemographic information in Table 8.1. Of the 269 participants retained for analyses, 148 (55.0%) were cisgender women, 110 (40.9%) were cisgender men, and 11 (4.1%) did not report their gender or were transgender/non-binary people. At the time of the study, participants were between 17 – 39 years of age ($M = 19.37$, $SD = 2.66$). All participants were currently enrolled in a first-year undergraduate course at the University of Ottawa and 66.2% indicated that they had partially completed a post-secondary degree. A substantial minority (29.7%) of participants identified as a visible ethnic/racial minority, including African, Arabic, Caribbean, Chinese, Filipino, Latinx, and Vietnamese. Most participants (81.0%) identified as heterosexual. On average, participants reported that they had first engaged in TMSI when they were 16.4 years old ($SD = 1.95$).

All participants indicated that they were in some form of a committed relationship (see Table 8.1). The average current relationship length was 19.9 months ($SD = 19.01$). Most participants (90.0%) did not currently live with their romantic partner, and 40.9% were currently long-distance with that partner (months in LDR $M = 8.17$, $SD = 11.02$). Of those who were not currently in a long-distance relationship, 21.2% had been long-distance with their current partner at some point in their relationship (months in LDR $M = 8.28$, $SD = 9.51$).

Measures

Background Questionnaire. We used a background questionnaire to assess participants' demographic characteristics (e.g., gender, age, sexual orientation, relationship status, ethnicity), relationship experience, and sexual experience. These demographic items were selected to be consistent with previous research on sexting and cybersex in the committed relationship context (e.g., Drouin et al., 2013; Shaughnessy & Byers, 2014). Some of these questions allowed participants to select multiple options that applied to them, and other questions allowed

participants to write in their own answers (which we re-coded if they fit with the available options) or to select an option indicating that they did not want to respond (see Table 8.1).

TMSI Motives Scale. We created the TMSI Motives Scale (TMSIMS, suggested English pronunciation: “Tim-Sims”) for this study. To create this scale, we considered two related, but distinct, constructs: approach TMSI motives and avoidance TMSI motives. Based on past research on approach and avoidance sexual motives (e.g., Cooper et al., 1998; Impett et al., 2005; Impett & Tolman, 2006; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015), we defined approach TMSI motives as “reasons for TMSI that drive individuals towards a perceived positive outcome” and avoidance TMSI motives as “reasons for TMSI that drive individuals away from a perceived negative outcome” In keeping with recommended guidelines for construct validity (Boateng et al., 2018; Cronbach & Meehl, 1955), we used Courtice and Shaughnessy’s (Chapter 6 of current dissertation) qualitative findings and previous measures of approach-avoidance sexual motives (e.g., Cooper et al., 1998; Impett et al., 2005) as part of our substantive phase for developing the TMSIMS item pool. Specifically, we compared the themes and categories of approach and avoidance TMSI motives identified in Courtice and Shaughnessy’s research with subscales and items on existing measures of approach and avoidance sexual motives (e.g., Cooper et al., 1998; Impett et al., 2005). Courtice and Shaughnessy (Chapter 6 of current dissertation) identified four overarching themes of TMSI motives (i.e., self-, partner-, relationship-, and technology-focused TMSI motives), which altogether contained seven sub-categories of approach TMSI motives and seven sub-categories of avoidance TMSI motives. Approach TMSI motives included approaching sexual gratification, approaching positive body image, approaching partner’s sexual gratification, approaching partner’s emotional state, approaching emotional and sexual connection, approaching relationship preservation/

maintenance, and using technology to approach in-person sexual activities. Avoidance TMSI motives included avoiding negative emotional states, avoiding negative body image, avoiding partner's loss of interest, avoiding partner's sexual disappointment, avoiding doubt about the relationship, and using technology to avoid in-person sexual activity.

Many of Courtice and Shaughnessy's (Chapter 6 of current dissertation) overarching categories of approach and avoidance TMSI motives aligned with both Cooper et al. (1998) and Impett et al.'s (2005) measures of approach and avoidance motives for in-person sexual activities, with one exception: technology-focused approach and avoidance TMSI motives (i.e., using technology to approach and avoid in-person sexual activities). Therefore, we adopted five subscales and their items (23 items total) directly from Cooper and colleagues' (1998) original Sexual Motivations Scale: *Enhancement*, *Intimacy*, *Coping*, *Appeasing*, and *Affirmation*. Some of these items were also used (but re-phrased, in some cases) by Impett et al. (2005), in a shortened measure of approach and avoidance motives for in-person sexual activity. To ensure we had a large enough item pool to run exploratory factor analyses and refine our measure, we needed 8 items per factor (Boateng et al., 2018; Schinka et al., 2012). Thus, we created and added three new items each to the *Coping*, *Enhancement*, and *Affirmation* subscales, and four new items to the *Appeasement* and *Intimacy* subscales. These new items represented motivations for TMSI based on Courtice and Shaughnessy's findings. We also created the technology-focused TMSI motives subscales. To do so, we conceptualized two new subscales with 8 items each focused on: *Approaching In-Person Encounters* and *Avoiding In-Person Encounters*. Our initial item pool contained 56 items, representing three *approach* and three *avoidance* TMSI motive subscales, and one *affirmation* TMSI motives subscale.

We based the format, instructions, and response options for the TMSIMS on Cooper et al.'s (1998) Sexual Motivations Scale, but changed the language to apply to TMSI. All items on the TMSIMS were presented to participants in a random order, alongside the following instructions: "For each statement, select the response that best describes **how often**, on average, you have engaged in TMSI **with your current romantic partner** for each of these reasons." Each item represented a specific motive for engaging in TMSI with a romantic partner (see Table 8.2). Participants used a five-point scale to rate the frequency with which they had each motive when engaging in TMSI with a committed partner throughout the course of their relationship (*1 = Almost never, 5 = Almost always*). Participants were also able to select a sixth option, *This question does not make sense to me*, which we used to flag potentially confusing items.

Top Three TMSI Motives Question and Follow-Up Question. We used an open-ended question to assess participants' top three reasons for engaging in TMSI with their current romantic partner (i.e., *Below, write in your TOP 3 or MAIN 3 reasons that you have engaged in a TMSI with your current romantic partner*). We compared participant responses to this question against the items that we included in the TMSIMS to assess the content validity of the measure. Additionally, participants were presented with their answers to the Top Three TMSI Motives question after they completed the TMSIMS. Then, participants were asked whether they would change or add anything to their list of top three TMSI motives based on the motives questions just completed. Participants were presented with a text box wherein they provided additional commentary about their original responses. We used the responses to this question to help determine which items to maintain and which items to drop from the final version of the TMSIMS. That is, if a given item had only a moderate factor loading but was common in participant responses to this question, we made the decision to maintain the item.

TMSI Prevalence. We used a shortened, 12-item version of the TMSI Checklist (Courtice et al., 2018; Davies et al., 2018) to assess people's experience with different types of TMSI activities. Each item on the TMSI Checklist describes an activity that is consistent with Courtice and Shaughnessy's (2018) conceptual definition of TMSI. We asked participants whether they had engaged in each of the activities listed *with their current romantic partner* (e.g., *Have you ever... Exchanged sexual typed messages, back and forth, with your current romantic partner [e.g. words or emojis]?*). We created a total score for each participant based on the number of experiences they selected 'yes' for; this total score indicates the number of TMSI experiences they had ever had with their current partner.

In-Person Sexual Satisfaction. We used the Global Measure of Sexual Satisfaction (GMSEX; Lawrance & Byers, 1998) to measure participants' own feelings of in-person sexual satisfaction with their current partner. In previous studies of in-person sexual behaviour, the GMSEX has demonstrated high internal consistency (Cronbach's alphas ranging from .90 to .96) and construct validity (Lawrence et al., 2019). Participants were instructed to think only about "offline and in-person sexual activities" with their current partner when responding to these items. Participants rated how they would describe their overall sexual relationship with their current romantic partner on five bipolar items: *Good-Bad*, *Pleasant-Unpleasant*, *Positive-Negative*, *Satisfying-Unsatisfying*, and *Valuable-Worthless*. The original version of the GMSEX uses a seven-point Likert scale; due to a programming error, participants in this study used an eight-point bipolar scale. Ratings for all five items were summed to create a total score between five and 40, with higher scores indicating greater in-person sexual satisfaction.

Technology-Mediated Sexual Satisfaction. We modified the GMSEX to assess people's satisfaction with the technology-mediated aspects of their sexual relationship (i.e., *Overall, how*

would you describe your technology-mediated sexual relationship with your current romantic partner?). We also presented participants with the same definition of TMSI that preceded the Adapted TMSI Checklist. Participants used an eight-point bipolar scale to rate the same five bipolar items that they were presented with when completing the GMSEX. We scored this adapted version of the GMSEX in the same way as the in-person version.

Dyadic In-Person Sexual Desire. We used the eight-item *Dyadic Sexual Desire* subscale from the Sexual Desire Inventory (SDI; Spector et al., 1996) to assess participants' desire for in-person sexual activity with their current partner (e.g., *On average, how often would you prefer to engage in sexual activity with your current romantic partner?*). In previous studies of in-person sexual desire, the *Dyadic Sexual Desire* subscale has demonstrated high internal consistency (Cronbach's alpha of .86) and construct validity (Spector et al., 2019). To ensure that participants only considered their desire for in-person sexual activity when responding to each item, we gave the following instructions: "This next set of questions asks about your level of sexual desire. By desire, we mean INTEREST IN or WISH FOR IN-PERSON SEXUAL ACTIVITY." For each item, participants were asked to use a rating scale to identify their thoughts about or interest in different types of sexual activity in the past month; items one and two had an eight-point Likert scale and the remaining six items had a nine-point Likert scale. For each item, a higher score indicated higher levels of sexual desire. Consistent with the scoring instructions for the *Dyadic Sexual Desire* subscale, ratings for all eight items were summed to create a total score between five and 35, with higher scores indicating greater in-person sexual desire.

Dyadic Technology-Mediated Sexual Desire. We modified the eight dyadic items from the SDI to address TMSI (e.g., *On average, how often would you prefer to engage in TMSI with your current romantic partner?*), and examine participants' desire for engaging in technology-

mediated sexual activity with a partner. At the beginning of this scale, we presented participants with the definition of TMSI and instructions to consider only their desire for TMSI when responding. Participants used the same eight- or nine-point Likert scales as the SDI; we summed the items as per the in-person scale.

Socially Desirable Responding. We assessed participants' tendencies towards socially desirable responding with the Balanced Inventory of Desirable Responding (BIDR-6; Paulhus, 1988). The BIDR-6 consists of 40 items (20 reverse-scored) measuring two subscales: (i) self-deceptive enhancement (i.e., the tendency to give honest but positively biased reports, example item *I never regret my decisions; 20 items*), and (ii) impression management (i.e., tendency to give inflated self-descriptions to an audience; example item: *I never cover up my mistakes; 20 items*). Participants indicate the extent to which a statement is true/not true about them, using a seven-point Likert scale (*1 = Not true, 7 = Very true*). Both subscales include items that refer directly to sexuality, making it a relevant measure of socially desirable response bias for the present study. The items comprising each subscale are summed to create two subscale scores, indicating the extent to which an individual engages in self-deceptive enhancement and impression management, respectively. For both subscales, a higher score indicates a greater tendency to engage in that form of desirable responding. In previous studies, the BIDR-6 has shown good internal consistency (Cronbach's alpha ranging from .80 to .83; Li & Bagger, 2007; Meston et al., 1998).

To verify the internal consistency of the BIDR-6, we also conducted a post-hoc Principal Components Analysis (PCA) to ensure that both subscales would hold. We provide details of these analyses in the Supplementary Materials (see Appendix K). Our analyses suggested that the BIDR-6 may not be appropriate for measuring socially desirable responses in our sample.

Indeed, other researchers have identified that the original factor structure of the BIDR-6 may not hold up in unique contexts (e.g., with incarcerated male offenders; Kroner & Weeks, 1996).

Therefore, it is possible that the BIDR-6 may require revision, considering social changes that have occurred in the 34 years since it was developed.

Procedure

Participants were recruited from a large, French-English bilingual university in Canada to take part in an online survey study about “technology-mediated sexual interactions in romantic relationships” from September 2018 to April 2019. All participants were university students enrolled in an introductory psychology course, who voluntarily registered for this study from a list of open research studies in exchange for course credit. Upon registering, participants received a link to access the online survey study on Qualtrics. The first page of the survey was an Informed Consent Form, which provided information about the study, participants’ rights, privacy, confidentiality, and information about data management and storage (see Appendix H). Participants actively clicked to indicate consent and were then directed to the survey questions and scales. Following a study eligibility screener, participants were presented with measures in the following order: Background Questionnaire, Dyadic In-Person Sexual Desire, GMSEX, TMSI Checklist, Dyadic Technology-Mediated Sexual Desire, TMSI Satisfaction, Top Three TMSI Motives Question, TMSIMS, TMSI Motives Follow-up Question, Body Esteem Scale, Balanced Inventory of Desirable Reporting, Survey Experience Questions, and Effort and Attention Questions (see Appendix I). We do not report analyses related to the body-esteem scale because it was not directly related to any of our research goals or hypotheses. On the final page of the survey, we provided participants with debriefing information (see Appendix J). This study was approved by the Research Ethics Board at the University of Ottawa.

Analytic Approach. To evaluate and improve our newly created TMSIMS, we first examined the factor structure of the scale using a series of Exploratory Factor Analyses (EFAs). EFAs with maximum likelihood factor extraction were the most appropriate assessment for our purposes because, as a necessary part of measure development, we expected to make significant refinements to the scale (Gerbing & Hamilton, 1996; Haig, 2005; Schmitt, 2011). We used several metrics to determine the number of factors and items to retain. First, we conducted parallel analyses to examine a probable number of maximum factors (O'Connor, 2000; Sakaluk & Short, 2017). Consistent with O'Connor's (2000) recommendations, we generated 1000 distinct simulated datasets to establish 95th percentile estimates for factor eigenvalues and compared the simulated data to the eigenvalues from our actual data. We used this information to inform the upper maximum number of factors to retain for each analysis. Second, we examined scree plots, eigenvalues, and the proportion of variance explained for each additional factor retained. Third, we used a criterion of at least .32 for loadings and no more than .32 for cross-loadings (Costello & Osborne, 2005; Sakaluk & Short, 2017). However, we supplemented this information with item-level statistics (i.e., item-level range, means and standard deviations, skewness and kurtosis, and frequency of "this item doesn't make sense to me" responses), as well as responses to the Top 3 TMSI Motives questions to assist in item-specific decisions (e.g., keep, discard, or modify item). In doing so, we balanced statistical decision-making with construct validity decision-making in refining our TMSIMS measure. Despite the poor internal consistency of BIDR, we did explore the extent to which self-deceptive enhancement and impression management response tendencies may have influenced our measures of TMSI motives, in-person and technology-mediated sexual satisfaction, dyadic in-person sexual desire, and dyadic technology-mediated sexual desire. Specifically, we examined bivariate correlations

between the self-deceptive enhancement and impression management subscales of the BIDR-6 and the total scores on the final versions of the subscales of the TMSIMS, as well as the total scores on the final versions of our sexual satisfaction and desire measures (see Table 8.8).

Because of the questionable internal consistency of the BIDR-6 with our sample, we used a more stringent significance cut-off of $p < .01$.

We conducted Principal Component Analysis (PCA) to separately examine the combined factor structures of our measures assessing (i) in-person and technology-mediated sexual satisfaction and (ii) dyadic in-person and technology-mediated sexual desire. Specifically, we sought to examine the extent to which sexual satisfaction and dyadic sexual desire in technology-mediated contexts were distinct from these constructs related to in-person context. PCA was the most appropriate approach to factor analysis because, in each case, we were essentially merging two multi-item scales (Arguello & Crescenzi, 2019). We used orthogonal (Varimax) rotation to aid interpretability because in-person sexual activity is conceptually distinct from TMSI (Tabachnick et al., 2013). Consistent with our EFA approach, we used item-level responses, scree plots, eigenvalues, proportion of variance, and parallel analyses to determine the number of factors to retain for each measure comparison. We used the same cut-off of .32 for loadings and cross-loadings (Costello & Osborne, 2005; Sakaluk & Short, 2017; Tabachnick et al., 2013). Relative to our EFAs, we relied more heavily on these statistical cut-offs in our decision-making process because we did not plan to further refine these measures in Study Two.

Results

Preliminary Analyses for TMSI Motives Scale

We assessed the suitability of EFA prior to analyses. Data screening revealed four multivariate outliers (based on a chi-square distribution of Mahalanobis' distance), which were

excluded from these analyses. We examined the item-level statistics and the statistical assumptions that coincide with an EFA. In Table 8.2, we present the prevalence of responses that indicated each item 'did not make sense' to participants alongside item-level means, standard deviations, ranges, skewness, and kurtosis. Across items, the highest frequency of responses indicating that an item did not make sense was 17 (6.5%); for the majority of items, less than 5 participants indicated confusion. Many of the items related to avoidance TMSI motives displayed moderate-to-significant positive skewness and kurtosis (Tabachnick et al., 2013), which is typical for measures of avoidance motives for in-person sexual behaviour (Muise et al., 2017). Because factor analyses tend to be quite robust when it comes to violations of normality, we continued with the analyses as planned. However, due to the non-normal distribution of our data, we selected data analytic strategies that are known to perform better with non-normal data (i.e., robust maximum likelihood statistics). Inspection of the correlation matrix showed that all variables had inter-item correlations above .20, meaning they were all correlated past the minimum cut-off (Tabachnick et al., 2013). Because our items were correlated, we used Oblique Rotation (rather than Orthogonal rotation) to orient the results of our EFAs (see Table 8.3; Sakaluk & Short, 2017; Tabachnick et al., 2013). We then compared the two oblique rotation methods offered through SPSS (Direct Oblimin and Promax) to determine which method produced the clearest, simple structure. Neither method produced complex variables, nor were the structures substantially different. However, using a Promax rotation produced slightly higher factor loadings while allowing factors to correlate. The Kaiser-Meyer-Olkin (KMO) Test had a value of .90, a classification of 'meritorious' according to Kaiser (1974). Bartlett's test of sphericity was statistically significant, $\chi^2(1540) = 8516.55, p < .001$, indicating that the data was likely factorizable. The parallel analysis suggested an upper maximum of four factors.

Factor Structure of the TMSI Motives Scale

The initial EFA included a total of 11 factors. The two-factor solution explained 30.97% of the total variance, the three-factor solution explained 49.42% of the total variance, and the four-factor solution explained 53.33% of the total variance. A mixture of items from both the appeasement and avoiding in-person interaction subscales loaded on Factor 1, items from the affirmation subscale loaded on Factor 2, items from the enhancement subscale loaded on Factor 3, and items from the approaching in-person sexual interactions subscales loaded on Factor 4. The remaining seven factors for this initial solution contained a range of one to four items.

Next, we examined results from forced-extraction EFAs for two-, three-, and four-factor solutions, in line with the two-factor approach-avoidance theory, the scree plot results (three factors), and the upper limit set by the parallel analysis (four factors). The two-factor solution explained 44.03% of the total variance. The pattern matrix indicated that most of the ‘approach’ and all the ‘affirmation’ items loaded on Factor 1, most of the ‘avoidance’ items loaded on Factor 2, and the ‘affirmation’ items were distributed between both factors. For this two-factor solution, all items that loaded onto a factor had a loading greater than .32. Six items had cross-loadings greater than .30, and one item did not load on either factor. The three-factor solution explained 49.42% of the total variance. The pattern matrix indicated that there were strong loadings of most of the ‘approach’ items on Factor 1, most of the ‘avoidance’ items on Factor 2, and most of the ‘affirmation’ items on Factor 3. For this three-factor solution, all items that loaded onto a factor had a loading greater than .32. Six items had cross-loadings greater than .32, and one items did not load on any of the three factors. The four-factor solution explained 53.33% of the total variance. The pattern matrix indicated that most of the ‘enhancement’ and ‘intimacy’ subscale items, as well as some of the ‘approaching in-person sexual activity’ subscale items,

loaded on Factor 1. Most of the ‘appeasement’ and ‘avoiding in-person sexual activities’ loaded on Factor 2. A mixture of the ‘coping’ and the remaining ‘approaching in-person sexual activities’ subscale items loaded on Factor 3, and almost all the ‘affirmation’ items loaded on Factor 4. For this four-factor solution, all items that loaded onto a factor had a loading greater than .32. Eight had cross-loadings greater than .32 and one item did not load on any of the four factors. Based on these results, the three-factor solution made the most sense, for a few reasons. First, the three-factor solution aligned with the initial scree plot results and was below the upper limit set by parallel analysis. Second, the majority of the (conceptual) TMSIMS subscales relate specifically to sexual experiences and/or romantic relationships. However, the affirmation subscale is a conceptual outlier, in that it relates to people’s feelings about and perceptions of their appearance; thus, it makes sense for it to be a standalone component. Third, all three solutions had relatively similar patterns of loadings and cross-loadings; therefore, we chose the three-factor solution, which made the most conceptual sense.

Next, we compared the results of the forced three-factor solution against participant responses to the Top 3 TMSI Motives question, as well as the item-level statistics for each question. Specifically, we flagged items that appeared to be the least construct valid and then dropped them from the three-factor solution, one by one, until we were left with the twelve highest-loading items for each of our three factors (approach TMSI motives, avoidance TMSI motives, and affirmation TMSI motives). Because we wanted to be consistent with previous research on approach-avoidance sexual motives, we also sought to maintain at least four items from each of our seven conceptual subscales (i.e., enhancement, intimacy, approaching in-person sexual activity, coping, appeasement, avoiding in-person sexual interactions, and affirmation). The flagged items, the justification for why we flagged them, and the decision about whether to

drop/retain each item are presented in the Study 4, Survey One Supplementary Materials (see Appendix K).

The final factor solution component loadings and communalities of the rotated solution of the refined, 30-item measure are presented in Table 8.3. The results point to three conceptually reasonable factors that explained 51.99% of the variance: Factor 1 contained items related to ‘approach’ TMSI motives (i.e., four items each from the intimacy, enhancement, and approaching in-person interactions subscales); Factor 2 contained items related to ‘avoidance’ TMSI motives (i.e., four items each from the appeasement, coping, and avoiding in-person interactions subscales); and Factor 3 contained items related to seeking ‘affirmation’ about one’s body. We retained two items that cross-loaded above .32 on a second factor, as well as one item that loaded below .32 on one factor because these items represented highly endorsed motives in past research and among our participants.

Measuring In-Person and Technology-Mediated Sexual Satisfaction

We assessed the suitability of PCA prior to analyses. Data screening revealed three univariate outliers and three multivariate outliers (based on a chi-square distribution of Mahalanobis' distance), which we excluded. Next, we examined the item-level statistics and statistical assumptions that coincide with a PCA. We present the item-level means, standard deviations, ranges, skewness, and kurtosis in Table 8.4. Inspection of the correlation matrix showed that all variables had inter-item correlations above .20, meaning they were all correlated past the minimum cut-off (Tabachnick et al., 2013). Because our items were correlated, we used Oblique Rotation (rather than Orthogonal rotation) to orient the results of our PCAs (see Table 8.5; Sakaluk & Short, 2017; Tabachnick et al., 2013). We then compared the two oblique rotation methods offered through SPSS (Direct Oblimin and Promax) to determine which method

produced the clearest, simple structure. Neither method produced complex variables, nor were the structures substantially different. However, using a Promax rotation produced slightly higher factor loadings while allowing factors to correlate. The Kaiser-Meyer-Olkin (KMO) Test had a value of .91, a classification of 'meritorious' according to Kaiser (1974). Bartlett's test of sphericity was statistically significant, $\chi^2(45) = 2747.01, p < .001$, indicating that the data was likely factorizable. The parallel analysis suggested an upper maximum of two factors.

The PCA revealed two components that had eigenvalues greater than one and that explained 64.7% and 82.7% of the total variance, respectively. Visual inspection of the scree plot also indicated that two components should be retained (Cattell, 1966). Furthermore, a two-component solution met our interpretability criterion, with all items achieving loadings above .32 and no cross-loadings above .32 (Costello & Osborne, 2005; Sakaluk & Short, 2017; Tabachnick et al., 2001). As such, we retained two components.

The two-component solution explained 82.7% of the total variance. The rotated solution exhibited a 'simple structure' (Thurstone, 1947). The interpretation of the factors was consistent with the context of sexual activities that each scale was designed to measure. That is, there were strong loadings of the in-person sexual satisfaction items on Component 1 and the TMSI items on Component 2, with no cross-loaded items greater than .32. We present component loadings and communalities of the rotated solution in Table 5.

Measuring Dyadic In-Person and Technology-Mediated Sexual Desire

We assessed the suitability of PCA prior to analyses. Data screening revealed three univariate outliers and one multivariate outlier (based on a chi-square distribution of Mahalanobis' distance), which we excluded from these analyses. Next, we examined the item-level statistics and the statistical assumptions that coincide with a PCA. We present the item-

level means, standard deviations, ranges, skewness, and kurtosis in Table 8.6. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.2 (Tabachnick et al., 2013). Because our items were correlated, we used Oblique Rotation (rather than Orthogonal rotation) to orient the results of our PCAs (see Table 8.7; Sakaluk & Short, 2017; Tabachnick et al., 2013). We then compared the two oblique rotation methods offered through SPSS (Direct Oblimin and Promax) to determine which method produced the clearest, simple structure. Neither method produced complex variables, nor were the structures substantially different. However, using a Promax rotation produced slightly higher factor loadings while allowing factors to correlate. The Kaiser-Meyer-Olkin (KMO) Test had a value of .87, a classification of 'meritorious' according to Kaiser (1974). Bartlett's test of sphericity was statistically significant, $\chi^2(190) = 3049.70, p < .001$, indicating that the data was likely factorizable. The parallel analysis with the combined dyadic in-person and technology-mediated sexual desire items suggested an upper maximum of four factors.

The initial PCA revealed five components that had eigenvalues greater than one and that explained 36.0%, 47.8%, 58.7%, 65.2%, and 70.5% of the total variance, respectively. Visual inspection of the scree plot indicated that either two or three components should be retained (Cattell, 1966). The pattern matrix from the initial PCA included a total of four components. Seven items related to desire for TMSI comprised Component 1 and five items related to desire for in-person sexual activity comprised Component 2. Component 3 was comprised of four items related to desire for in-person sexual activity and TMSI stemming from seeing an attractive person, and Component 4 included the remaining three items related to in-person sexual desire.

Next, we examined results from forced-extraction PCAs for two- and three-component solutions, in line with the distinction between desire for in-person and technology-mediated

sexual activity, the scree plot results (two or three components), and the upper limit set by the parallel analysis (four components). The pattern matrix for the two-component forced-extraction did not have a clear structure; 11 items had loadings above .32 on Component 1 (with one item cross-loading above .32 on Component 2), seven items had loadings above .32 on Component 2 (with one item cross-loading above .32 on Component 1), and the remaining item did not load above .32 on either component. The pattern matrix for the three-component forced-extraction revealed three distinct components. Eight of the items related to desire for TMSI had loadings above .32 on Component 1 (with one item cross-loading above .32 on Component 2).

Component 2 was comprised of five items related to desire for in-person sexual activity and TMSI stemming from seeing an attractive person or being in a romantic situation; all but one of these items had loadings above .32 (the remaining item had a loading of .31). The remaining seven items related to desire for in-person sexual activity loaded on Component 3. Based on these results, the three-component solution made the most sense, for a few reasons. First, the three-component solution aligned with the initial scree plot results and was below the upper limit set by parallel analysis. Second, the majority of the dyadic sexual desire items (for both in-person and technology-mediated sexual desire) relate specifically to desire for sexual activity with one's own romantic partner. The items related to spending time with an attractive person or in a romantic situation appear to be conceptual outliers, in that they relate to generalized sexual desire rather than sexual desire specifically for one's partner; thus, it makes sense for these items to comprise a standalone component. Third, all three solutions had relatively similar patterns of loadings and cross-loadings; therefore, we proceeded to further assess and refine the three-factor solution, which made the most conceptual sense.

Because the purpose of our research was to examine people's desire for sexual activity and TMSI specifically with their romantic partner, we next tested a two-component forced extraction PCA without the items related to spending time with an attractive person or in a romantic situation. This solution explained 54.9% of the total variance. Component 1 included all seven of the remaining items related to desire for TMSI with one's partner, and Component 2 included all seven of the remaining items related to desire for in-person sexual activity with one's partner. All items loaded above .32 onto their respective components and there were no cross-loadings above .32. To further reduce the number of items entering Study Two, we then dropped the lowest-loading items from Component 1 ("How long could you go comfortably without engaging in TMSI with a partner?"; loading of .65) and Component 2 ("How long could you comfortably go without having sexual activity with some kind of partner?"; loading of .58). This final component structure explained 59.1% of the variance; although this is slightly below 60%, we accepted this component structure with the knowledge that we would test these scales again in Study Two. We present component loadings and communalities of the rotated solution in Table 8.7.

Socially Desirable Responding

Bivariate correlations revealed that self-deceptive enhancement was significantly positively correlated with in-person sexual ($r = .19, p = .002$) and technology-mediated ($r = .20, p < .001$) satisfaction. Impression management was significantly positively correlated with technology-mediated sexual satisfaction ($r = .18, p = .003$). All other correlations were not significant (see Table 8.8).

Discussion

The overarching purpose of Study One was to create and examine the initial structural validity of self-report measures of approach/avoidance TMSI motives, technology-mediated sexual satisfaction, and dyadic technology-mediated sexual desire. The results suggested that the TMSI Motives Scale was comprised of three subscales, which respectively assess people's approach, avoidance, and affirmation motives for TMSI with a romantic partner. Our results also suggested that the TMSIMS factors were internally consistent; however, further evaluation and refinement (e.g., modifications to the wording of some items) are warranted to improve the structural validity of this measure. Although the final factor structure for this scale was not perfect, we were able to further test and refine it in Study Two. We also found that our measures of technology-mediated sexual satisfaction and dyadic technology-mediated sexual desire were each internally consistent, and that they represented different constructs in comparison to measures of in-person sexual satisfaction and dyadic in-person sexual desire. This finding suggests that satisfaction with and desire for TMSI should be measured separately from in-person sexual satisfaction and desire. Finally, our results suggest that some aspects of socially desirable responding may influence people's assessments of their affirmation TMSI motives and outcomes. However, we also found that the factor structure of the Balanced Inventory of Socially Desirable Responding did not hold up in our sample, suggesting a different measure of socially desirable responding should be used in Study Two. Overall, the results of Study One suggest that people report TMSI motives that fall within the approach-avoidance framework, and that technology-mediated sexual satisfaction and dyadic technology-mediated sexual desire may be different constructs relative to in-person sexual satisfaction and desire. The measures developed in this study show evidence of content and structural validity that can be further evaluated and used in Study Two.

Study Two

The purpose of Study Two was to examine the extent to which approach and avoidance TMSI motives predict people's dyadic sexual desire, and in turn, their technology-mediated and in-person sexual satisfaction, relationship satisfaction, and satisfaction with life. We also sought to examine the extent to which people's TMSI frequency predicted the motives that they employ for TMSI. We expected to find that more frequently engaging in TMSI with one's partner would predict more frequent use of approach motives for TMSI, whereas less frequent TMSI would predict more frequent use of avoidance motives (see Figure 8.1). We also expected that more frequent use of approach TMSI motives would predict greater dyadic sexual desire and, in turn, enhanced sexual, relationship, and life satisfaction. Finally, we expected that more frequent use of avoidance TMSI motives would predict lower dyadic sexual desire and, in turn, decreased sexual, relationship, and life satisfaction (see Figure 8.2).

Methodology

Participants

A total of 720 people consented to participate in this online survey study. To be included in analyses, participants were required to speak and write English well, be 18 years of age or older, and be in a committed relationship with someone with whom they had engaged in TMSI. Of the 720 participants who consented to participate, we excluded six who did not meet inclusion criteria, as well as four who provided responses indicating that they did not pay adequate attention or respond to the survey honestly (i.e., insufficient effort responding assessed via directed questions, survey response timing, and self-reported levels of effort and attention; Ashley & Shaughnessy, 2021). We also excluded 251 participants who only completed the first half of the study (i.e., data was 100% missing after the survey midpoint), because these

participants did not provide responses for most of the variables related to our Confirmatory Factor Analyses and hypothesized models.

We present detailed participant sociodemographic information in Table 8.9. Of the 459 participants that we retained for analyses, 158 (34.4%) were undergraduate students (recruited using the same processes as in Study One), 281 (61.2%) were recruited through Qualtrics, and 20 (4.3%) were recruited through Twitter advertisements. Most participants retained for analyses were cisgender women ($n = 251$, 54.7%); 120 (26.1%) were cisgender men, 17 (4.0%) were non-binary people, and 2 (0.4%) chose not to report their gender. Some participants ($n = 69$, 15.0%) only reported their gender as “cisgender” without identifying if they were a cisgender man or woman. The majority of participants identified as white ($n = 282$, 61.4%); the remaining participants reported a wide variety of racial identities, including African, Arabic, Caribbean, Chinese, Filipino, Latinx, and Vietnamese. Most participants ($n = 373$, 81.3%) identified as heterosexual or mostly heterosexual, and most participants indicated that they had completed all or part of a university or college education ($n = 298$, 64.9%). All participants were between 18 and 78 years of age ($M = 30.31$, $SD = 13.02$) and indicated that they were in some form of a committed relationship. The average current relationship length among participants was 78.15 months ($SD = 104.09$). Most participants (55.8%) shared a household with their current partner and 27.0% were currently long-distance with their current partner (months in LDR $M = 18.40$, $SD = 33.46$). Of those who were not currently in a long-distance relationship, 29.0% had been long-distance with their current partner at some point in their relationship (months in LDR $M = 18.27$, $SD = 40.78$).

Measures

We used the results of Study One to inform the measures used in Study Two. Specifically, in Study Two we used a similar background questionnaire with modified wording on some questions to be more inclusive of diverse identities. We also used the same in-person and technology-mediated sexual satisfaction, and the final versions of the dyadic in-person and technology-mediated sexual desire measures. We present information about the internal consistency of each measure within our current sample in Table 8.10.

TMSI Motives Scale. We used the refined TMSI Motives Scale (TMSIMS) from Study One to assess participants' motives for TMSI with their current romantic partner. This version of the TMSIMS was comprised of three subscales: Approach TMSI Motives (12 items; four for 'enhancement,' four for 'intimacy,' and four for 'approaching in-person sexual activity'), Avoidance TMSI Motives (12 items; four for 'coping,' four for 'appeasement,' and four for 'avoiding in-person sexual activity'), and Affirmation TMSI Motives (six items). We did not include the Affirmation subscale in our analyses because it does not directly address approach and avoidance motives for TMSI. All 30 TMSIMS items were presented to participants in a random order. Participants used a five-point scale (*1 = Almost never, 5 = Almost always*) to rate their frequency of engaging in TMSI with each motivation. Before using the TMSIMS to test our hypothesized models, we clarified the factor structure of the scale using confirmatory factor analyses. We expected separate approach and avoidance subscales with items that summed together to create a total score, representing the frequency with which each motive was used.

TMSI Frequency. We used a longer, 29-item version of the TMSI Checklist to assess participants' frequency of TMSI with their current romantic partner. Each item describes an activity that is consistent with Courtice and Shaughnessy's (2017) conceptual definition of TMSI. Participants rated how often they had engaged in each activity (e.g., *How often have you...*

Exchanged sexual typed messages, back and forth, with YOUR PARTNER?). Participants responded to each item using a 9-point frequency scale (*1 = Never in my life, 9 = More than once a day in the past 12 months*). We summed participant responses to create a total score between 29 and 261, with higher scores representing greater overall TMSI frequency with one's current partner.

Relationship Satisfaction. We used the five-item Relationship Satisfaction subscale of The Investment Model Scale (IMS; Rusbult et al., 1998) to assess participants' overall satisfaction with their current romantic relationship. For each item, participants were asked to use a nine-point rating scale (*1 = Do not agree at all; 9 = Agree completely*) to identify the extent to which they agreed with each statement (e.g., *My relationship is close to ideal*). Ratings for all five items were summed to create a total score between 5 and 45, with higher scores representing higher levels of relationship satisfaction. In previous studies, the Relationship Satisfaction subscale of the IMS has shown acceptable reliability and internal consistency (e.g., Moore & Campbell, 2020; Rusbult et al., 1998).

Life Satisfaction. We used the five-item Satisfaction With Life Scale (SWLS; Diener et al., 1985) to assess participants' satisfaction with their lives as a whole. For each item, participants used a seven-point Likert scale (*1 = Strongly disagree, 7 = Strongly agree*) to identify the extent to which they agreed with each statement (e.g., *The conditions of my life are excellent*). Ratings for all five items were summed to create a total score between 5 and 35, with higher scores indicating higher levels of life satisfaction. In previous studies, the SWLS has shown acceptable reliability and internal consistency (e.g., Diener et al., 1985; Vassar, 2008).

Socially Desirable Responding. We used the ten-item version of the Marlowe-Crowne Social Desirability Scale to assess participants' tendency towards socially desirable responding

(MCDS; Strahan & Gerbasi, 1972). In previous studies, the MCDS has shown acceptable reliability and internal consistency (e.g., Fischer & Fick, 1993; Pommier et al., 2020; Strahan & Gerbasi, 1972). Each item is a statement (e.g., *I like to gossip at times* and *I always try to practice what I preach*). For each statement, participants indicated whether the statement is true (1) or false (0) for them. We summed the answers to create a total score between 0 and 10, with lower scores indicating higher levels of socially desirable response tendencies.

Procedure

We recruited participants to take part in an online survey about “technology-mediated sexual interactions in romantic relationships” from December 2021 – April 2022. We recruited participants in three ways: from the University of Ottawa undergraduate student pool; through Qualtrics, which aggregated a diverse array of Canadian survey panel respondents and independently compensates those who complete the study with approximately \$8.65 (CAD); and through Twitter advertisements (these participants were volunteers and uncompensated). We used separate survey links/pages for each of our three recruitment channels; after the data was collected, we merged the data from each survey into one dataset. Aside from our recruitment and participant compensation approaches, we used the same survey procedure as described in Study One (for Consent Forms, see Appendix L; for Debriefing Forms, see Appendix N). The survey questions and scales were presented in the following order: Background Questionnaire, Relationship Satisfaction, Dyadic In-Person Sexual Desire, GMSEX, TMSI Checklist, Dyadic Technology-Mediated Sexual Desire, TMSI Satisfaction, TMSIMS, Satisfaction With Life Scale, Marlowe-Crowne Social Desirability Scale, and Effort and Attention Questions (see Appendix M). This study was approved by the Research Ethics Board at the University of Ottawa.

Analytic Approach. We conducted our analyses in four steps. In our first ‘preliminary analyses’ step, we used SPSS (Version 29.0) to examine the item-level statistics and the statistical assumptions required to conduct Confirmatory Factor Analyses (CFAs) and Structural Equation Modelling (SEM) with each of our measures. Specifically, we ensured that the data met assumptions of normality by visually examining the distribution of scores in histograms, inspecting the standard error of skewness and kurtosis, and inspecting the data for significant outliers. We also calculated the Cronbach’s alpha coefficients and Pearson correlations for each of our key measures.

Second, we assessed the factor structure of each of our measures with CFAs using AMOS (Version 29.0). We made post-hoc modifications that were consistent with theory to reduce the number of items entering the SEM. We examined six statistics to assess goodness of fit, using the following guidelines for excellent fit suggested by Hu and Bentler (1999) in combination with guidelines for adequate fit (Pituch & Stevens, 2016; Schumacker & Lomax, 2016): comparative fit index (CFI; $> .90 - .95$), goodness-of-fit index (GFI; $> .90 - .95$), adjusted goodness-of-fit index (AGFI; $> .80$), standardized root-mean-square residual (SRMR; $< .09$), root-mean-square error of approximation (RMSEA; $< .05 - .08$), and a nonsignificant chi-square value (CMIN/DF; $< 3, p > .05$). We used a combination of fit indices because each index can provide a biased fit estimate in certain conditions (e.g., model complexity, sample size; Hu & Bentler, 1999; Jackson et al., 2009; Kline, 2015).

Third, we used SEM with maximum likelihood estimation and 5,000 bootstrapped samples to examine our two hypothesized models separately. In the first, we examined the extent to which approach and avoidance TMSI motives predicted in-person and technology-mediated sexual satisfaction, as well as relationship and life satisfaction (Hypotheses 1 and 2; see Figure

8.1). Next, we tested our hypothesized mediated model (adding Hypotheses 3, 4, 5, and 6; see Figure 8.2). We made a post-hoc decision to test the results of an additional model that replaced the in-person measures of dyadic sexual desire and sexual satisfaction with the technology-mediated versions of these measures. We did this to address what we learned in Study One: dyadic sexual desire and sexual satisfaction likely differ between in-person and technology-mediated contexts and are therefore worthwhile to separately assess. We compared Akaike's information criterion (AIC) and the Bayesian information criterion across models with the goal of selecting a conceptually appropriate model with the lowest AIC and BIC values. For each SEM, we evaluated acceptable model fit by examining six statistics to assess goodness of fit, using the following guidelines for excellent fit suggested by Hu and Bentler (1999) in combination with guidelines for adequate fit (Pituch & Stevens, 2016; Schumacker & Lomax, 2016): comparative fit index (CFI; $> .90 - .95$), Tucker-Lewis index (TLI; $> .90 - .95$), incremental fit index (IFI; $> .80$), root-mean-square error of approximation (RMSEA; $< .05 - .08$), and a nonsignificant chi-square value (CMIN/DF; $< 3, p > .05$). We used a combination of fit indices because each index can provide a biased fit estimate in certain conditions (e.g., model complexity, sample size; Hu & Bentler, 1999; Jackson et al., 2009; Kline, 2015). We conducted all our SEMs using AMOS (Version 29.0)

Results

Preliminary Analyses

We examined the item-level statistics and statistical assumptions that coincide with a CFA and SEM for each of our outcome measures. We identified 49 multivariate outliers, which we excluded from all further analyses. The item-level means, standard deviations, ranges, skewness, and kurtosis for each of the items comprising our key measures are presented in the

Supplementary Materials (see Appendix O). All items had skewness values of less than 2 and kurtosis values of less than 7 after multivariate outliers were removed; this finding indicated that our data sufficiently met the normality assumption for factor analyses (Boateng et al., 2018; Sakaluk & Short, 2017; Tabachnick et al., 2013).

Factor Structure of the TMSI Motives Scale

Because our goal was to examine patterns of associations between approach and avoidance TMSI motives and our outcome measures, we conducted our initial CFA with a two-factor solution (Factor 1 = Approach Motives, Factor 2 = Avoidance Motives), such that the affirmation items (and therefore the Affirmation Factor) were excluded. This initial CFA had an overall poor level of model fit: CFI (.81), GFI (.70), AGFI (.65), SRMR (.13), RMSEA (.12), $\chi^2(251) = 1651.68, p < .001$, CMIN/DF (6.58). We tested a variety of models by systematically dropping items from each factor based on statistical and conceptual fit; in one model, we added an additional factor to capture Technology-Focused TMSI Motives. This approach resulted in three possible factor structures with inconsistent model fit indicators to use in our SEMs.

The first option included three factors, with three items per factor: Approach TMSI Motives (two enhancement items and one intimacy item), Avoidance TMSI Motives (two coping items and one appeasement item), and Technology-Focused TMSI Motives (one ‘avoiding in-person sexual activity’ and two ‘approaching in-person sexual activity’). For this solution, the results of the CFI (.98), GFI (.96), AGFI (.93), and SRMR (.04) indicated excellent model fit. The results of the RMSEA (.07) indicated adequate fit. The chi-square test, $\chi^2(24) = 76.06, p < .001$, indicated poor fit; however, the CMIN/DF (3.17) suggested adequate fit. Because this factor structure included a ‘technology-focused’ factor that is neither an approach nor avoidance motive (but rather, a combination of both), we could not make theory-driven predictions about

how this factor would predict TMSI outcomes in our SEM. SEM performs best when it is used to test theoretically derived hypotheses; thus, we chose not to use this factor structure in our SEMs.

The second option included two factors, with three items per factor: Approach TMSI Motives (one intimacy item, one enhancement item, and one ‘approaching in-person sexual activity’ item) and Avoidance TMSI Motives (one coping item, one appeasement item, and one ‘avoiding in-person sexual activity’ item). For this solution, the results of the CFI (.96), GFI (.96), AGFI (.88), and SRMR (.07) indicated excellent model fit. The results of the RMSEA (.13), chi-square test, $\chi^2(8) = 60.70, p < .001$, and CMIN/DF (7.59) indicated poor model fit. Researchers have suggested that, when developing a measure, three items per factor is the minimum that is acceptable. This solution does meet that requirement; however, including only three indicators per factor would reduce the robustness of the scale overall.

The third option included two factors, with six items per factor: Approach TMSI Motives (two intimacy items, two enhancement items, and two ‘approaching in-person sexual activity’ items) and Avoidance TMSI Motives (two coping items, two appeasement items, and two ‘avoiding in-person sexual activity’ items). Here, we added correlation terms between the error terms for each of the subscale items (e.g., a correlation term between both intimacy items; a correlation term between both coping items), which was conceptually justified because these subscale items were closely related. For this solution, the results of the CFI (.96), AGFI (.89), and SRMR (.09) indicated excellent model fit. The results of the GFI (.93) and RMSEA (.08) indicated adequate model fit. The chi-square test, $\chi^2(47) = 180.86, p < .001$, indicated poor fit; however, the CMIN/DF (3.85) suggested adequate fit. Because this solution performed relatively well and included more items related to TMSI approach and avoidance motives (and was therefore more robust), we chose to retain this solution.

Factor Structure of Outcome Measures

We used the same approach to test the factor structure for each of our outcome measures (i.e., measures of relationship satisfaction, in-person sexual satisfaction, technology-mediated sexual satisfaction, and life satisfaction). Specifically, for each measure, we conducted an initial CFA with maximum likelihood estimation to test the factor structure. For each, we tested an initial one-factor solution, and then a second one-factor solution with an added correlation term(s) between the error values for items in the model. For all measures, adding the correlation term improved the model fit (based on CFI, GFI, AGFI, SRMR, RMSEA, and chi-square values). However, for all measures, the initial factor structure (without any correlation terms) exhibited acceptable fit and scale reliability indicators (i.e., Cronbach's alpha) all indicated excellent construct validity. Therefore, we decided to retain the initial factor structure for all our outcome measures. The results of the CFAs for each measure are presented in Table 8.11.

Factor Structure of Dyadic In-Person Sexual Desire Measure

We conducted an initial CFA with maximum likelihood estimation to test the factor structure of the dyadic in-person sexual desire measure that we used with this sample. For the one-factor solution, the results of the SRMR (.08) indicated excellent fit, but the results of the CFI (.87), GFI (.89), AGFI (.73), RMSEA (.21), chi-square test, $\chi^2(9) = 164.02, p < .001$, and CMIN/DF (18.22) all indicated poor fit. An examination of the factor values for each item revealed that item one ("During the last month, how often would you have liked to engage in sexual activity with your partner?") was the lowest loading of the six items. We conducted a second CFA without this item, which improved the factor structure: the GFI (.95), AGFI (.84), and SRMR (.05) all indicated excellent fit, but the CFI (.94), RMSEA (.17), chi-square test, $\chi^2(5) = 63.76, p < .001$, and CMIN/DF (12.75) still indicated poor fit. Dropping the sixth item

(“Compared to other people of your age and sex, how would you rate your desire to behave sexually with your partner?”) of this measure further improved the factor structure, with the CFI (.99), GFI (.99), AGFI (.95), SRMR (.02), chi-square test, $\chi^2 (2) = 8.95, p = .011$ and CMIN/DF (4.48) all indicating excellent fit. Although the RMSEA (.09) still indicated poor fit, we decided this was the most appropriate fitting model for this data.

Factor Structure of Dyadic Technology-Mediated Sexual Desire Measure

We conducted an initial CFA with maximum likelihood estimation to test the factor structure of the dyadic technology-mediated sexual desire measure that we used with this sample. For the one-factor solution, the results of the SRMR (.09) indicated good fit, but the results of the CFI (.84), GFI (.80), AGFI (.54), RMSEA (.32), chi-square test, $\chi^2 (9) = 386.77, p < .001$, and CMIN/DF (42.97) indicated poor fit. An examination of the factor values for each item revealed that item one (“During the last month, how often would you have liked to engage in TMSI with your partner?”) was the lowest loading of the six items. We conducted a second CFA without this item, which improved the factor structure: the CFI (.97), AGFI (.81), and SRMR (.03) indicated excellent fit, but the GFI (.94), RMSEA (.18), chi-square test, $\chi^2 (5) = 68.51, p < .001$, and CMIN/DF (13.70) indicated poor fit. Dropping the sixth item (“Compared to other people of your age and sex, how would you rate your desire to engage in TMSI with your partner?”) of this measure further improved the factor structure, with the CFI (1.00), GFI (1.00), AGFI (.99), SRMR (.00), RMSEA (.00), chi-square test, $\chi^2 (2) = 1.54, p = .464$, and CMIN/DF (0.77) indicating excellent fit. We decided this was the most appropriate model for this data.

Descriptive Statistics and Correlations

Most of the scales that we finalized through our CFAs and planned to use for our SEMs met assumptions for normality (Kim, 2013); however, our measures of relationship satisfaction,

in-person sexual satisfaction, and dyadic in-person sexual desire all demonstrated a negative skew and positive kurtosis. We present the descriptive statistics, Pearson correlation coefficients, and internal consistency reliability estimates (i.e., Cronbach's alpha) for all variables in Table 8.12. Approach TMSI motives had significant positive correlations with TMSI frequency, relationship satisfaction, in-person and technology-mediated sexual satisfaction, dyadic in-person and technology-mediated sexual desire, and life satisfaction. Unexpectedly, avoidance TMSI motives were not significantly correlated with relationship satisfaction, in-person sexual satisfaction, or dyadic in-person sexual desire; avoidance TMSI motives had significant positive correlations with TMSI frequency, technology-mediated sexual satisfaction, dyadic technology-mediated sexual desire, and life satisfaction.

Testing the Hypothesized Model

Our first hypothesized model (Model 1) examined the associations between approach and avoidance TMSI motives and technology-mediated sexual satisfaction, in-person sexual satisfaction, relationship satisfaction, and life satisfaction. The final hypothesized model (Model 1) and standardized coefficients are outlined in Figure 8.3. The final version of Model 1 demonstrated an acceptable fit ($CFI = .96$, $TLI = .95$, $IFI = .96$, $RMSEA = .06$, $\chi^2(443) = 994.50$, $p < .001$, $CMIN/DF = 2.25$). There was a positive direct effect of approach TMSI motives on technology-mediated sexual satisfaction ($\beta = .573$, $p < .001$), in-person sexual satisfaction ($\beta = .289$, $p < .001$), and relationship satisfaction ($\beta = .307$, $p < .001$). Unexpectedly, there was no significant effect of approach TMSI motives on life satisfaction ($\beta = .073$, $p = .194$). Thus, Hypothesis 1 was partially supported: More frequent use of approach TMSI motives predicted higher levels of technology-mediated sexual satisfaction (H1a), in-person sexual satisfaction (H1b), and relationship satisfaction (H1c) – but not life satisfaction (H1d).

There was also a negative direct effect of avoidance TMSI motives on in-person sexual satisfaction ($\beta = -.110, p = .049$) and relationship satisfaction ($\beta = -.181, p = .001$); however, there was not a significant effect of avoidance TMSI motives on technology-mediated sexual satisfaction ($\beta = -.014, p = .767$) or life satisfaction ($\beta = .106, p = .068$). Hypothesis 2 was therefore partially supported: More frequent use of avoidance TMSI motives predicted lower levels of in-person sexual satisfaction (H2b) and relationship satisfaction (H2c), but not technology-mediated sexual satisfaction (H2a) or life satisfaction (H2d).

Testing the Hypothesized Mediated Model

Our hypothesized mediated model (Model 2) examined the associations between approach and avoidance TMSI motives and in-person sexual satisfaction, relationship satisfaction, and life satisfaction, with mediating effects of dyadic in-person sexual desire. The final hypothesized mediated model (Model 2) and standardized coefficients are outlined in Figure 8.4. The final version of Model 2 demonstrated an acceptable fit ($CFI = .95$, $TLI = .94$, $IFI = .95$, $RMSEA = .06$, $\chi^2(442) = 1026.54, p < .001$, $CMIN/DF = 2.32$). There were significant direct positive effects of TMSI frequency on approach TMSI motives ($\beta = .304, p < .001$); this finding fully supported Hypothesis 3: More frequent engagement in TMSI with a romantic partner predicted more frequent use of approach TMSI motives. There were also significant direct positive effects of approach TMSI motives on dyadic in-person sexual desire ($\beta = .484, p < .001$). The direct effects of approach TMSI motives on in-person sexual satisfaction ($\beta = -.004, p = .946$), relationship satisfaction ($\beta = .069, p = .220$), and life satisfaction ($\beta = -.056, p = .369$) were not significant. However, the indirect effects of approach TMSI motives (via dyadic in-person sexual desire) were significant and positive for in-person sexual satisfaction ($\beta = .288$, 95% CI [.24, .55], $p < .001$), relationship satisfaction ($\beta = .233$, 95% CI [.18, .49], $p < .001$), and

life satisfaction ($\beta = .127$, 95% CI [.07, .25], $p < .001$). Thus, we found full support for Hypothesis 5: More frequent use of approach TMSI motives predicted higher dyadic in-person sexual desire (H5a), which in turn predicted higher in-person sexual satisfaction (H5b), relationship satisfaction (H5c), and life satisfaction (H5d).

We also found a significant direct effect of TMSI frequency on avoidance TMSI motives ($\beta = .505$, $p < .001$) – however, contrary to Hypothesis 4, this association was positive rather than negative. Thus, we did not find support for Hypothesis 4. The direct effect of avoidance TMSI motives on dyadic in-person sexual desire was significant and negative ($\beta = -.112$, $p = .037$). The direct effect of avoidance TMSI motives on in-person sexual satisfaction ($\beta = -.024$, $p = .614$) was not significant, but it was significant and negative for relationship satisfaction ($\beta = -.106$, $p = .038$), and significant and positive for life satisfaction ($\beta = .150$, $p = .009$). Additionally, the indirect effects of avoidance TMSI motives (via dyadic in-person sexual desire) were significant and negative for in-person sexual satisfaction ($\beta = -.067$, 95% CI [-.18, -.03], $p = .007$), relationship satisfaction ($\beta = -.054$, 95% CI [-.16, -.02], $p = .007$), and life satisfaction ($\beta = -.029$, 95% CI [-.08, -.01], $p = .005$). Thus, we found full support for Hypothesis 6: More frequent use of avoidance TMSI motives predicted lower dyadic in-person sexual desire (H6a), which in turn led to lower in-person sexual satisfaction (H6b), relationship satisfaction (H6c), and life satisfaction (H6d). Although we did not make hypotheses about direct effects for Model 2, we found that more frequent use of avoidance TMSI motives also predicted lower levels of relationship satisfaction ($\beta = -.150$, $p = .038$) and higher levels of life satisfaction ($\beta = .181$, $p = .009$), independent of their strength of dyadic in-person sexual desire.

Testing the Post-Hoc Model

Our post-hoc model (Model 3) examined the associations between approach and avoidance TMSI motives and technology-mediated sexual satisfaction, relationship satisfaction, and life satisfaction, with mediating effects of dyadic technology-mediated sexual desire. The final post-hoc model (Model 3) and standardized coefficients are outlined in Figure 8.5. The final version of Model 3 demonstrated an acceptable fit ($CFI = .95$, $TLI = .95$, $IFI = .95$, $RMSEA = .06$, $\chi^2(442) = 1014.66$, $p < .001$, $CMIN/DF = 2.30$). We examined the indicators of comparative model fit for Model 2 and Model 3. Model 3 ($AIC = 1186.66$, $BIC = 1532.05$) appeared to fit the data slightly better relative to Model 2 ($AIC = 1198.54$, $BIC = 1543.93$). The structural model and standardized coefficients are outlined in Figure 8.5. As with Model 2, TMSI frequency had a significant positive direct effect on approach TMSI motives ($\beta = .317$, $p < .001$), and approach TMSI motives had a significant positive direct effect on dyadic technology-mediated sexual desire ($\beta = .638$, $p < .001$). We also found that the indirect effects of approach TMSI motives (via dyadic technology-mediated sexual desire) were significant and positive for technology-mediated sexual satisfaction ($\beta = .163$, 95% CI [.07, .27], $p = .001$). In contrast to Model 2, indirect effects were not significant for relationship satisfaction ($\beta = .011$, 95% CI [−.11, .13], $p = .912$) nor life satisfaction ($\beta = .040$, 95% CI [−.06, .15], $p = .452$). Also unlike Model 2, we found significant positive direct effects of approach TMSI motives on technology-mediated sexual satisfaction ($\beta = .392$, $p < .001$) and relationship satisfaction ($\beta = .634$, $p < .001$). Therefore, the relationship between approach TMSI motives and technology-mediated sexual satisfaction was partially mediated through dyadic technology-mediated sexual desire in a positive direction. However, there was no mediation between approach TMSI motives and relationship satisfaction, nor between approach TMSI motives and life satisfaction.

As with Model 2, TMSI frequency also had a significant positive direct effect on avoidance TMSI motives ($\beta = .510, p < .001$). In contrast to Model 2, avoidance TMSI motives had a significant direct positive effect on dyadic technology-mediated sexual desire ($\beta = .138, p = .002$). Also unlike Model 2, the indirect effects of avoidance TMSI motives (via dyadic technology-mediated sexual desire) were significant and negative for technology-mediated sexual satisfaction ($\beta = -.035, 95\% \text{ CI } [.01, .08], p = .003$) but were not significant for relationship satisfaction ($\beta = .002, 95\% \text{ CI } [-.03, .04], p = .872$) nor life satisfaction ($\beta = .084, 95\% \text{ CI } [-.01, .04], p = .392$). The direct effect of avoidance TMSI motives on technology-mediated sexual satisfaction and life satisfaction was not significant, but it was significant for relationship satisfaction ($\beta = -.231, p = .004$). Therefore, the relationship between avoidance TMSI motives and technology-mediated sexual satisfaction was fully mediated through dyadic technology-mediated sexual desire in a negative direction. However, there was no mediation between avoidance TMSI motives and relationship satisfaction, nor between avoidance TMSI motives and life satisfaction.

Discussion

The purpose of Study Two was to examine the extent to which: (i) people's approach and avoidance TMSI motives predict their sexual, relationship, and life satisfaction, and (ii) TMSI frequency and dyadic sexual desire contributed to the associations between TMSI motives and outcomes. We found that people who use more frequently use approach TMSI motives experience higher levels of technology-mediated sexual satisfaction, in-person sexual satisfaction, and relationship satisfaction (partial support for H1). Conversely, people who more frequently use avoidance TMSI motives experience lower levels of in-person sexual satisfaction and relationship satisfaction (partial support for H2). We also found that people who more

frequently engage in TMSI with their romantic partner more frequently used both approach (full support for H3) and avoidance TMSI motives (no support for H4). Although unexpected, the latter finding suggests that TMSI frequency may inform or reinforce people's TMSI motives, regardless of whether they are driven by achieving positive outcomes or avoiding negative outcomes. The results of our hypothesized mediated model suggested that when people use approach TMSI motives more frequently, they experience stronger dyadic in-person sexual desire, which in turn enhances their in-person sexual satisfaction, relationship satisfaction, and life satisfaction (full support for H5). Conversely, more frequently avoidance TMSI motives predicted weaker dyadic in-person sexual desire, which in turn reduced their in-person sexual satisfaction, relationship satisfaction, and life satisfaction (full support for H6). When we replaced in-person sexual desire and satisfaction with their technology-mediated counterparts in our post-hoc model, we found that more frequent use of both approach and avoidance TMSI motives predicted stronger dyadic technology-mediated sexual desire. A strengthened desire for technology-mediated sexual activities with one's partner led to higher levels of technology-mediated sexual satisfaction in the context of more frequent approach motives. However, more frequent avoidance TMSI motives, strengthened desire for technology-mediated sexual activities and in turn decreased technology-mediated sexual satisfaction. The distinctions between the results of our hypothesized and post-hoc model suggest that there appears to be a difference in how people experience desire for and satisfaction with in-person versus technology-mediated sexual activity. More broadly, our findings suggest that the technology-mediated context for sexual behaviour is in some ways similar to, and in other ways distinct from, in-person sexual behaviour. We discuss these results further in the overall discussion.

Overall Discussion

The purpose of this research was to identify the ways in which approach and avoidance motives for TMSI with a romantic partner are associated with people's experiences of sexual, romantic, and life satisfaction. In Study One, we found that the TMSI Motives Scale was comprised of three internally consistent factors: approach, avoidance, and affirmation TMSI motives. Some of these factors were consistent with past research on approach and avoidance motives for in-person sexual behaviours (Cooper et al., 1998; Impett et al., 2005; Impett et al., 2008; Impett et al., 2010; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015), whereas others were novel and reflected the distinct, technological context of TMSI. In Study Two, we further refined the TMSI Motives Scale and used it to test our hypotheses. We found that approach and avoidance TMSI motives each contributed to people's TMSI outcomes (i.e., sexual, relationship, and life satisfaction), both directly and indirectly, via dyadic in-person sexual desire. However, when we used measures that addressed the technology-mediated context of TMSI, we found some variation in the extent and mechanisms through which TMSI motives predicted people's TMSI outcomes. Overall, our findings and their grounding in the approach-avoidance motivational framework extend and improve upon research examining partnered sexual behaviour in both technology-mediated and in-person contexts.

Approach-Avoidance Motivational Framework and TMSI

Our findings contribute to and extend past research that applies the approach-avoidance motivational framework to sexual behaviour in a few ways. First, our results suggest that the basic predictions made by the approach-avoidance motivational framework about sexual motives and outcomes apply to TMSI. Across Studies One and Two, we created and refined the Technology-Mediated Sexual Interaction Motives Scale (TMSIMS). In doing so, we applied a construct validity framework. Our findings suggest that the scale used in Study Two is suitable to

assess approach and avoidance TMSI motives among people in a committed romantic relationship. The current results also are consistent with Courtice and Shaughnessy's (Chapter 6 of current dissertation) findings: people engage in TMSI with a romantic partner for both approach and avoidance motives. In Study Two, we extended Courtice and Shaughnessy's qualitative findings. We found that approach and avoidance TMSI motives differentially predicted people's experience of technology-mediated sexual, in-person sexual, and relationship satisfaction. These findings align with previous research suggesting that approach motives for in-person sexual behaviour are associated with higher sexual and relationship satisfaction – and avoidance motives with lower sexual and relationship satisfaction – for people in romantic relationships (Cooper et al., 1998; Impett et al., 2005; Impett et al., 2008; Impett et al., 2010; Muise et al., 2013; Muise et al., 2017; Rosen et al., 2015). Overall, the current research suggests that the approach-avoidance motivational framework links sexual motives to outcomes in both technology-mediated and in-person interpersonal sexual contexts.

Second, our findings extend the approach-avoidance motivational framework by highlighting two potential mechanisms through which approach and avoidance TMSI motives predict TMSI outcomes: TMSI frequency and dyadic sexual desire. In both our hypothesized mediated and post-hoc models, we found that people who more frequently engaged in TMSI with their romantic partner also reported more frequent approach and avoidance TMSI motives. We also found that both approach and avoidance TMSI motives indirectly predict people's TMSI outcomes via dyadic sexual desire, such that more frequent use of approach TMSI motives predicts stronger – and avoidance motives, weaker – dyadic in-person sexual desire. In turn, stronger and weaker dyadic sexual desire predicted higher and lower levels of satisfaction (respectively) in various domains. These findings appear to contradict previous research

suggesting that people engage in in-person sexual activity more frequently when they experience positive outcomes, and less frequently when they experience negative outcomes (e.g., Joudin et al., 2019; McNulty et al., 2016; Schoenfeld et al., 2017). However, our findings are in keeping with most other studies that have included dyadic sexual desire as a mediator when examining the link between approach/avoidance sexual motives and related outcomes (Impett et al., 2006; Muise et al., 2013; for an exception, see Muise et al., 2017). It appears that people's motives for TMSI – regardless of whether they are approach or avoidance motives – reinforce engagement in TMSI, perhaps based on a perceived positive outcome. For instance, someone who engages in TMSI for an avoidance motive (e.g., to prevent their partner from breaking up with them) may experience decreased dyadic sexual desire, which in turn detracts from their experiences of sexual, relational, and individual satisfaction. However, they may also experience the outcome that they sought to avoid (e.g., their partner does not break up with them), which then serves to reinforce both their behaviour and their motive for that behaviour – despite experiencing worsened outcomes overall. Indeed, some of Courtice & Shaughnessy's (Chapter 6 of current dissertation) participants described using TMSI for avoidance reasons that successfully avoided a fear outcome and maintained relational satisfaction in doing so. We were not able to directly test this potential cyclical relationship because we collected data at a single time point. In the future, researchers should use a longitudinal approach to examine the extent to which approach and avoidance TMSI motives are reinforced by the outcomes the people experience. Regardless, our findings identify TMSI frequency and dyadic sexual desire as relevant to improving knowledge on the relationships between people's TMSI motives and outcomes.

Third, applying the approach-avoidance motivational framework revealed potential resolutions for some of the inconsistencies in previous TMSI research. Previously, some

researchers have found that people who engage in TMSI also report positive outcomes (Brodie et al., 2019; Currin et al., 2016; Galovan et al., 2018; McDaniel & Drouin, 2015; Oriza & Hanipraja, 2020; Parker et al., 2013), whereas others have found that engaging in TMSI coincides with negative outcomes (Galovan et al., 2018; McDaniel & Drouin, 2015). Our findings suggest that the motives guiding people's TMSI – and their related associations with dyadic sexual desire – predict the extent to which people experience positive versus negative outcomes, not TMSI in and of itself. Consistent with Le et al. (2022) and Lefebvre et al. (2022), our findings suggest that people can experience both increases and decreases in sexual, relationship, and life satisfaction depending on the extent to which they use different types of motives, such as approach and avoidance TMSI motives. Together, ours and these previous findings suggest that harnessing approach TMSI motives may increase the likelihood that people can use TMSI for their sexual, relational, and individual benefit (Lefebvre et al., 2002; add a bit of in-person sex cause still works).

The Role of Technology in People's Sexual Experiences

Overall, our findings suggest that, although TMSI is a distinct behaviour relative to in-person sexual activity, it is not irrelevant to people's in-person sexual experiences. In Study One, we found evidence suggesting that technology-mediated sexual satisfaction and dyadic sexual desire are distinct relative to their in-person counterparts. In Study Two, we also found that our post-hoc model – which used measures of technology-mediated dyadic sexual desire and sexual satisfaction, rather than in-person measures – fit the data slightly better relative to the hypothesized model. Furthermore, across Studies One and Two, we found support for including items related to technology-focused TMSI motives in both the 'approach' and 'avoidance' components of the TMSIMS. This latter finding aligns with Courtice and Shaughnessy's

(Chapter 6 of current dissertation) qualitative research, which suggested that people have technology-focused approach and avoidance motives for engaging in TMSI with a romantic partner. Thus, technology-focused motives should be specifically addressed in research, but they also fit within existing theoretical frameworks. Altogether, these findings suggest that in-person sexual behaviour is likely a distinct construct relative to technology-mediated sexual behaviour. At the same time, the technology-mediated context for interpersonal sexual activity is still relevant to people's in-person sexual experiences. For instance, in Study Two, our hypothesized and post-hoc models indicated that approach and avoidance TMSI motives predicted variables related to both technology-mediated (i.e., technology-mediated sexual satisfaction, dyadic technology-mediated sexual desire) and in-person (i.e., in-person sexual satisfaction, dyadic in-person sexual desire) domains. This finding suggests that motives specific to TMSI are relevant not only to outcomes that pertain to the technology-mediated context; TMSI motives and experiences relate to and impact people's in-person lives, as well. No studies to our knowledge have adapted measures of sexual satisfaction or desire to address technology-mediated contexts specifically; instead, most TMSI researchers have used measures that have been developed in and for in-person sexual contexts without adjusting them (aside from slight changes to wording) to fit the technology-mediated context of TMSI (e.g., Le et al., 2022; Lefebvre et al., 2022). However, our findings suggest that researchers should consider TMSI a novel and distinct context of sexual behaviour and adjust their approaches to measurement accordingly.

It is possible that one way in which TMSI interacts with the in-person context is as a replacement for partnered, in-person sexual activity. A descriptive comparison of our hypothesized model and post-hoc model in Study Two suggests that, compared to technology-mediated dyadic sexual desire, in-person dyadic sexual desire was a better indirect predictor of

outcomes that were not directly relevant to the technology-mediated context (i.e., relationship and life satisfaction). Furthermore, in both studies, we found that people reported higher levels of dyadic sexual desire and sexual satisfaction when asked about in-person contexts, and comparatively lower levels when asked about technology-mediated contexts. Indeed, Courtice and Shaughnessy (Chapter 6 of current dissertation) found that some people's motives for engaging in TMSI with a romantic partner included "replacing" in-person sexual activity. Currin et al. (2020) also found that, for people in romantic relationships, one of the most reported reasons for sexting was to maintain intimacy while in a long-distance relationship. It appears that people seem to primarily engage in TMSI when the opportunity for in-person sexual activity is not available. The current research, combined with previous findings (Courtice & Shaughnessy, Chapter 6 of current dissertation), suggests that people desire TMSI with a romantic partner less than they desire in-person sexual activity, that they are less satisfied by TMSI relative to in-person sexual activity, and that TMSI motives only predict technology-specific outcomes. Therefore, TMSI may function as an adequate, but less desirable and less satisfying, replacement when opportunities for in-person sexual activity with a romantic partner are not available.

Limitations and Future Directions

The current research contributes to the still-nascent literature suggesting that people's motivations for TMSI appear to contribute more to people's outcomes than the behaviour itself. First, the final factor structure for the TMSI Motives Scale (TMSIMS) in both studies was acceptable and presents a conceptually strong starting point for researchers who seek to examine people's motives for TMSI through the approach-avoidance perspective. However, in line with the need for ongoing construct validation, it requires further testing and improvement (Flake et al., 2017; Kane, 2013; Messick, 1989). Second, we found evidence suggesting that technology-

mediated sexual satisfaction and dyadic technology-mediated sexual desire are distinct constructs relative to their in-person counterparts. It is possible that there may also be both technology-mediated and in-person dimensions of relationship and life satisfaction (as there appear to be for sexual satisfaction and dyadic sexual desire). In the future, researchers should examine whether relationship and life satisfaction are distinct when comparing in-person and technology-mediated dimensions of these constructs. Finally, despite our best efforts, we were not able to assess the extent to which our measures in Study One and Study Two were influenced by socially desirable response biases. Researchers have previously indicated that studies on sexual behaviour and romantic relationships are particularly susceptible to socially desirable response patterns (e.g., King, 2022; Meston et al., 1998). However, the measures we used in our research (i.e., the Balanced Inventory of Desirable Responding; Paulhus, 1988, and the Marlowe-Crowne Social Desirability Scale; Strahan & Gerbasi, 1972) were not internally consistent, despite previous research pointing to their psychometric properties. Future researchers should re-evaluate the construct validity of existing social desirability measures, as well as the extent to which the current measures may have been influenced by social desirability bias.

Conclusion

In conclusion, by applying the approach-avoidance motivational framework to TMSI, the current research sheds light on the ways in which people's TMSI motives predict the related positive and/or negative TMSI outcomes that they experience. Over the course of two studies, we created the TMSI Motives Scale -- a construct valid, theoretically informed measure of people's approach and avoidance motives for TMSI. We also adapted measures of sexual satisfaction and dyadic sexual desire to the TMSI context, which revealed similarities and distinctions between technology-mediated and in-person contexts for sexual activity. Our findings indicated that more

frequent use of approach TMSI motives predicts higher – and avoidance motives, lower – levels of sexual, relationship, and life satisfaction, both directly and indirectly via dyadic sexual desire. In this way, the current research appears to resolve several inconsistencies in the mostly atheoretical literature examining TMSI. Overall, by using a motivational framework, the current research builds knowledge of both technology-mediated and in-person sexual behaviour by demonstrating how these two contexts are distinct but related to one another.

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Tables and Figures

Table 8.1 Participant Sociodemographic Information for Study One

	Subsample size (<i>n</i>)	Proportion of total sample (%)
Gender ^a		
Cisgender man	110	40.9
Cisgender woman	148	55.0
Transgender, nonbinary, and/or genderqueer	6	2.2
Sexual orientation ^a		
Heterosexual	218	81.0
Bisexual, pansexual, or bi-curious	40	14.9
Gay or lesbian	7	2.6
Queer, unlabeled, or unsure	< 5	< 1.85%
Visible ethnic/racial minority status		
No	179	66.5
Yes	80	29.7
Highest level of education ^a		
High school diploma	73	27.1
Some college or university	178	66.2
Diploma from certificate, college, or trades program	11	4.0
Bachelor's degree	5	1.9
Relationship context with current partner		
Currently in long-distance relationship	110	40.9

Ever in long-distance relationship ^b	57	21.2
Currently living together	27	10.0
In a monogamous relationship	238	88.5
	Mean (<i>M</i>)	Standard deviation (<i>SD</i>)
Number of TMSIs with current partner (of 12)	5.87	2.80
Age	19.37	2.66
Length of current relationship (in months)	19.91	19.01

Note. $N = 269$. Some numbers do not add up to 100% because participants were given the option to “choose not to respond”.

^a Participants were given options to write in their own answer, or to choose not to respond.

^b Excludes participants who reported they are currently in a long-distance relationship ($n = 110$).

Table 8.2 Item-Level Statistics for the TMSI Motives Scale

Item	Number of participants who indicated item 'did not make sense' (<i>n</i> , %)	Descriptive Statistics					
		<i>N</i>	Mean	SD	Range	Skewness	Kurtosis
Intimacy1: To make my partner feel good	< 5	261	4.10	1.11	4	-1.39	1.34
Intimacy2: To feel emotionally closer to my partner	6 (2.3%)	259	3.59	1.39	4	-.69	-.81
Intimacy3: To do something special for my partner	8 (3.1%)	257	3.79	1.32	4	-.88	-.38
Intimacy4: To excite my partner	17 (6.5%)	248	4.30	1.06	4	-1.67	2.16
Intimacy5: To make my partner happy	< 5	264	3.69	1.23	4	-.62	-.66
Intimacy6: To feel closer to my partner	< 5	264	3.61	1.36	4	-.59	-.88
Intimacy7: To be more intimate with my partner	< 5	264	3.53	1.36	4	-.50	-.95
Intimacy8: To express love for my partner	8 (3.1%)	257	3.60	1.41	4	-.61	-.93
Enhancement1: For the thrill of it	< 5	261	3.72	1.33	4	-.90	-.41
Enhancement2: To try something new	< 5	262	3.20	1.43	4	-.25	-1.27
Enhancement3: Because it feels good	9 (3.5%)	256	3.65	1.32	4	-.65	-.72
Enhancement4: To experience sexual pleasure	12 (4.6%)	253	3.69	1.40	4	-.70	-.86
Enhancement5: For excitement	0	265	3.72	1.26	4	-.80	-.34
Enhancement6: To satisfy sexual needs	< 5	263	3.55	1.41	4	-.57	-.98
Enhancement7: Because I feel horny	6 (2.3%)	259	4.10	1.20	4	-1.28	.65
Enhancement8: To do something adventurous	< 5	263	3.35	1.44	4	-.38	-1.21
ApproachInPerson1: To get emotionally excited about my next sexual encounter with my partner	< 5	261	3.43	1.39	4	-.47	-1.06
ApproachInPerson2: To make myself feel more comfortable with sexual activities	< 5	263	2.23	1.44	4	.73	-.98
ApproachInPerson3: To get my partner to feel more comfortable with sexual activity	< 5	264	2.19	1.41	4	.80	-.80
ApproachInPerson4: To get my partner sexually aroused about our next sexual encounter	6 (2.3%)	259	3.64	1.45	4	-.76	-.79

ApproachInPerson5: To get my partner to feel more comfortable with a new type of sexual activity	< 5	264	2.33	1.51	4	.67	-1.10
ApproachInPerson6: To get sexually aroused about my next sexual encounter with my partner	< 5	262	3.57	1.42	4	-.65	-.90
ApproachInPerson7: To make myself feel more comfortable with a new type of sexual activity	< 5	264	1.97	1.35	4	1.15	-.08
ApproachInPerson8: To get my partner emotionally excited about our next sexual encounter	5 (1.9%)	260	3.64	1.48	4	-.76	-.85
Coping1: To deal with disappointment	12 (4.6%)	253	1.40	.78	4	2.23	4.93
Coping2: Because I was bored	6 (2.3%)	259	2.50	1.41	4	.40	-1.22
Coping3: To cope with upset	< 5	261	1.44	.86	4	2.29	5.12
Coping4: To cheer myself up	< 5	264	2.03	1.32	4	1.04	-.23
Coping5: To manage my emotions	< 5	263	1.70	1.11	4	1.55	1.41
Coping6: To feel better when I feel lonely	0	265	2.07	1.31	4	.91	-.47
Coping7: To feel better when I feel low	< 5	263	1.61	1.06	4	1.77	2.20
Coping8: To feel better when I was feeling stressed or anxious	< 5	264	1.69	1.15	4	1.71	1.85
Appeasement1: Because I worry my partner will be angry if I don't	0	265	1.35	.86	4	2.81	7.37
Appeasement2: To prevent my partner from losing interest in our sex life	< 5	264	2.15	1.35	4	.91	-.50
Appeasement3: Because I fear my partner won't love me if I don't	< 5	264	1.31	.86	4	3.04	8.86
Appeasement4: Because I am afraid my partner will leave if I don't	< 5	265	1.28	.81	4	3.24	10.15
Appeasement5: To keep my partner interested in me	< 5	264	2.35	1.42	4	.64	-.94
Appeasement6: To prevent my partner from cheating on me	0	265	1.43	.93	4	2.33	4.81
Appeasement7: To prevent my partner from no longer loving me	0	265	1.42	.97	4	2.51	5.53
Appeasement8: Because I worry my partner won't want me if I don't	< 5	264	1.38	.90	4	2.69	6.75

AvoidInPerson1: To experiment with sexual activities without doing them in-person	9 (3.5%)	256	2.46	1.39	4	.44	-1.17
AvoidInPerson2: To decrease my anxiety about engaging in sexual activities with my partner offline	< 5	262	1.83	1.28	4	1.39	.58
AvoidInPerson3: To prevent my partner from asking me to engage in sexual activities offline	< 5	262	1.20	.63	4	3.66	14.43
AvoidInPerson4: To present an image of myself that is more attractive than I am in-person	< 5	264	1.64	1.17	4	1.79	2.04
AvoidInPerson5: To maintain my virginity	5 (1.9%)	260	1.11	.50	4	5.55	34.75
AvoidInPerson6: Because I am uncomfortable with in-person dirty talk	< 5	263	1.71	1.13	4	1.49	1.09
AvoidInPerson7: Because I know I won't be in the mood for in-person sexual activities	< 5	261	1.37	.83	4	2.67	7.17
AvoidInPerson8: To prevent myself from getting an STI or experiencing unwanted pregnancy	< 5	263	1.23	.74	4	3.88	15.48
Affirmation1: Because I look good that day	< 5	262	3.04	1.46	4	-.19	-1.40
Affirmation2: To feel more self-confident	< 5	261	2.98	1.51	4	-.02	-1.46
Affirmation3: To feel more interesting	< 5	261	2.93	1.51	4	-.03	-1.48
Affirmation4: To prove my attractiveness	< 5	264	2.42	1.42	4	.48	-1.19
Affirmation5: To reassure myself of my desirability	< 5	262	2.26	1.39	4	.64	-1.04
Affirmation6: To feel better about my body	< 5	264	2.30	1.42	4	.67	-.96
Affirmation7: To show that I am confident about my body	< 5	264	2.28	1.31	4	.66	-.80
Affirmation8: Because I feel attractive	< 5	264	3.14	1.51	4	-.24	-1.39

Note. $N = 265$. Four participants who were identified as multivariate outliers are excluded. Item-level sample sizes vary because we

removed participants who chose “this item does not make sense to me” from item-level descriptive statistics.

Table 8.3 Factor Loadings and Communalities Based on a Maximum Likelihood Exploratory Factor Analysis with Oblique Rotation (Promax) for Thirty Items from the TMSI Motives Scale

TMSIMS Item	Factor 1: Approach TMSI Motives	Factor 2: Avoidance TMSI Motives	Factor 3: Affirmation TMSI Motives	Extraction Communalities
Enhancement5: For excitement	.805			.633
Intimacy8: To express love for my partner	.773			.544
Enhancement6: To satisfy sexual needs	.768			.455
Enhancement1: For the thrill of it	.715			.490
Intimacy4: To excite my partner	.701			.551
Enhancement7: Because I feel horny	.661			.406
ApproachInPerson1: To get emotionally excited about my next sexual encounter with my partner	.644			.468
Intimacy3: To do something special for my partner	.590			.450
Intimacy5: To make my partner happy	.583			.354
ApproachInPerson8: To get my partner emotionally excited about our next sexual encounter	.563			.572
AvoidInPerson1: To experiment with sexual	.419			.164

activities without doing them
offline

ApproachInPerson2: To make myself feel more comfortable with sexual activities	.390	.378	.417
ApproachInPerson5: To get my partner to feel more comfortable with a new type of sexual activity	.367	.361	.338
Appeasement4: Because I am afraid my partner will leave if I don't		.879	.676
Appeasement8: Because I worry my partner won't want me if I don't		.793	.596
Appeasement6: To prevent my partner from cheating on me		.787	.533
AvoidInPerson7: Because I know I won't be in the mood for offline sexual activities		.717	.518
AvoidInPerson8: To prevent myself from getting an STI or experiencing unwanted pregnancy		.649	.385
Coping5: To manage my emotions		.561	.400
Appeasement5: To keep my partner interested in me		.504	.421
Coping6: To feel better when I feel lonely		.444	.381
Coping4: To cheer myself up		.429	.441
AvoidInPerson6: Because I am uncomfortable with in-person dirty talk		.404	.222

Coping2: Because I was bored	.213	.098
Affirmation1: Because I look good that day	.853	.608
Affirmation8: Because I feel attractive	.825	.662
Affirmation7: To show that I am confident about my body	.769	.586
Affirmation6: To feel better about my body	.739	.678
Affirmation4: To prove my attractiveness	.692	.503
Affirmation2: To feel more self-confident	.623	.593

Note. $N = 265$. Four participants who were identified as multivariate outliers are excluded.

Major loadings for each item are bolded. Factor loadings below .32 are suppressed.

Table 8.4 Item-Level Statistics for Measures of In-Person and Technology-Mediated Sexual Satisfaction

Item	Descriptive Statistics									
	In-Person Sexual Satisfaction Measure					Technology-Mediated Sexual Satisfaction Measure				
	Mean	<i>SD</i>	Range	Skew	Kurtosis	Mean	<i>SD</i>	Range	Skew	Kurtosis
1. <i>Very bad to Very good</i>	6.90	1.26	6	-1.08	0.69	5.88	1.69	7	-0.43	-0.51
2. <i>Very unpleasant to Very pleasant</i>	7.11	1.09	5	-1.21	0.90	6.27	1.55	6	-0.58	-0.50
3. <i>Very positive to Very negative</i>	7.06	1.23	5	-1.24	0.71	6.20	1.66	6	-0.59	-0.56
4. <i>Very unsatisfying to Very satisfying</i>	6.82	1.31	5	-0.97	0.11	5.91	1.76	7	-0.43	-0.78
5. <i>Worthless to Very valuable</i>	7.07	1.24	5	-1.33	0.99	5.75	1.87	7	-0.45	-0.30

Note. $N = 263$. Three participants who were identified as multivariate outliers and three who were identified as univariate outliers are excluded. All items for the in-person sexual satisfaction measure were preceded by “Overall, how would you describe your sexual life with your current romantic partner?”. All items for the technology-mediated sexual satisfaction measure were preceded by “Overall, how would you describe your technology-mediated sexual life with your current romantic partner?”

Table 8.5 Component Loadings and Communalities Based on a Principal Component Analysis with Oblique Rotation (Promax) for Five Items from the Global Measure of Sexual Satisfaction and Five Items from the TMSI-Adapted Global Measure of Sexual Satisfaction

Items	Rotated Component Coefficients		
	Component 1: In-Person Sexual Satisfaction	Component 2: Technology- Mediated Sexual Satisfaction	Extraction Communalities
GMSEX2: Overall, how would you describe your sexual life with your current romantic partner? – <i>Very unpleasant to Very pleasant</i>	.982		.899
GMSEX4: Overall, how would you describe your sexual life with your current romantic partner? – <i>Very unsatisfying to Very satisfying</i>	.922		.852
GMSEX3: Overall, how would you describe your sexual life with your current romantic partner? – <i>Very positive to Very negative</i>	.919		.887
GMSEX1: Overall, how would you describe your sexual life with your current romantic partner? – <i>Very bad to Very good</i>	.919		.894
GMSEX5: Overall, how would you describe your sexual life with your current romantic partner? – <i>Worthless to Very valuable</i>	.908		.852
TMSI_GMSEX2: Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very unpleasant to Very pleasant</i>		.929	.896

TMSI_GMSEX1: Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very bad to Very good</i>	.923	.849
TMSI_GMSEX3: Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very positive to Very negative</i>	.896	.844
TMSI_GMSEX5: Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Worthless to Very valuable</i>	.895	.760
TMSI_GMSEX4: Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very unsatisfying to Very satisfying</i>	.866	.776

Note. $N = 263$. Three participants who were identified as multivariate outliers and three who were identified as univariate outliers are excluded. Major loadings for each item are bolded. Factor loadings below .32 are suppressed.

Table 8.6 Item-Level Statistics for Measures of Dyadic In-Person and Technology-Mediated Sexual Desire

Item	Descriptive Statistics									
	In-Person Sexual Satisfaction Measure					Technology-Mediated Sexual Satisfaction Measure				
	Mean	<i>SD</i>	Range	Skew	Kurtosis	Mean	<i>SD</i>	Range	Skew	Kurtosis
1. During the last month, how often would you prefer to engage in [sexual activity/TMSI] with a current romantic partner?	5.94	1.51	7	-0.84	1.21	3.86	1.89	7	0.19	-0.95

2. During the last month, how often have you had sexual thoughts [involving/about engaging in TMSI with] a partner?	5.83	1.59	8	-0.60	0.30	3.34	1.86	7	0.48	-0.72
3. When you have sexual thoughts, how strong is your desire to engage in [sexual behavior/TMSI] with a partner?	6.01	1.51	7	-0.66	0.22	4.32	2.23	8	-0.17	-0.98
4. When you first see an attractive person, how strong is your [sexual desire/desire to engage in TMSI]?	3.50	2.03	8	0.33	-0.69	2.39	2.21	8	0.85	-0.15
5. When you spend time with an attractive person (for example, at work or school), how strong is your [sexual desire/desire to engage in TMSI]?	3.65	2.18	8	0.22	-0.88	2.34	2.14	8	0.94	0.18
6. When you are in romantic situations (such as a candle lit dinner, a walk on the beach, etc.), how	5.17	1.79	8	-0.41	-0.61	2.52	2.33	8	0.83	-0.24

strong is your [sexual
desire/desire to
engage in TMSI]?

7. How strong is your desire to engage in [sexual activity/ TMSI] with a partner?	6.28	1.38	6	-0.72	0.30	4.09	2.22	8	-0.09	-0.90
8. How important is it for you to fulfill your sexual desire through [sexual activity/ TMSI] with a partner?	5.33	1.93	8	-0.44	-0.60	3.00	2.21	8	0.62	-0.46
9. Compared to other people of your age and sex, how would you rate your desire to [behave sexually/ engage in TMSI] with a partner?	4.96	1.49	7	-0.26	0.01	3.32	1.98	8	0.25	-0.61
10. How long could you go comfortably without [having sexual activity of some kind/engaging in TMSI] with a partner?	3.88	1.37	7	0.33	-0.19	2.79	1.59	7	0.62	-0.14

Note. $N = 265$. One participant who was identified as a multivariate outlier and three who were identified as univariate outliers are excluded.

Table 8.7 Component Loadings and Communalities Based on a Principal Component

Analysis with Oblique Rotation (Promax) for Six Items from Measures of Dyadic In-Person and Technology-Mediated Sexual Desire

Items	Rotated Component Coefficient		
	Component 1: Dyadic Technology- Mediated Sexual Desire	Component 2: Dyadic In- Person Sexual Desire	Extraction Communalities
SDI_TMSI10: Compared to other people of your age and sex, how would you rate your desire to desire to engage in TMSI with a partner?	.868		.668
SDI_TMSI8: How strong is your desire to engage in TMSI with a partner?	.826		.741
SDI_TMSI9: How important is it for you to fulfill your sexual desire through TMSI with a partner?	.810		.633
SDI_TMSI2: During the last month, how often have you had sexual thoughts about engaging in TMSI with a partner?	.804		.628
SDI_TMSI1: During the last month, how often would you have liked to engage in TMSI with a partner (for example, sending sexual text messages, photos, videos, etc.)?	.788		.609
SDI_TMSI3: When you have sexual thoughts, how strong is your desire to engage in TMSI with a partner?	.778		.751

SDI8: How strong is your desire to engage in sexual activity with a partner?	.795	.621
SDI2: During the last month, how often have you had sexual thoughts involving a partner?	.794	.557
SDI3: When you have sexual thoughts, how strong is your desire to engage in sexual behavior with a partner?	.680	.476
SDI1: During the last month, how often would you have liked to engage in sexual activity with a partner (for example, touching each other's genitals, giving or receiving oral stimulation, intercourse, etc.)?	.668	.421
SDI10: Compared to other people of your age and sex, how would you rate your desire to behave sexually with a partner?	.659	.524
SDI9: How important is it for you to fulfill your sexual desire through activity with a partner?	.657	.462

Note. $N = 265$. One participant who was identified as a multivariate outlier and three who were identified as univariate outliers are excluded.

Table 8.8 Correlations Between Total Scores for Key Measures Used in Study One

Measure	α	M	SD	1	2	3	4	5	6	7	8	9
1. Self-Deceptive Enhancement	.725	82.28	13.54	-	-	-	-	-	-	-	-	-
2. Impression Management	.715	77.07	14.54	.426**	-	-	-	-	-	-	-	-
3. Approach TMSI Motives	.891	43.88	11.54	-.034	.014	-	-	-	-	-	-	-
4. Avoidance TMSI Motives	.828	19.16	7.55	-.158	-.118	.461**	-	-	-	-	-	-
5. Affirmation TMSI Motives	.884	16.32	6.92	-.196**	-.116	.606**	.520**	-	-	-	-	-
6. In-Person Sexual Satisfaction	.964	34.12	6.55	.188*	.140	.235**	-.115	.089	-	-	-	-
7. Technology-Mediated Sexual Satisfaction	.945	29.02	8.18	.202**	.180*	.307**	-.051	.100	.583**	-	-	-
8. Dyadic In-Person Sexual Desire	.824	50.29	10.77	.046	-.100	.394**	.077	.260**	.383**	.221**	-	-
9. Dyadic Technology-Mediated Sexual Desire	.902	31.66	15.44	.025	-.041	.557**	.260**	.348**	.231**	.358**	.483**	-

Note. $N = 269$. * $p < .01$ ** $p < .001$

Table 8.9 Participant Sociodemographic Information for Study Two

	Subsample size (<i>n</i>)	Proportion of total sample (%)
Gender ^a		
Cisgender man	120	26.1
Cisgender woman	251	54.7
Cisgender (not specified)	69	15.0
Transgender, nonbinary, genderqueer, and/or questioning	17	4.0
Sexual orientation ^a		
Heterosexual or mostly heterosexual	373	81.3
Bisexual, pansexual, or bi-curious	56	12.4
Gay or lesbian, and/or mostly gay or lesbian	16	3.4
Asexual or demisexual	9	2.0
Visible ethnic/racial minority status ^a		
No	282	61.4
Yes	166	36.2
Highest level of education ^a		
Some high school without a diploma	10	2.2
High school diploma	99	21.6
Some college or university	195	42.5
Bachelor's or college degree	103	22.5
Some post-graduate	18	3.9
Post-graduate degree	33	7.2

Relationship context with current partner		
Currently in long-distance relationship	124	27.0
Ever in long-distance relationship ^b	133	29.0
Currently living together	256	55.8
In a monogamous relationship ^a	422	91.9
	Mean (<i>M</i>)	Standard deviation (<i>SD</i>)
Number of TMSIs with current partner (of 29)	11.77	8.40
Age	30.31	13.02
Length of current relationship (in months)	78.15	104.09

Note. $N = 459$. Some numbers do not add up to 100% because participants were given the option to “choose not to respond” to particular sociodemographic questions.

^a Participants were given options to write in their own answer, or to choose not to respond

^b Excludes participants who reported they are currently in a long-distance relationship ($n = 156$).

Table 8.10 Internal Consistency of Measures Used in Study Two

Scale	Number of Items	α	Internal Consistency
Relationship Satisfaction	5	.938	Excellent
In-Person Sexual Satisfaction	5	.970	Excellent
Dyadic In-Person Sexual Desire	6	.853	Good
TMSI Frequency	29	.969	Excellent
Technology-Mediated Sexual Satisfaction	5	.970	Excellent
Dyadic Technology-Mediated Sexual Desire	6	.931	Excellent
TMSI Motives – Approach Subscale	12	.944	Excellent
TMSI Motives – Avoidance Subscale	12	.922	Excellent
Life Satisfaction	5	.915	Excellent
Socially Desirable Responding	10	.085	Unacceptable

Note. $N = 410$. 49 participants who were identified as multivariate outliers are excluded.

Table 8.11 Model Fit Statistics for Outcome Measures Using Confirmatory Factor Analyses with Maximum Likelihood**Estimation**

Outcome Measure	Model Tested	CFI	GFI	AGFI	SRMR	RMSEA	$\chi^2 (df)$	CMIN/DF
Relationship Satisfaction	Initial one-factor solution (no adjustments)	.99	.97	.91	.02	.12	33.57 (5)**	6.71
	One-factor solution with correlation term between error values for Items 2 and 3	.98	.95	.83	.01	.05	9.39 (4)	2.10
In-Person Sexual Satisfaction	Initial one-factor solution (no adjustments)	.98	.95	.85	.01	.15	51.72 (5)**	10.35
	One-factor solution with correlation term between error values for Items 1 and 4 and for Items 1 and 5	1.00	.99	.95	.01	.08	10.77 (3)*	3.59
Technology-Mediated Sexual Satisfaction	Initial one-factor solution (no adjustments)	.99	.97	.91	.01	.11	30.82 (5)**	6.16
	One-factor solution with correlation term between error values for Items 1 and 3 and for Items 1 and 5	1.00	.99	.94	.01	.09	12.74 (4)*	4.25

Life Satisfaction	Initial one-factor solution (no adjustments)	.99	.98	.93	.02	.10	24.60 (5)**	4.92
	One-factor solution with correlation term between error values for Items 4 and 5	1.00	.99	.97	.01	.05	8.79 (4)	2.07

Note. $N = 410$. 49 participants who were identified as multivariate outliers are excluded. CFI = comparative fit index; GFI =

goodness-of-fit index; AGFI = adjusted goodness-of-fit index; SRMR = standardized root-mean-square residual.

* $p < .05$

** $p < .001$

Table 8.12 Correlations, Means, and Standard Deviations for Measures Used in Study Two

Measure	1	2	3	4	5	6	7	8	9	10	<i>M</i>	<i>SD</i>
1. Approach TMSI Motives	-	-	-	-	-	-	-	-	-	-	22.63	6.52
2. Avoidance TMSI Motives	.356**	-	-	-	-	-	-	-	-	-	12.08	6.18
3. TMSI Frequency	.298**	.455**	-	-	-	-	-	-	-	-	63.32	35.70
4. Relationship Satisfaction	.233**	-.079	.114*	-	-	-	-	-	-	-	37.43	8.10
5. In-Person Sexual Satisfaction	.245**	-.019	.159**	.730**	-	-	-	-	-	-	34.77	6.56
6. Technology-Mediated Sexual Satisfaction	.542**	.189**	.316**	.414**	.442**	-	-	-	-	-	29.56	8.78
7. Dyadic In-Person Sexual Desire	.409**	.094	.183**	.445**	.534**	.404**	-	-	-	-	24.61	4.86
8. Dyadic Technology-Mediated Sexual Desire	.640**	.362**	.415**	.150**	.190**	.527**	.478**	-	-	-	16.66	8.27
9. Life Satisfaction	.104*	.115*	.149**	.471**	.364**	.180**	.207**	0.095	-	-	24.03	6.93

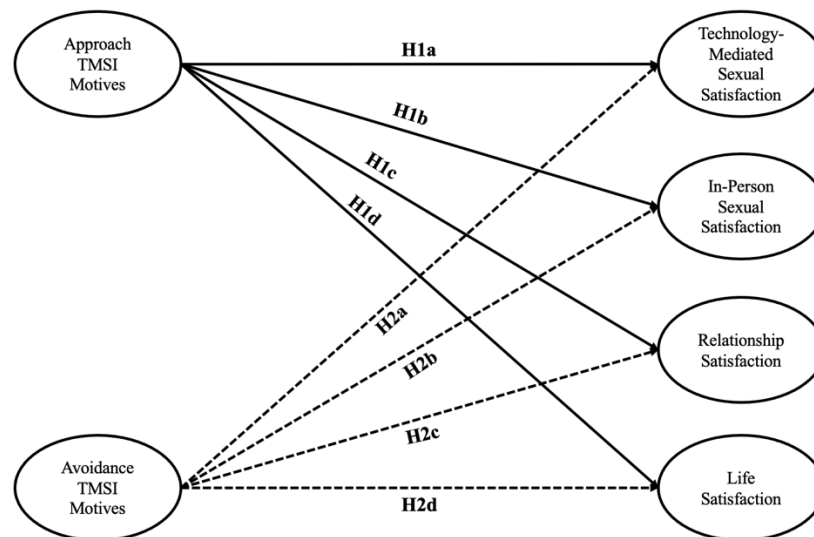
10. Socially
Desirable
Responding

-.034	.109*	.115*	.040	.059	-.001	.060	.063	.006	-	6.44	1.47
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Note. $N = 410$. 49 participants who were identified as multivariate outliers are excluded.

* $p < .05$

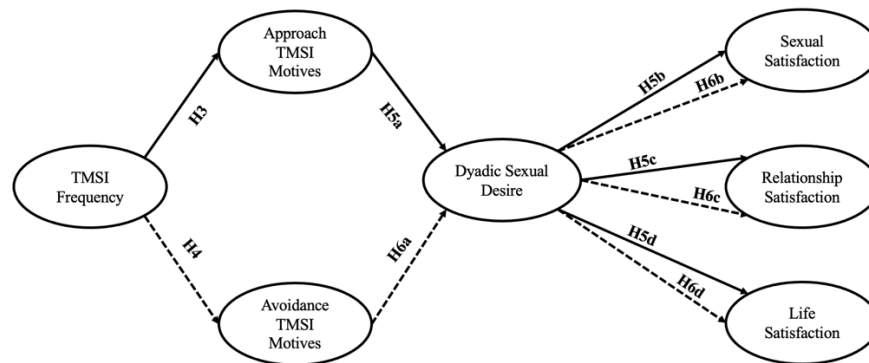
** $p < .001$

Figure 8.1 Hypothesized Model (Model 1)

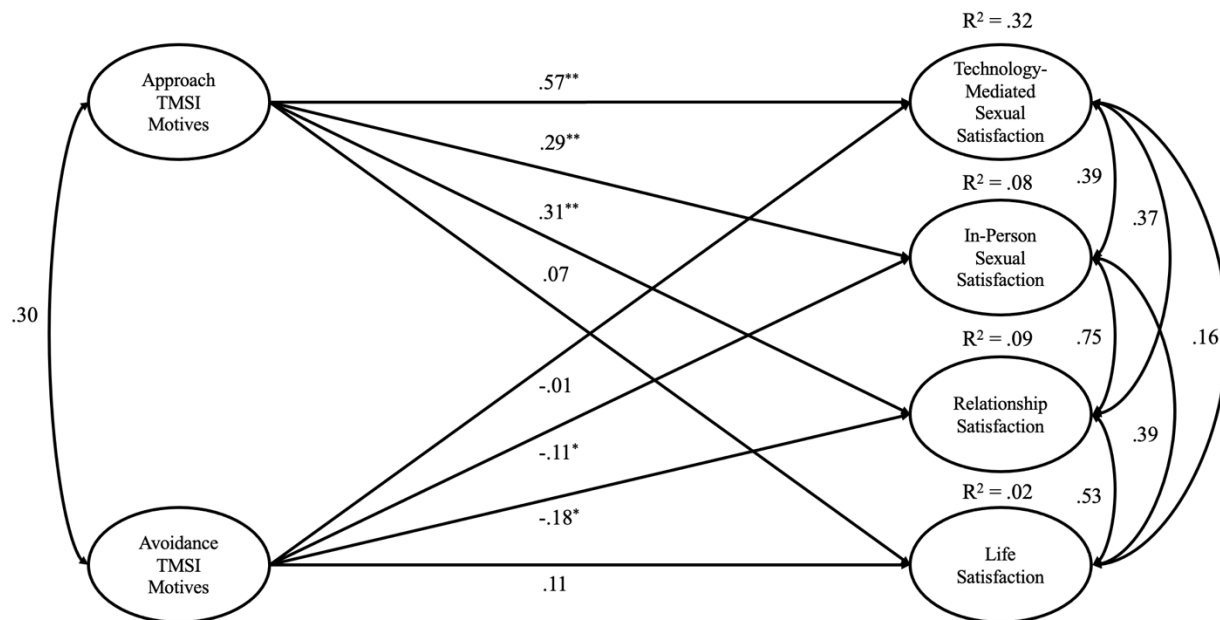
This hypothesized model (Model 1) predicts satisfaction with technology-mediated sexual activity, in-person sexual activity, romantic relationship, and life from approach and avoidance TMSI motives.

Note. Dotted lines represent negative hypothesized predictive associations; bold lines represent positive hypothesized predictive associations. All paths are expected to be significant ($p < .05$).

TMSI = technology-mediated sexual interaction.

Figure 8.2 Hypothesized Mediated Model (Model 2)

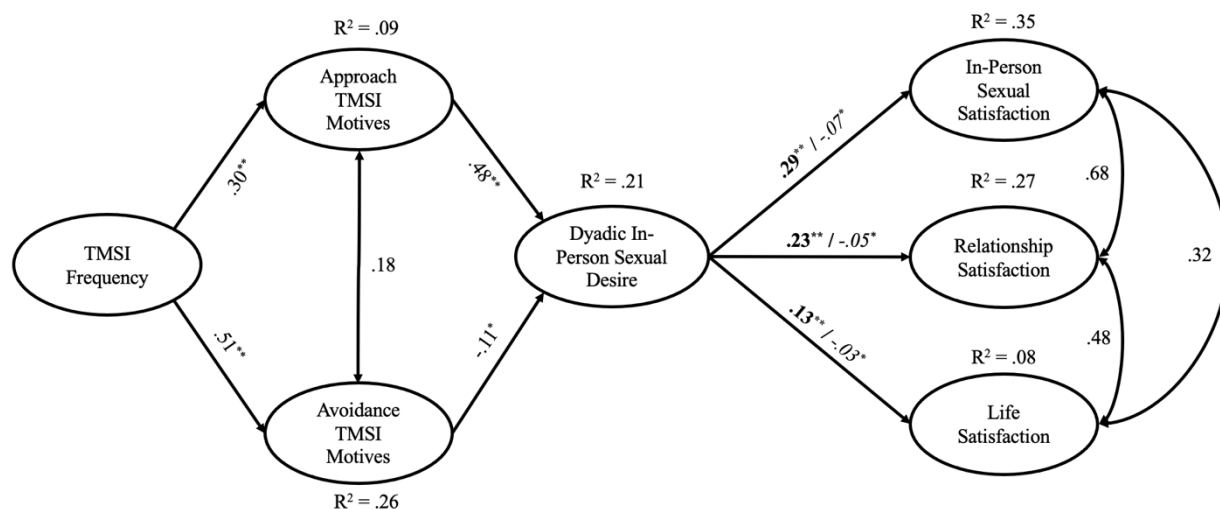
Note. This hypothesized model predicts satisfaction with in-person sexual activity, current romantic relationship, and life from approach and avoidance TMSI motives, with mediating effects of sexual desire. Dotted lines represent negative hypothesized predictive associations; bold lines represent positive hypothesized predictive associations. All paths are expected to be significant ($p < .05$). TMSI = technology-mediated sexual interaction.

Figure 8.3 Hypothesized Model Test Results

Results from our first hypothesized model (Model 1) testing the associations between approach and avoidance TMSI motives and outcome variables.

Note. Standardized path coefficients are shown for the full sample, excluding 49 participants who were identified as multivariate outliers. TMSI = technology-mediated sexual interaction.

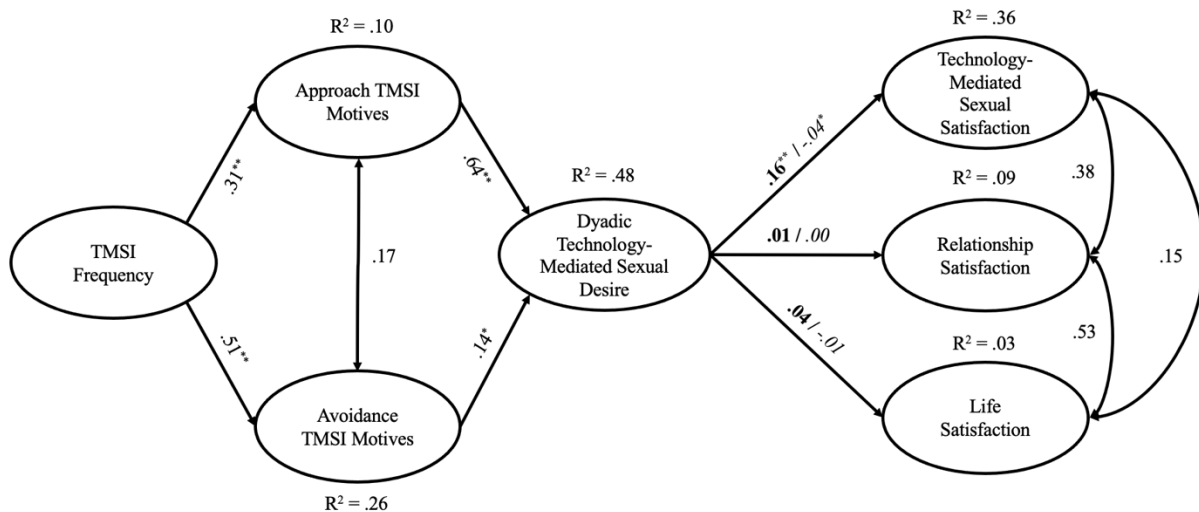
** $p < .001$, * $p < .05$.

Figure 8.4 Hypothesized Mediated Model Test Results

Results from our hypothesized mediated model (Model 2) testing the associations between approach and avoidance TMSI motives and outcome variables with dyadic in-person sexual desire as a mediator.

Note. Standardized path coefficients are shown for the full sample, excluding 49 participants who were identified as multivariate outliers. Standardized path coefficients for indirect relationships between TMSI motives and outcomes through dyadic in-person sexual desire are shown in bold for approach TMSI motives and in italics for avoidance TMSI motives. Direct paths between approach and avoidance TMSI motives and outcome variables are not pictured; however, there were significant direct positive effects of avoidance TMSI motives on relationship satisfaction and life satisfaction. TMSI = technology-mediated sexual interaction.

** $p < .001$, * $p < .05$.

Figure 8.5 Post-Hoc Mediated Model Test Results

Results from our post-hoc mediated model (Model 3) testing the associations between approach and avoidance TMSI motives and outcome variables with dyadic technology-mediated sexual desire as a mediator.

Note. Standardized path coefficients are shown for the full sample, excluding 49 participants who were identified as multivariate outliers. Standardized path coefficients for indirect relationships between TMSI motives and outcomes through dyadic in-person sexual desire are shown in bold for approach TMSI motives and in italics for avoidance TMSI motives. Direct paths between approach and avoidance TMSI motives and outcome variables are not pictured; however, there were significant direct positive effects of approach TMSI motives on technology-mediated sexual satisfaction and relationship satisfaction as well as significant direct negative effects of avoidance TMSI motives on relationship satisfaction. TMSI = technology-mediated sexual interaction. ** $p < .001$, * $p < .05$.

Chapter 9 (General Discussion)

Alongside rapid developments in communication technology over the past two decades, researchers have initiated a field of study that seeks to understand the ways in which people use and integrate communication technologies into the sexual aspects of their romantic relationships. The current dissertation subscribes to recent efforts to understand people's interpersonal use of technology but extends the existing literature past its limited, exploratory confines. Specifically, the overall goal of my dissertation was to improve knowledge about people's motives for engaging in technology-mediated sexual interactions (TMSIs) – interpersonal exchanges of self-created, sexual material via communication technology – within committed romantic relationships. In this dissertation, I advance knowledge and research in this area by focusing on TMSI as a behavioural domain rather than examining specific activities (e.g., sexting, cybersex). Additionally, I used the approach-avoidance motivational framework as a theoretical basis for measuring people's TMSI motives, describing the links between TMSI motives and outcomes, and connecting TMSIs with existing knowledge about in-person sexual behaviour. My dissertation is comprised of four studies that build on each other, towards a conceptually grounded, construct valid, theory-driven examination of people's motives for and outcomes of TMSI with a committed romantic partner. Throughout this dissertation, I demonstrate how, and underscore the importance of, applying methodological rigor to examinations of novel, technology-mediated behaviour. I also present concrete future directions and applications of my dissertation research that are relevant to educators, practitioners, and those who are interested in the implications of technology in people's sexual and interpersonal lives.

Contributions to the Literature

Technology-Mediated Sexual Interactions: Integrating Technology with Sex Research

Overall, the studies in this dissertation improve research methods and practices for enhancing knowledge on people's integration of technologies in their sexual lives – including with romantic partners. In Articles 1 (Chapter 2) and 2 (Chapter 4), I highlight conceptual, operational, and methodological problems in research about interpersonal technology-mediated sexual behaviour. Researchers have created fragmented knowledge about (mostly) sexting and cybersex – two activities that are almost indistinguishable from a conceptual and operational perspective. The existing empirical literature has also failed to incorporate construct valid approaches to measurement and has instead focused on exploratory research. By applying this narrow lens, researchers have hampered knowledge development about the underlying mechanisms through which TMSI impacts people's lives specifically, and in conjunction with other in-person sexual behaviours. To rectify these conceptual and methodological issues, I propose that researchers must shift their research focus to the TMSI behavioural domain. TMSI is an interpersonal sexual behaviour that occurs through technology and is commonly used in romantic relationships that also involve in-person sexual and relational components. By examining the TMSI behavioural domain, researchers will operate from a shared and consistent conceptual understanding of behaviour and create knowledge that sustains shifts in technological capabilities. Throughout the data collection for this dissertation, I also contributed to the development of the TMSI Checklist, a construct valid measure that operationalizes the TMSI behavioural domain.

In this dissertation, I highlighted and reinforced the necessity of theory-driven research, even for relatively new behaviours like TMSI. Theory-driven research is required if researchers seek to explain why behaviours occur and how behaviours are associated with various outcomes. Yet, researchers who have engaged in TMSI-related research have rarely used existing

theoretical frameworks to guide empirical studies. In my dissertation, I begin to fill this gap in knowledge by using the approach-avoidance motivational framework to understand and explain people's TMSI motives and related outcomes. In Article 3 (Chapter 6), I explored people's motives for TMSI with a romantic partner using a multi-grounded qualitative approach. In this way, I was able to identify a wide variety of TMSI motives, many of which extended or were entirely novel relative to previous research on motives for TMSI-related activities (e.g., Califano et al., 2022; Currin & Hubach, 2019; Currin et al., 2020; Drouin et al., 2013; Drouin & Tobin, 2014; Greer et al., 2022). I was also able to determine that the approach-avoidance framework was a useful theory to contextualize people's TMSI experiences. In Article 4 (Chapter 8), I used my qualitative findings in conjunction with previous research examining approach/avoidance motives for in-person sexual behaviour, in order to develop a construct valid, theory-driven measure of TMSI motives. I used this and measures adapted for TMSI to shed light on how TMSI motives predict the related outcomes that people experience. Thus, my dissertation connects TMSI to broader knowledge about how people's sexual motives explain related sexual, relational, and individual outcomes. By approaching research from a construct valid and theory-driven standpoint, my dissertation advances knowledge about TMSI and connects it to existing research on sexual behaviour and motives.

My dissertation research also suggests that TMSI is distinct from but related to people's in-person sexual behaviours and experiences. In Article 3, participants described how their in-person sexual and relational experiences with a current romantic partner impacted and were impacted by TMSIs. For instance, many participants described TMSI as an activity that functions as an 'adequate replacement' for – but is not quite the same as – in-person sexual activity, when in-person sexual activity with their partner is not an option (e.g., because they were living in a

different geographic location). Previously, researchers have captured similar motives for TMSI-related activities, such as maintaining intimacy when physically distant (e.g., Califano et al., 2022; Currin & Hubach, 2019; Currin et al., 2020; Drouin et al., 2013; Drouin & Tobin, 2014; Greer et al., 2022). However, my findings extend this past research by not only identifying motives and experiences that are unique to TMSI but also by examining how people's TMSI motives integrate with their in-person sexual lives. In Article 3, I identified 'technology-focused motives' as a standalone category that addressed how technology afforded participants the opportunity to either approach or avoid aspects of in-person sexual activities with their romantic partner. In Article 4, I found further support for including items related to technology-focused TMSI motives in both the 'approach' and 'avoidance' components of the TMSI Motives Scale. Furthermore, my hypothesized and post-hoc models indicated that approach and avoidance TMSI motives predicted variables related to both technology-mediated and in-person sexual domains. Together, my findings in Articles 3 and 4 suggest that motives specific to TMSI are relevant to people's technology-mediated and in-person sexual experiences. Therefore, researchers who wish to achieve a holistic understanding of people's sexual lives must account for both the technology-mediated and in-person contexts in which people interact.

The Approach-Avoidance Motivational Framework: Connecting TMSI Motives with Outcomes

The results of my dissertation extend the approach-avoidance motivational framework to account for people's TMSI motives in the romantic relationship context. Across Articles 3 and 4, I found that people's TMSI motives fit within the approach-avoidance motivational framework – a theory that researchers have previously used to explain people's motives for in-person sexual activity (e.g., Gewirtz-Meydan & Ayalon, 2018; Impett et al., 2005; Impett et al., 2008; Muise et

al., 2013; Muise et al., 2018; Rosen et al., 2015). In Article 3, I found that the TMSI motives people described fit within the broad categories that the approach-avoidance motivational framework describes (Cooper et al., 1998; Impett et al., 2005). In Article 4, I found that the basic predictions made by the approach-avoidance motivational framework about sexual motives and outcomes apply to TMSI. Specifically, approach and avoidance TMSI motives differentially predicted people's experience of technology-mediated sexual, in-person sexual, relationship, and life satisfaction. Previously researchers have generated atheoretical lists describing common motives for TMSI (primarily sexting; e.g., Califano et al., 2022; Currin & Hubach, 2019; Currin et al., 2020; Drouin et al., 2013; Drouin & Tobin, 2014; Greer et al., 2022). However, without a theoretical framework, these 'lists' of motives cannot be used to explain people's behaviour beyond establishing exploratory connections. Thus, by applying the approach-avoidance motivational framework in this research, I was able to demonstrate that the types of motives people use for TMSI (i.e., approach and avoidance) relate to their outcomes in predictable ways.

My findings contribute to and extend the approach-avoidance framework by highlighting two potential variables through which approach and avoidance TMSI motives impact TMSI outcomes: TMSI frequency and dyadic sexual desire. In Article 4, I found that people who more frequently engaged in TMSI with their current partner were likely to use both approach and avoidance TMSI motives. Counter to previous findings (e.g., Joudin et al., 2019; McNulty et al., 2016; Schoenfeld et al., 2017), the current research suggests that when people's motives for TMSI yield their intended outcomes, the sexual motives that they employ could be reinforced – regardless of whether those motives are approach or avoidance-oriented. In other words, when it comes to TMSI with a romantic partner, the motives that people intend to achieve could matter more for reinforcing behaviour than the related sexual, relational, and individual outcomes they

experience. In keeping with some of the previous research on in-person sexual behaviour (e.g., Impett et al., 2008; Muise et al., 2013) – but in contrast to other research (e.g., Impett et al., 2005; Muise et al., 2017) – I also found that approach and avoidance TMSI motives indirectly impact people's TMSI outcomes through dyadic sexual desire. Approach TMSI motives appear to increase sexual desire, resulting in higher levels of sexual, relational, and life satisfaction; conversely, avoidance TMSI motives reduce sexual desire, leading to lower levels of sexual, relational, and life satisfaction. Overall, my findings indicate that the connection between TMSI motives and outcomes – and likely in-person sexual motives and outcomes as well – involve more factors than just the motives and outcomes themselves.

By applying the approach-avoidance motivational framework to TMSI, my findings help to resolve some of the inconsistencies in previous TMSI-related research. Some researchers have found that TMSI is associated with positive outcomes (e.g., Brodie et al., 2019; Currin et al., 2016; Galovan et al., 2018; McDaniel & Drouin, 2015; Oriza & Hanipraja, 2020; Parker et al., 2013), whereas others have found that TMSI is associated with negative outcomes (e.g., Galovan et al., 2018; McDaniel & Drouin, 2015). However, it does not seem to be TMSI in and of itself that yields positive or negative outcomes; instead, my findings suggest that the motives guiding people's TMSI – and their related impacts on dyadic sexual desire – predict the extent to which people experience positive versus negative outcomes. Therefore, depending on the extent to which people use approach and avoidance TMSI motives, they can experience both increases and decreases in sexual, relationship, and life satisfaction. Indeed, other researchers who have applied motivational theory to TMSI have found similar results. Both Le et al. (2022) and Lefebvre et al. (2022) also found that the extent to which people experience positive or negative TMSI outcomes depends, in large part, on the motives that they employ. As such, the current

research contributes to the still-nascent literature suggesting that TMSI alone does not guarantee positive or negative outcomes; instead, the motivations that people employ appear to play a larger role than the behaviour itself. More broadly, my findings suggest that harnessing approach TMSI motives may increase the likelihood that people can use TMSI for their sexual, relational, and individual benefit.

Limitations and Future Directions

In this dissertation, I used a mixed-methods approach to address my four research objectives and associated research questions and hypotheses. Each of the four studies comprising my dissertation builds on the next in a consecutive way. In Article 1, I conducted a systematic literature review on sexting and cybersex research, finding that the ways researchers have separately conceptualized both activities point to the same underlying TMSI behavioural domain. In Article 2, I examined and critiqued the conceptual and methodological practices that researchers have employed when examining sexting, the most studied activity related to TMSI. I propose that to address the problems with existing research on sexting, researchers must shift their focus away from sexting and towards TMSI. Researchers must also use construct valid measurement practices and engage in theory-driven research. I implemented these solutions in Articles 3 and 4, wherein I used the approach-avoidance motivational framework as a theoretical basis for examining people's motives for TMSI. In Article 3, I qualitatively examined people's motives for engaging in TMSI with a current romantic partner. Using multi-grounded qualitative analyses, I found that the approach-avoidance framework explained people's TMSI motives. In Article 4, I used my findings from Article 3 to develop the TMSI Motives Scale – a construct valid, theory-driven measure of people's approach and avoidance motives for TMSI. I then used this measure to test my six hypotheses. Overall, my chosen methodologies were suitable for

addressing my research objectives. Nevertheless, there are limitations to the current research, which should be addressed in future studies. Limitations and future directions specific to each article were discussed in their respective chapters. Therefore, in the following sections, I focus on describing limitations and future directions that are relevant across studies.

Sampling Limitations and Future Directions

More research is needed to examine the extent to which the findings in this dissertation generalize to segments of the population that are not well represented in the current samples. Across articles, I made concerted efforts toward recruiting diverse samples (e.g., using inclusive study advertisements) and using inclusive sociodemographic questions. However, this dissertation is limited in generalizability due to a reliance on convenience samples in my empirical studies (Articles 3 and 4). Article 3 relied on convenience samples because participants were recruited from the University of Ottawa campus and nearby areas; Article 4 relied on University of Ottawa undergraduate students participating in exchange for course credit; the second online survey in Article 4 partially relied on people living in Canada who participated in exchange for monetary compensation. Participants recruited through these contexts likely differ from the general Canadian population in terms of background and sociodemographic characteristics (e.g., socioeconomic status, education levels, age, gender/sex, race/ethnicity, religion, political leanings). For example, compared to the Canadian population estimates (Statistics Canada, 2021), the participants in these two studies are younger on average; therefore, the findings may not be fully relevant for older adults who also engage in TMSI with a romantic partner. Furthermore, the majority of participants in Articles 3 and 4 were white, heterosexual, and cisgender. It is likely that the romantic and sexual experiences of people with minoritized racial, sexual, and/or gender identities differ from their non-minoritized counterparts.

Comparatively, minoritized people may have more limited opportunities to engage in romantic relationships (e.g., due to discrimination or less access to people who share their sexual orientation) or might face social disapproval for doing so (Van Ouystel et al., 2018). As such, minoritized people may rely more on technology-mediated platforms for social or relational contact and may report distinct motives for and outcomes of engaging in TMSI; these distinct experiences can only be captured with inclusive and diversity-forward research methods.

The participants in the current research also may differ from the broader population because they agreed to take part in a study about technology-mediated sexual activities in the context of a current relationship. In the current dissertation, I integrated people's reports of their own motives for TMSI into my research methodology as part of the substantive phase of construct valid measure development. However, researchers have found that, compared to people who do not participate in sexuality studies, those who do tend to be more sexually experienced, hold more sexually liberal attitudes, and are more comfortable discussing sexuality and sexual behaviour overall (Dawson et al., 2019; Wiederman, 1999). Furthermore, researchers have identified differences in the extent to which people are comfortable using and integrating technology into their interpersonal communications (e.g., Junco et al., 2010; Kimbrough et al., 2013). It is possible that my participants in Articles 3 and 4 were more comfortable answering questions about technology-mediated sexual activities and their current relationship relative to those who saw the study advertisements but chose not to participate. Furthermore, participants who are willing to discuss technology-mediated sexual behaviour and their current romantic relationship may generally be more satisfied with both domains relative to the general population (Fowers et al., 2001); they may also have different TMSI motives relative to those who chose not to participate. Researchers should strive to include people who have lower than average

technology usage and sexual/ relationship satisfaction, to ensure that a wide range of TMSI motives and experiences are represented.

Future research should also examine people's motives for TMSI in non-romantic relationship contexts. In this dissertation, I exclusively examined TMSI motives in the committed romantic relationship context. I limited my research scope in this way because previous research has found that people most commonly engage in TMSIs with a romantic partner (e.g., Brodie et al., 2019; Drouin et al., 2013; Klettke et al., 2014; Kokkinos & Krommida, 2022; Shaughnessy & Byers, 2014; Van Ouystel et al., 2020), suggesting this context as a good starting point for the current research. Furthermore, when I conceptualized this dissertation, prior research had not adequately addressed the role that relationship context likely plays in people's TMSI experiences, motives, and outcomes. However, by limiting my scope (and therefore, research samples) to people in a committed romantic relationship, I was not able to compare TMSI motives and outcomes across different relationship contexts (e.g., comparing motives for TMSI with a romantic partner to motives for TMSI with a casual sex partner or a stranger). As such, the current research may not be representative of the approach and avoidance motives people use for TMSI across all relationship contexts. Indeed, some researchers have found that people who engage in TMSI outside of the romantic relationship context may have different and additional TMSI motives (e.g., Drouin et al., 2013). As such, exploring people's approach and avoidance TMSI motives in other relationship contexts may shed further light on people's relevant outcomes and experiences.

Measurement Limitations and Future Directions

Future research is needed to examine the extent to which social desirability bias influences people's responses to questions about their TMSI experiences, motives, and

outcomes. In Article 4, I planned to account for the potential influence of social desirability bias by including common social desirability measures (i.e., the Balanced Inventory of Desirable Responding; Paulhus, 1988, and the Marlowe-Crowne Social Desirability Scale; Strahan & Gerbasi, 1972) in my research. However, these measures were not internally consistent in my samples and I was therefore unable to examine the extent to which social desirability bias may have influenced participant reports of their TMSI frequency, motivations, and related outcomes were measured in Articles 3 and 4. Social desirability bias can impact how participants respond to questions about their sexual behaviour and romantic relationships (King, 2022; Meston et al., 1998). For example, participants in both Articles 3 and 4 may have been motivated to report more positively on their levels of dyadic sexual desire, as well as sexual, relationship, and life satisfaction due to social desirability bias. Furthermore, it is possible that participants in both studies reported more approach TMSI motives relative to avoidance motives because the items measuring approach motives may have sounded comparatively more positive. As such, the extent to which the measures used in the current research may have been influenced by social desirability bias is unclear. My research also points to a need for researchers to re-evaluate the construct validity and reliability of existing social desirability measures, both in TMSI research and sexuality research more broadly.

Researchers also need to examine the extent to which measures of relationship and life satisfaction differ when comparing technology-mediated and in-person contexts. In Articles 3 and 4, I found evidence suggesting that aspects of people's interpersonal sexual experiences differ depending on whether they consider the in-person versus technology-mediated context of their sexual lives. This may also be the case for relationship and life satisfaction, such that people might provide different responses depending on whether they are considering the technology

versus in-person components of their relationship and/or life. However, I did not directly examine whether participants experienced different levels of in-person versus technology-mediated relationship and life satisfaction. Indeed, some studies suggest that people report lower satisfaction with friendships that exist only in online spaces compared to those with in-person contact (Buote et al., 2009; Scott et al., 2022); others have found that people report lower relationship and sexual satisfaction with romantic relationships that are maintained online compared to those with in-person contact (Blunt-Vinti et al., 2016). Furthermore, researchers have found mixed results when examining the associations between social media use and life satisfaction (e.g., Orben et al., 2019; Twenge, 2019); these results suggest that there may be multiple domains of life satisfaction that are currently untapped. Examining and comparing the technology-mediated and in-person contexts of relationship and life satisfaction may reveal further nuance in the outcomes related to people's technology use overall.

The measures that I created and adapted for use in the current dissertation require ongoing evaluation and refinement, both in new contexts (e.g., with other samples) and alongside developments in the technology (e.g., virtual sex, haptic sex) that people may use to engage in TMSIs. In this dissertation, I approached my research from a construct validity standpoint (as outlined by Boateng et al., 2018; Cronbach & Meehl, 1955; Flake et al., 2017; Strauss & Smith, 2009). Both Articles 1 and 3 contribute to the 'substantive phase' (Boateng et al., 2018; Cronbach & Meehl, 1955) of developing the TMSI Motives Scale (TMSIMS). My systematic literature review (Article 1) included a consideration of the various technological contexts of activities relevant to TMSI, thereby establishing the conceptual bounds of the TMSI behavioural domain. In Article 3, I examined and interpreted people's motivations for TMSI through the lens of the approach-avoidance motivational framework; I was able to incorporate this information

when developing novel items for the TMSIMS. In Article 4, I tested various aspects of structural validity (Boateng et al., 2018; Flake et al., 2017; Shaffer et al., 2016) and external validity (Mitchell, 2012) for the TMSIMS, as well as the measures I adapted to assess technology-mediated sexual satisfaction and dyadic sexual desire. The final factor structure that I achieved for the TMSIMS in Article 4 was acceptable but could likely be further improved upon with additional testing in the future. Because I did not engage in a substantive phase when adapting/developing measures of technology-mediated sexual satisfaction and dyadic sexual desire, researchers should assess whether these measures fully capture people's experiences in these regards. Indeed, construct validation is an ongoing process and requires continued evaluation; researchers must regularly report on their sample's validity evidence because each new study presents a unique research context (Flake et al., 2017; Kane, 2013; Messick, 1989).

Research Design Limitations and Future Directions

As technology continues to advance, it is likely that people will engage in new types of activities that fall within the TMSI behavioural domain. In Article 1, I chose to focus on examining sexting and cybersex because, at the time, these were the most reported and researched activities related to my conceptualization of the TMSI behavioural domain. However, my literature review was also limited by its focus on only these two activities. Indeed, since Article 1 was published, other activities that are captured by the TMSI behavioural domain have become more accessible to people. Empirical research on people's use of and engagement in haptic sex, virtual sex, and avatar sex is still (to my knowledge) unavailable or in early stages. However, researchers have published theoretical papers considering the potential sexual applications, uses, and implications of teledildonic devices (e.g., Flore & Pienaar, 2020; Ley & Rambukka, 2021) and virtual reality (e.g., Aleksandrovich & Mariano Gomes, 2020; Döring et

al., 2021; Lafortune et al., 2020). It is likely that, as this technology becomes more accessible and affordable in the consumer market, empirical research on new types of TMSI – including outside of clinical settings – will soon be available. Therefore, future literature reviews and meta-analyses should include search terms that capture a wider array of TMSI activities and ensure that they are captured by my conceptual definition of TMSI.

Because TMSI is an interpersonal activity, future research would also benefit from applying dyadic study designs. In my dissertation, I examined people's TMSI experiences, motives, and related outcomes in the interpersonal context of a current romantic relationship. However, in Articles 3 and 4, I only examined individual participant experiences – I did not examine the TMSI motives that both/all members of a romantic relationship employed. Yet, it is possible that one person's use of either approach or avoidance TMSI motives could impact not only their own experiences, but their partner's experiences of sexual, relational, and life satisfaction as well. Indeed, using dyadic study designs, researchers have found that when one member of a couple uses approach motives for in-person sexual activities, both they and their partner experience higher levels of sexual satisfaction, relationship satisfaction, and well-being (e.g., Impett et al., 2005; Muise et al., 2013). Conversely, when one member of a couple uses avoidance motives for in-person sexual activity, both they and their partner experience lower levels of sexual satisfaction, relationship satisfaction, and well-being. It is likely that similar patterns of findings would hold true for TMSI. Therefore, dyadic study designs would improve knowledge of how TMSI motives can impact all partners in a romantic relationship.

Future research should also use longitudinal research designs and experimental manipulations to directly test the potential causal impacts of using approach and avoidance TMSI motives on sexual, relational, and individual outcomes. The empirical research in this

dissertation is cross-sectional and captures participant responses at a single moment in time. However, it is likely that people's TMSIs with a romantic partner evolve over time and alongside changing relationship circumstances. For example, someone who was initially in a long-distance relationship may experience a change in their TMSI frequency, motives, and/or related outcomes if/when they and their partner share a household later in their relationship. In Article 4, I also suggest that people's TMSI outcomes may reinforce future TMSI frequency and motives, depending on whether their outcomes corresponded with the TMSI motives that they initially used. However, I was not able to directly test this possible reciprocal relationship without a longitudinal research design. Furthermore, I used Structural Equation Modeling (SEM) to examine my hypotheses in Article 4. SEM can be used to make causal inferences about relationships between variables; however, SEM cannot definitively demonstrate causality (Beran & Violato, 2010; Bollen & Pearl, 2013). Therefore, although my results suggest potential causal and reciprocal relationships between TMSI frequency, motives, and outcomes, they must still be interpreted with caution. Indeed, some researchers have experimentally manipulated people's approach and avoidance outcomes to observe longitudinal changes in relevant outcomes. As one example, Muise et al. (2017) found that participants who learned about the benefits of approach sexual motives and integrated them into sexual activity with their romantic partner, they then experienced higher levels of sexual and relationship satisfaction. A similar longitudinal and experimental approach could be used in future research to directly examine the potential causal impacts of TMSI motives across time.

Theory Limitations and Future Directions

Future research should incorporate theories rooted in both in-person sexual behaviour and cyberpsychology to better understand and explain TMSI experiences, motives, and related

outcomes. In this dissertation, my theoretical framing – and therefore, my research objectives, questions, hypotheses, and methodology – may not have fully addressed the novel affordances that technology can offer for interpersonal sexual behaviour. ‘Technology affordance’ refers to the perceived or potential capabilities and possibilities for action that a specific technology offers to its users (Gibson, 1978; Hutchby, 2001). In relation to TMSI, features and elements of technology can afford users something, such as the ability to engage in sexual communication with one’s partner while physically apart, to hide or conceal specific physical features or expressions when engaging in sexual activities, or to permanently save messages from another person for personal use (Shaughnessy & Braham, 2021). Technology affordances can also deter some people from engaging in TMSI. For example, technology also affords the opportunity to easily save and share sexual images sent by another person – intentionally (e.g., cyber-exploitation) or unintentionally (e.g., hacking victimization) (e.g., Albury, 2017; Courtice et al., 2021). Because I incorporated qualitative research into my dissertation, I was able to capture some technology affordances related to TMSI. Indeed, in Article 3, some participants discussed technology affordances (e.g., technology-focused motives, privacy/security concerns) when describing their TMSI experiences with their current partners. However, using cyberpsychology theory in tandem with the approach-avoidance framework may have allowed me to incorporate additional technology affordances into my research. Cyberpsychology theories describe people’s technology use, such as by exploring the mediums they choose, how they use them, why they continue or discontinue using them, and how technology use integrates with in-person experiences. One relevant theory, the Technology Integration Model (TIM; Shaw et al., 2018), describes the variables and processes that prompt continued technology use in various domains of a person’s life. Within this model, the TIM captures so-called ‘technology features’ (i.e.,

technology affordances) as well as motivations for use. Applying the TIM (or other cyberpsychology theory) to TMSI could allow researchers to more fully explain how TMSI can become integrated into people's sexual and romantic lives.

Applications and Conclusion

This dissertation provides information that would be useful for health educators and clinical practitioners who include sexuality in their work. The existing literature has produced mixed findings about the extent to which TMSI can be beneficial to sexual, relational, and well-being aspects of people's lives. However, as I argue in Articles 1 and 2, it is possible that this lack of clarity may stem from a lack of focus on the relationship and consent context of TMSI, as well as the historical focus on TMSI as a wholly problematic or 'addictive' behaviour. My findings in Articles 3 and 4 suggest that TMSI is not in and of itself a problematic behaviour, nor one that guarantees negative outcomes. Instead, my findings suggest that by harnessing approach TMSI motives, people can increase the likelihood of experiencing benefits in sexual, relational, and individual domains. Other researchers have suggested that couples can use TMSI to explore sexual fantasies and to engage in sexual activities when they are not in the same physical location (e.g., Currin et al., 2020; Parker et al., 2013). Furthermore, advances in technology, such as virtual reality, may help people address sexual dysfunctions both within and outside the romantic relationship context (e.g., Lafortune, 2022). Therefore, educators and clinicians who seek to enhance people's sexual and relational experiences in an increasingly technology-mediated world should incorporate these perspectives into their practice.

This dissertation advances knowledge about the ways in which people integrate technology into their sexual and romantic lives. A key finding of this dissertation is that TMSI is distinct but related to people's in-person sexual and relationship experiences: people's TMSIs

interact with and impact their in-person sexual experiences but also represent a new and, in some ways, separate context for these and related domains. Further examination of how people use and integrate TMSI – and technology more broadly – into their lives will prove essential for expanding knowledge about people’s interpersonal sexual experiences. Indeed, many researchers have argued that current events and advancing technological developments have accelerated the extent to which the sexual and relational domains of people’s lives are mediated by technology. For example, the COVID-19 pandemic marked a shift in public health recommendations related to sexting. In 2020, public health agencies in Ontario, New York, and other districts endorsed sexting as a means for pursuing sexual intimacy while observing physical distancing guidelines (Döring, 2020). Furthermore, current and future advancements related to virtual reality, robotics, and artificial intelligence will require an improved understanding of the increasingly fundamental role that technology plays in people’s sexual and interpersonal lives (McArthur & Twist, 2017). This dissertation represents a crucial step towards developing knowledge on the ways technology will continue to shape and be integrated into people’s lives and interpersonal relationships.

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Appendix A (Article 3 Eligibility Screener)

Are you over 18 years old? Are you currently in a committed romantic relationship? Have you used mobile or Internet technology to engage in technology-mediated sexual interactions (e.g., sexting, cybersex, or phone sex) with your CURRENT romantic partner(s)?

If your answer is YES to all of the above, we have a study for you!

The goal of this study is to better understand young adults' use of technology-mediated sexual interactions (the exchange of sexual material via mobile and/or Internet-based technology; e.g., sexting, cybersex, phone sex) in the context of their romantic relationships.

To participate, you would need to come for an in-person interview with a trained graduate student that will take no more than 90 minutes to complete.

You will be asked to answer questions about your experiences using mobile and Internet-based technologies for sexual communication and interaction with your current partner(s). Your comments in this interview and the following demographic survey will be kept strictly anonymous and confidential. In order to minimize the risk of security breaches and to help ensure your confidentiality we recommend that you use standard safety measures such as signing out of your account, closing your browser and locking your screen or device when you are no longer using them / when you have completed the study.

We are looking for people of all walks of life – of any religious backgrounds, ethnic backgrounds, sexual orientations, and gender identities.

You will receive \$20 cash for participating in this study, which will be awarded to you when you attend the in-person interview.

If you have any questions regarding this study, please feel free to contact the Principal Investigator, Erin Leigh Courtice, at REDACTED.

Do you agree to participate in this demographic survey?

- Yes
- No

IF NO: Skip to the final block of the survey ('Thank You' page)

IF YES: Proceed with eligibility screener questions

How old are you (in years)?

Which of the following options best represents your gender?

- Man
- Woman
- Transgender man
- Transgender woman
- Gender-neutral
- Gender-queer
- Non-binary
- You don't have an option that applies to me. I identify as (please specify):

- Choose not to respond

Which of the following options best represents the sex you were assigned at birth?

- Male
- Female
- Intersex
- You don't have an option that applies to me. At birth, I was assigned (please specify):

- Choose not to respond

Which of the following options best represents your sexual orientation?

- Heterosexual
- Gay
- Bisexual
- Bi-curious
- Two-spirited
- Asexual
- Unlabeled
- Unsure
- You don't have an option the applies to me. I identify as (please specify):

- Choose not to respond

Which of the following options best represents your current relationship status?

- Single
- Single and casually dating
- Committed relationship
- Common law
- Married
- Divorced
- Widowed
- You don't have an option that applies to me. My current relationship status is (please specify): _____
- Choose not to respond

Display This Question:

If Which of the following options best represents your current relationship status? = Committed relationship

Or Which of the following options best represents your current relationship status? = Common law

Or Which of the following options best represents your current relationship status? = Married

Or Which of the following options best represents your current relationship status? = You don't have an option that applies to me. My current relationship status is (please specify):

Or Which of the following options best represents your current relationship status? = Choose not to respond

How long (in years and months) have you been in this relationship?

- Years: _____
- Months: _____

If you are in a relationship, have you ever engaged in sexual interactions via technology (e.g., activities like sexting, cybersex, or phone sex), with your **current** romantic partner?

- Yes
- No
- Not sure (please explain): _____

In order to participate in this study, we will need to contact you via email. Please enter the email address you would like to be contacted at in the text box below. If you do not feel comfortable

entering your email address or phone number, you may contact Erin Courtice directly at **REDACTED**.

Email: _____

Thank you!

If you have any questions, please contact Erin Courtice at REDACTED

Appendix B (Article 3 Information Letter and Consent Forms)

Information Letter and Consent Form for Participants Recruited from uOttawa Integrated System for Participation in Research

Thank you very much for your interest in this study!

YOUR PARTICIPATION IN THIS PROJECT

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. You will first be asked to complete a short survey about your experiences using mobile and Internet-based technologies for sexual communication and interaction with your current primary romantic partner(s). Then, we will complete an in-person interview with a series of questions about these experiences, which will be audio-recorded on a digital recorder. In addition, during the interview I may take hand-written notes. Altogether, this study should take about 90 minutes to complete. The results of this study will be instrumental in improving knowledge about the nature of sexual and romantic intimacy, and behaviours online. For your participation, you will be compensated with 2 course credits for PSY1101 (Introduction to Psychology).

Please note that your participation in this study is completely voluntary. Your responses will remain completely confidential. If after completing the study you wish to withdraw your responses, you will be able to do so. We will be audio-recording your interview on a digital recorder. This audio recording will provide us with a script of your answers to questions and any discussions surrounding them. We will qualitatively analyze the scripts from all interview participants together (we expect to conduct between 15 to 20 separate interviews in total), looking for common types of responses and content that seems to represent most people's responses as a whole, and as subgroups. This analysis will result in a summary of the types of responses and discussions that were had about people's experiences, and only this summary information will be included in written reports of the interview results. No one person's opinion will be represented if it is not shared by some others. No one will be identified in these reports.

RISKS FROM PARTICIPATING IN THIS STUDY

We do not anticipate that there are serious risks from your participation in this study. Some people may feel uncomfortable or embarrassed talking about themselves or their sexual experiences during an interview. However, the interviewer will do their best to make you feel comfortable during the interview process.

BENEFITS FROM PARTICIPATING IN THIS STUDY

The results of this study will be instrumental in improving knowledge about the nature of sexual and romantic intimacy, and behaviours online. Your participation in this study is fundamental to this objective.

ANONYMITY AND CONFIDENTIALITY

Your contributions to this project will be kept confidential. In this study you will be assigned a number code that will be placed on all materials associated with your interview (e.g., audio-recording, transcript, questionnaires). Your name and signed consent form will not be marked with this participant number. The consent forms will be filed separately from the other research materials. No comments made by participants during the interviews will be personally attributed to them in any report associated with this project.

CONSERVATION OF DATA

Data from this study will consist of your responses on the questionnaires, handwritten notes from the interviewer, and audio-recordings of the interview. All interview data will be transcribed to password protected word documents and labeled with a participant number; all questionnaire data will be inputted into electronic databases and labeled with the same participant number. The hardcopy notes, transcriptions, questionnaires, and consent forms will be stored in a locked file cabinet, in Dr. Shaughnessy's locked research office, at the University of Ottawa. The consent forms will be stored in a separate drawer from the research data. Electronic files will be password protected and stored on Dr. Shaughnessy's secure network folder on the University of Ottawa network, and on an encrypted, password protected external hard-drive. The external hard-drive will be stored in a locked cabinet in Dr. Shaughnessy's research office at the University of Ottawa. Once transcribed and checked for accuracy, the original audio files will be securely and permanently deleted. We will store all study materials for up to 5 years after the end of the study and all scientific publications about this study are completed. After the storage period, your research-related information will be confidentially and permanently deleted from all devices and storage locations and the paper documents confidentially shredded.

VOLUNTARY PARTICIPATION

Participating in this project is voluntary. You can end your participation at any time. You do not have to answer any question you do not want to answer. There will be no consequences for you now or in the future if you choose not to participate. You will be granted the ISPR credit for this study even if you stop early or choose not to answer some questions.

QUESTIONS ABOUT YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY

If you have any questions about the purpose or content of the study before you begin, please ask the research interviewer now. If you still have questions either before or after your participation, please contact the researcher, Erin Leigh Courtice, or the principle investigator, Dr. Krystelle Shaughnessy (C. Psych).

Erin Leigh Courtice, Ph.D. Candidate
REDACTED
School of Psychology, University of Ottawa

Krystelle Shaughnessy, Ph.D
(613) 562-5800 ext. 8701
krystelle.shaughnessy@uottawa.ca
School of Psychology, University of Ottawa
136 Jean Jacques Lussier, Vanier Hall
Ottawa, ON, Canada
K1N 6N5

We would like to assure you that this study has received ethics approval from the University of Ottawa Research Ethics Board. However, the final decision to participate is yours. If you have any comments or concerns resulting from your participation in this study, please contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5.

Tel.: (613) 562-5387

Email: ethics@uottawa.ca

PROVIDING CONSENT

There are two copies of this consent form, one for you, and one for me to keep.

I have read and understand the information in the letter, I have had the opportunity to ask questions and receive answers that I understand, and I agree, of my own free will, to participate in this study.

Participant's signature: _____

Date: _____

Researcher's signature: _____

Date: _____

I agree to have the interview audio-recorded on a digital recorder.

Participant's signature: _____

Date: _____

Researcher's signature: _____

Date: _____

Information Letter and Consent Form for Participants Recruited from the Community

Thank you very much for your interest in this study!

YOUR PARTICIPATION IN THIS PROJECT

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. You will first be asked to complete a short survey about your experiences using mobile and Internet-based technologies for sexual communication and interaction with your current primary romantic partner(s). Then, we will complete an in-person interview with a series of questions about these experiences, which will be audio-recorded on a digital recorder. In addition, during the interview I may take hand-written notes. Altogether, this study should take about 90 minutes to complete. The results of this study will be instrumental in improving knowledge about the nature of sexual and romantic intimacy, and behaviours online. For your participation, you will be compensated with \$20 in cash.

Please note that your participation in this study is completely voluntary. Your responses will remain completely confidential. If after completing the study you wish to withdraw your responses, you will be able to do so. We will be audio-recording your interview on a digital recorder. This audio recording will provide us with a script of your answers to questions and any discussions surrounding them. We will qualitatively analyze the scripts from all interview participants together (we expect to conduct between 15 to 20 separate interviews in total), looking for common types of responses and content that seems to represent most people's responses as a whole, and as subgroups. This analysis will result in a summary of the types of responses and discussions that were had about people's experiences, and only this summary information will be included in written reports of the interview results. No one person's opinion will be represented if it is not shared by some others. No one will be identified in these reports.

RISKS FROM PARTICIPATING IN THIS STUDY

We do not anticipate that there are serious risks from your participation in this study. Some people may feel uncomfortable or embarrassed talking about themselves or their sexual experiences during an interview. However, the interviewer will do their best to make you feel comfortable during the interview process.

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The results of this study will be instrumental in improving knowledge about the nature of sexual and romantic intimacy, and behaviours online. Your participation in this study is fundamental to this objective.

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Participating in this project is voluntary. You can end your participation at any time. You do not have to answer any question you do not want to answer. There will be no consequences for you now or in the future if you choose not to participate. You will be given the \$20 compensation for this study even if you stop early or choose not to answer some questions.

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If you have any questions about the purpose or content of the study before you begin, please ask the research interviewer now. If you still have questions either before or after your participation, please contact the researcher, Erin Leigh Courtice, or the principle investigator, Dr. Krystelle Shaughnessy (C. Psych).

Erin Leigh Courtice, Ph.D. Candidate
REDACTED
School of Psychology, University of Ottawa

Krystelle Shaughnessy, Ph.D
(613) 562-5800 ext. 8701
krystelle.shaughnessy@uottawa.ca
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PROVIDING CONSENT

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I have read and understand the information in the letter, I have had the opportunity to ask questions and receive answers that I understand, and I agree, of my own free will, to participate in this study.

Participant's signature: _____

Date: _____

Researcher's signature: _____

Date: _____

I agree to have the interview audio-recorded on a digital recorder.

Participant's signature: _____

Date: _____

Researcher's signature: _____

Date: _____

Appendix C (Article 3 Background Questionnaire)

1. How old are you in years?

_____ (numerical response only)

2. Which of the following options best represents your gender?

- Cisgender man
- Cisgender woman
- Transgender man
- Transgender woman
- Gender-neutral
- Gender-queer
- Non-binary
- You don't have an option that applies to me. I identify as (please specify):

- Choose not to respond

3. Which of the following options best represents the sex you were assigned at birth?

- Male
- Female
- Intersex
- You don't have an option that applies to me. At birth, I was assigned (please specify):

- Choose not to respond

4. Which of the following options best represents your sexual orientation/identity?

- Heterosexual
- Lesbian
- Gay
- Bisexual
- Bi-curious
- Asexual
- Unlabeled
- Unsure
- You don't have an option that applies to me. I identify as (please specify):

- Choose not to respond

5. Which of the following best describes the ethnic origin of your ancestors (i.e., the parents of your grandparents)?

- Caucasian/White
- First Nation
- South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- Chinese
- Black
- Filipino
- Latin American
- Arab
- Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai)
- West Asian (e.g., Iranian, Afghan)
- Korean
- Japanese
- Biracial/biethnic or multiracial/multiethnic (please specify): _____
- Other (please specify): _____
- Choose not to respond

6. What is the highest level of education that you have completed?

- Some school without high-school diploma
- High-school graduate
- Some college/university education (including the degree you are currently pursuing, if applicable)
- Degree from a college or university
- Post-graduate degree
- Choose not to respond

7. About how many years have you been sexually active?

_____ (numerical response only)

8. About how many sexual partners have you had in your lifetime?

_____ (numerical response only)

9. Which of the following best describes your current relationship status (select all that apply)?

- Committed relationship
- Common law
- Married
- Divorced
- Widowed
- Other (please specify): _____
- Choose not to respond

10. How long have you been in this relationship?

_____ (years) _____ (months)

11. About how frequently do you and your current relationship partner engage in *offline* (in-person) sexual activity, ***not including penetrative sexual intercourse***?

- Never
- Once or twice a month
- A few times a month
- Once a week
- A few times a week
- Almost daily or daily

12. About how frequently do you and your current relationship partner engage in *offline* (in-person) sexual activity, ***including penetrative sexual intercourse***?

- Never
- Once or twice a month
- A few times a month
- Once a week
- A few times a week
- Almost daily or daily

13. What technological devices have you used in the last 12 months to connect with your current relationship partner(s)? Check all that apply.

- Mobile phone (*does not* connect to the internet)
- Smart phone (*does* connect to the internet)
- Tablet
- E-reader
- Gaming system (X-Box, PlayStation)
- Landline phone
- Laptop
- Desktop computer
- Smart watch
- Other (please specify): _____

14. About how old were you (in years) when you first started using the Internet?
_____ (numerical entry only)

15. About how old were you (in years) when you first got a mobile phone from which you could send text messages?

- _____ (numerical entry only)
- I've never had one of these

16. About how old were you (in years) when you first got a smart phone from which you could browse the Internet without an Internet connection (i.e., using cellular data)?

_____ (numerical entry only)

- I've never had one of these

17. About how many years have you been using the Internet for?

- Less than 1
- 1 – 5
- 6 – 10
- 11 – 15
- 16 – 20
- More than 20 years
- Choose not to respond

In the next questions, when the term “active” is used, it means actually using the Internet. It does not mean having webpages open that you are not using or looking at while doing something else. So, “active” means that you are viewing/reading/composing messages or content on webpages/websites and online programs.

For example: chatting with people on Facebook Messenger, WhatsApp or Reddit; browsing Instagram, Snapchat or Twitter; checking, reading or composing emails; reading an online article or doing research for coursework; watching YouTube or Netflix.

18. About how many hours a day, during the week (i.e., Monday to Friday), do you spend being *active* online?

_____ (numerical entry only)

19. About how many hours a day during the weekend (i.e., Saturday and Sunday), do you spend being *active* online?

_____ (numerical entry only)

Appendix D (Article 3 TMSI Checklist)

Below is a list of possible activities that some people engage in during technology-mediated sexual communications or interactions that involve **at least one other person**.

Please indicate whether or not you have ever **consensually** engaged in each of these activities with your **current romantic partner(s)**, using mobile or Internet-based technology of any kind, on any type of device (e.g., smart phone, laptop, tablet).

Have you ever...	YES	NO
1. <i>Exchanged</i> sexual typed messages, back and forth, with your current partner?		
2. <i>Sent</i> a sexual typed message to your current partner?		
3. <i>Received</i> a sexual typed message from your current partner?		
4. With your current partner, <i>exchanged</i> sexual semi-nude pictures (i.e., where you each were partially naked) of yourselves, back and forth?		
5. With your current partner, <i>exchanged</i> sexual nude pictures (i.e., where you each were completely naked) of yourselves, back and forth?		
6. With your current partner, <i>exchanged</i> sexual pictures of yourselves, back and forth, where each of you were performing sexual actions?		
7. <i>Sent</i> a sexual semi-nude picture (i.e., where you were partially naked) of yourself to your current partner?		
8. <i>Sent</i> a sexual nude picture (i.e., where you were completely naked) of yourself to your current partner?		
9. <i>Sent</i> a sexual picture of yourself to your current partner, where you were performing sexual actions?		
10. <i>Received</i> a sexual semi-nude picture (i.e., where they were partially naked) of and from your current partner?		
11. <i>Received</i> a sexual nude picture (i.e., where they were completely naked) of and from your current partner?		

12. Received a sexual picture of and from your current partner, where they were performing sexual actions?		
13. With your current partner, <i>exchanged</i> sexual semi-nude videos (i.e., where you each were partially naked) of yourselves, back and forth?		
14. With your current partner, <i>exchanged</i> sexual nude videos (i.e., where you each were completely naked) of yourselves, back and forth?		
15. With your current partner, <i>exchanged</i> sexual videos of yourselves, back and forth, where each of you were performing sexual actions?		
16. Sent a sexual semi-nude video (i.e., where you were partially naked) of yourself to your current partner?		
17. Sent a sexual nude video (i.e., where you were completely naked) of yourself to your current partner?		
18. Sent a sexual video of yourself to your current partner, where you were performing sexual actions?		
19. Received a sexual semi-nude video (i.e., where they were partially naked) of and from your current partner?		
20. Received a sexual nude video (i.e., where they were completely naked) of and from your current partner?		
21. Received a sexual video of and from your current partner, where they were performing sexual actions?		
22. <i>Exchanged</i> sexual audio messages (e.g., voice recordings), back and forth, with your current partner?		
23. Sent a sexual audio message to your current partner?		
24. Received a sexual audio message from your current partner?		
25. Engaged in a sexual live audio exchange (e.g., phone call) with your current partner?		
26. Engaged in a sexual live video exchange (e.g., webcam, FaceTime) with your current partner?		

Appendix E (Article 3 Qualitative Interview Schedule)

Just to start off, technology-mediated sexual interactions (or, TMSIs) are any type of sexual interaction with another person that occur through the use of communication technology. For example, sexting is a type of TMSI where you might exchange sexually explicit texts or photos – usually over a mobile or smart phone, or maybe something like Facebook messenger or SnapChat. Things like FaceTime or Skype – that happen over live video or audio – also fit within TMSI.

Before we start, I want to be sure that what TMSI is clear to you because these types of behaviours or activities are a key part of this study. Do you have any questions about that first? Have you done these types of activities with your current partner?

TMSI Checklist Questions

1. Overall, what are your thoughts about that list of questions?
 - a. Do you think they give a good overview of the TMSI experiences that you've had?
2. Were there any items that stuck out as confusing or oddly worded?
3. Were there any items that seemed repetitive to each other?
4. Are there any activities that appear to be missing from this list?

Thank you for agreeing to participate in this interview today. As you know, the purpose of this study is to better understand young adults' use of technology-mediated sexual interactions, especially with their primary romantic partners. Today, I'm going to ask you some questions about your personal experiences with technology-mediated sexual interactions. This will take us no more than 90 minutes. Before we begin, I'd like to remind you that your participation in this study is completely voluntary – you don't have to participate if you don't want to, and you don't have to answer any of the questions I ask if you don't want to. If there is anything you would like me to strike from the record of our conversation and exclude from my analyses, please let me know. Your participation is completely confidential – so your responses are never going to be linked to your name, and I will never identify you to anyone else. I also want you to know that this is a safe space and I am not going to be judgemental of anything you say here – people have had all kinds of experiences and we are simply trying to better understand the variety of technology-mediated sexual experiences in romantic relationships. But, if you are feeling uncomfortable at any point and need to stop, please don't hesitate to let me know.

I'm just going to get you to verbally let me know for the recording- do you agree to participate?

And before we begin, please confirm for me that you have read, understood, and signed the consent form for this study including that you are willing to be audio recorded?

Another thing I'd like you to keep in mind is that there are no right or wrong answers here – I'm just interested in hearing about your experiences. Many people have a range of experiences with

TMSI and sex in general, so I'm interested in hearing about all of those things – the goods, bads, and in-betweens – from you today, as well.

Relationship and Sexual Satisfaction Questions

1) **First off, I just have a few questions to better understand your current relationship context.**

- How long have you and your partner been together?
- What gender does your current partner identify as?
- Are you and your partner monogamous with each other (do you only engage in romantic and sexual interactions with each other, and no one else)?
 - **IF NO:** How would you describe your relationship context, with regards to monogamy? (E.g., are you in an open or polyamorous relationship?)
 - Do you refer to one of your partners as a 'primary' partner?
 - How many other romantic/sexual partners do you have (outside of your primary partner)?
 - How many other romantic/sexual partners do you or have you engaged in TMSI with?
- Are you and your current partner living together? (Do you live with any of your current partners?)
 - **IF YES:** How long have you been living together?
- Have you ever been, or are you currently, in a long-distance relationship with your current partner? (...with any of your current partners?)
 - **IF YES:** How long were you **OR** have you been in a long-distance relationship?
 - **How long do you foresee yourself being long-distance with your current partner?** (E.g., six months, a year, unsure).
 - **Is it likely your relationship with your current partner will be long-distance again in the future?**
 - **How far away, geographically, was/is your current partner?**

2) **Broadly, how would you describe your relationship with your partner?**

- How **satisfied** are you with your and your partner's relationship overall?
- What are the most positive aspects of your relationship?
- If you could, what would you change about your relationship?
- Can you tell me about a time that you and your partner had a fight or disagreement? What are your fights or disagreements usually like?

3) **Broadly, how would you describe your sex life (excluding technology/TMSI) with your partner?**

- Do you engage in offline sexual activities together, other than TMSI?
 - Broadly, what types of sexual activities do you and your partner most often engage in together?
 - Is there anything you would like to add to your sex life, that you haven't yet? – Why haven't you tried it yet?
- How **satisfied** are you with your and your partner's sexual life overall?

- What are the most positive aspects of your sex life?
- If you could, what would you change about your sex life?
- **Are there ways that you've incorporated technology into your in-person sex life (e.g., sex toys)? Can you tell me more about that?**

Great, thank you for sharing that with me. All right, now I'm going to ask you about your TMSI experiences in the context of your current romantic relationship.

(If they need a reminder: any type of sexual interaction with another person that occur through the use of communication technology. For example, sexting is a type of TMSI where you might exchange sexually explicit texts or photos – usually over a mobile or smart phone, or maybe something like Facebook messenger or SnapChat. Things like FaceTime or Skype – that happen over live video – also fit within TMSI.).

TMSI Questions

- 4) **Broadly, how would you describe your experiences engaging in TMSI with your partner?**
 - **Can you give me sort of a timeline or overview of yours and your partner's use of TMSI in your relationship? (From when you started until now)**
 - Is it something you've done with previous partners?
 - Broadly, what types of technologies have you used for engaging in TMSI with your current partner?
 - What modes, forums, apps, or ways of sending/receiving/exchanging have you used?
 - Which types of technologies and/or apps would you say you prefer the most/least?
 - Have these changed over time (or have you always used the same things for TMSI)?
 - What types of TMSI activities have you engaged in with your partner? (E.g., sexting, photos)
 - Which activities would you say you do the most/least?
 - Which activities would you say you **enjoy** the most/least?
 - How have the types of TMSI activities that you do changed over time (or do you still generally do the same stuff as you did when you started)?
 - **What led you and your current partner to start using TMSI together?**
 - Who initiated it the very first time?
 - How did *you/they* initiate? (E.g., asking consent, sending a text or photo without warning)
 - What **motivated** you to initiate TMSI with your partner this first time?
OR What do you think motivated your partner to initiate TMSI with you this first time?
 - How did *you/they* respond?
 - How did you feel after this first experience was over?

- How did this first experience change your relationship?
 - How did this first experience change your sexual life?
 - **Do you foresee you and your partner continuing to use TMSI in the future?**
 - **OR** Do you still use TMSI with your partner now?
 - **IF NO:** What prompted you to stop?
 - What lead to you to decide not to do it anymore?
 - Would you say it was it more your decision, or more your partner's decision?
 - Would anything occur that would get you back into using TMSI?
 - **(IF yes)** What would that be? **(IF no)** Why not?
 - **About how often/frequently would you say you engage/d in different TMSI activities with your partner?**
 - Under what circumstances do you use TMSI *more*?
 - Under what circumstances do you use TMSI *less*?
- 5) Broadly, can you tell me about the most recent TMSI experience that you had with your partner, from start to finish?**
- How did it start?
 - Did you or your partner initiate this interaction?
 - What did *you/your partner* do to get things started?
 - How many messages were exchanged?
 - Was the content of the messages mostly text, photo, video, or some combination?
 - Via what app or technology?
 - How did it end?
 - How did you know it was over?
 - **Broadly, did you enjoy this interaction?**
 - What aspects of it did you enjoy the most?
 - What aspects of it did you enjoy the least?
 - What impacts do you think this interaction had on...
 - Your relationship?
 - Your life?
 - On you, personally?
 - Is this typically how **most** of your TMSI experiences happen with your partner?
 - **IF NO:** How does a more typical experience usually go (same questions as in c)?
 - **IF YES:** Is there anything else that is usually incorporated, but that wasn't this most recent time?
 - **Are there other ways that a TMSI experience starts or gets initiated between you and your partner?**
 - Overall, what aspects of your TMSI experiences do you enjoy the most?
 - Overall, what aspects of your TMSI experiences do you enjoy the least?
 - If you could, how would you change your TMSI experiences with your partner?

- Overall, how would you your TMSI activities to your in-person sexual activities?
 - How are they different?
 - How are they the same?
- 6) Overall, how much do you enjoy your TMSI experiences with your current partner?
 - Under what circumstances do you enjoy your TMSI experiences with your partner the *most*?
 - What about these TMSI experiences makes them enjoyable?
 - Under what circumstances do you enjoy your TMSI experiences with your partner the *least*?
 - Is there anything about these TMSI experiences that are not enjoyable?
 - Is there anything that would make your TMSI experiences more enjoyable?
 - Thinking about all of your TMSI experiences with your current partner, who typically initiates TMSI (e.g., usually your partner, usually you, about equal)?
 - What percentages of the time do you/your partner initiate TMSI?
 - What are the *differences* in how the TMSI exchange goes, when you compare times that you've initiated it versus when your partner has initiated it?
 - What are the *similarities* in how the TMSI exchange goes, when you compare times that you've initiated it versus when your partner has initiated it?
- TMSI Motives:
 - When you think about the TMSI experiences that you've initiated with your current partner(s), what are some things that **prompt/motivate** you to initiate a TMSI exchange (e.g., to send a sext or a photo)?
 - What are some reasons that lead you to initiate a TMSI exchange?
 - *For example, feeling aroused or like your partner expects it of you?*
 - Do these reasons differ based on particular circumstances?
 - What types of circumstances lead to X reason versus Y reason?
 - What kinds of circumstances lead to you enjoying it more?
 - Can you tell me about of a time when you've initiated TMSI...
 - **When you wanted to have an interaction?** What reason(s) did you have for initiating that exchange?
 - **When you weren't really in the mood?** What reason(s) did you have for initiating that exchange?
 - **To get you/your partner excited about an in-person sexual encounter?** What reason(s) did you have for initiating that exchange?
 - **To replace or approximate an in-person sexual activity?** What reason(s) did you have for initiating that exchange?
 - Does your partner usually engage in TMSI when you try to initiate it?
 - When does your partner usually engage, versus when do they usually not engage?
 - Have you noticed any patterns to when they like to engage versus not?

- **Do you think your TMSI exchanges are different, depending on your motivations for initiating it?**
 - How so?
 - When you think about the TMSI experiences that your partner has initiated, what are some things that you think **prompt/motivate** them to initiate a TMSI exchange (e.g., to send a sext or a photo)? For example, feeling aroused or knowing you expect it of them.
- What are some reasons that lead you to engage in a TMSI exchange that your partner has initiated?
 - Do these reasons differ based on particular circumstances?
 - What types of circumstances lead to X reason versus Y reason?
 - What kinds of circumstances lead to you enjoying it more?
 - **Do you ever *not* engage in TMSI when you can tell your partner is trying to initiate it?**
 - What are some reasons you don't engage in TMSI under those circumstances?
- **Can you tell me about of a time when you've engaged in TMSI (that your partner has initiated)...**
 - **When you *wanted* to have that interaction as well?** What reason(s) did you have for engaging in that exchange?
 - **When you weren't really in the mood?** What reason(s) did you have for engaging in that exchange?
 - **To avoid a negative consequence?** What reason(s) did you have for engaging in that exchange?
 - **To replace or approximate an in-person sexual activity?** What reason(s) did you have for engaging in that exchange?
 - **When do you prefer to engage versus when do you prefer not to engage?**
 - Do you usually engage in TMSI when you can tell your partner is trying to initiate it?
- **TMSI Outcomes:**
 - How has engaging in TMSI with your partner **impacted** your relationship with your partner?
 - How has TMSI made your relationship better?
 - How has TMSI made your relationship worse?
 - How would your relationship be different without using TMSI?
 - How has your use of TMSI with your partner **impacted** you outside of your relationship(s)?
 - How has it affected you or your life in a good way?
 - How has it affected you or your life in a bad way?

So, those are all of my key questions for you. Before we finish up, is there anything about your experiences using TMSI in your relationship that I haven't asked you about and that

you think is important? – Thank you very much for sharing your thoughts and experiences with me. Your willingness to participate in this interview is very important to our research and ability to better understand TMSI experience from a balanced perspective – thinking about the good, bads, in-betweens, and just generally how people are integrating technology into their sexual lives.

Appendix F (Article 3 Debriefing Forms)

Debriefing Form for Participants Recruited from uOttawa Integrated System for Participation in Research

We have just one more question for you before your participation in this study is complete. Please read through the following information and answer the final question at the bottom of the page.

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their primary romantic partners. We were specifically interested in peoples' motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people's experiences with TMSI in romantic relationship contexts more broadly. Your responses will be combined with other people's responses (and thus kept anonymous) and then used to: a) summarize common ideas in people's TMSI experiences within their romantic relationships, for Erin Courtice's dissertation and descriptive research publications, and b) use these common ideas to inform future research on TMSI. You will still receive your ISPR credits in compensation for your participation if you have indicated that you do not consent to your data being used for this study.

If you are interested in learning more about technology-mediated sexual relationships, we suggest the following articles:

- Courtice, E. L., & Shaughnessy, K. (2017). Technology-mediated sexual interaction and relationships: A systematic review of the literature. *Sexual and Relationship Therapy, 3-4*, 269-290. doi: 10.1080/14681994.2017.1397948.
- Courtice, E. L., & Shaughnessy, K. (2018). The partner context of sexual minority women's and men's cybersex experiences: Implications for the traditional sexual script. *Sex Roles, 1-14*.
- Drouin, M., Vogel, K. N., Surbey, A., & Stills, J. R. (2013). Let's talk about sexting, baby: Computer-mediated sexual behaviors among young adults. *Computers in Human Behavior, 29*(5), doi: 10.1016/j.chb.2012.12.030
- Shaughnessy, K., Byers, E. S. (2014) Contextualizing cybersex experience: Heterosexually identified men and women's desire for and experiences with cybersex with three types of partners. *Computers in Human Behavior, 32*, 178-185. doi:10.1016/j.chb.2013.12.005
- McKie, R. M., Lachowsky, N. J., & Milhausen, R. R. (2015). The positive impact of technology on young gay men's dating and sexual relationships in Canada: Results from a focus group study. *Journal of LGBT Youth, 12*(1), 19-38.

Resources

It is possible that you may have become anxious, distressed, or uncomfortable while completing this study. It also is possible that participating in this study may have raised questions about yourself or your experiences. If this is the case, you may want to seek support from someone. Here are some resources in the Ottawa area that may be useful to you:

- Ottawa Distress Centre, Tel.: 613-238-3311
- Tel-Aide Outaouais, Tel.: 613-741-6433
- Centre d'Aide 24-7, Tel.: 819-595-9999
- University of Ottawa Student Academic Success Service Counseling and Coaching Services: Tel.: 613-562-5200; Email: couns@uOttawa.ca
- University of Ottawa Centre for Psychological Services and Research: Tel: 613-562-5289 (reception); Email: cpsr@uOttawa.ca

Contact Us

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principle Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

Ethics

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa's Research Ethics Board. However, if you have any concerns about the ethics of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

THANK YOU AGAIN FOR PARTICIPATING IN OUR STUDY!

Consent to Use of Information

Your consent is extremely important to us. Therefore, we ask that you read the statement below and indicate whether you are willing to allow us to use your survey and interview answers in our study. Should you choose not to consent to use of your information, your written and audio-recorded answers will be deleted and not included in the data analysis. Note that you can withdraw your consent at any time during the study as well.

I have read and understand the information in this letter and I agree, of my own free will, to allow Erin Courtice and Dr. Krystelle Shaughnessy to use the answers I provided during this study.

Participant's signature: _____

Date: _____

Debriefing Form for Participants Recruited from the Community

We have just one more question for you before your participation in this study is complete. Please read through the following information and answer the final question at the bottom of the page.

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their primary romantic partners. We were specifically interested in peoples' motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people's experiences with TMSI in romantic relationship contexts more broadly. Your responses will be combined with other people's responses (and thus kept anonymous) and then used to: a) summarize common ideas in people's TMSI experiences within their romantic relationships, for Erin Courtice's dissertation and descriptive research publications, and b) use these common ideas to inform future research on TMSI. You will still receive \$20 cash in compensation for your participation if you have indicated that you do not consent to your data being used for this study.

If you are interested in learning more about technology-mediated sexual relationships, we suggest the following articles:

- Courtice, E. L., & Shaughnessy, K. (2017). Technology-mediated sexual interaction and relationships: A systematic review of the literature. *Sexual and Relationship Therapy, 3-4*, 269-290. doi: 10.1080/14681994.2017.1397948.
- Courtice, E. L., & Shaughnessy, K. (2018). The partner context of sexual minority women's and men's cybersex experiences: Implications for the traditional sexual script. *Sex Roles, 1-14*.
- Drouin, M., Vogel, K. N., Surbey, A., & Stills, J. R. (2013). Let's talk about sexting, baby: Computer-mediated sexual behaviors among young adults. *Computers in Human Behavior, 29*(5), doi: 10.1016/j.chb.2012.12.030
- Shaughnessy, K., Byers, E. S. (2014) Contextualizing cybersex experience: Heterosexually identified men and women's desire for and experiences with cybersex with three types of partners. *Computers in Human Behavior, 32*, 178-185. doi:10.1016/j.chb.2013.12.005
- McKie, R. M., Lachowsky, N. J., & Milhausen, R. R. (2015). The positive impact of technology on young gay men's dating and sexual relationships in Canada: Results from a focus group study. *Journal of LGBT Youth, 12*(1), 19-38.

Resources

It is possible that you may have become anxious, distressed, or uncomfortable while completing this study. It also is possible that participating in this study may have raised questions about yourself or your experiences. If this is the case, you may want to seek support from someone. Here are some resources in the Ottawa area that may be useful to you:

- Ottawa Distress Centre, Tel.: 613-238-3311
- Tel-Aide Outaouais, Tel.: 613-741-6433
- Centre d'Aide 24-7, Tel.: 819-595-9999
- University of Ottawa Student Academic Success Service Counseling and Coaching Services: Tel.: 613-562-5200; Email: couns@uOttawa.ca
- University of Ottawa Centre for Psychological Services and Research: Tel: 613-562-5289 (reception); Email: cpsr@uOttawa.ca

Contact Us

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principle Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

Ethics

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa's Research Ethics Board. However, if you have any concerns about the ethics of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

THANK YOU AGAIN FOR PARTICIPATING IN OUR STUDY!

Consent to Use of Information

Your consent is extremely important to us. Therefore, we ask that you read the statement below and indicate whether you are willing to allow us to use your survey and interview answers in our study. Should you choose not to consent to use of your information, your written and audio-recorded answers will be deleted and not included in the data analysis. Note that you can withdraw your consent at any time during the study as well.

I have read and understand the information in this letter and I agree, of my own free will, to allow Erin Courtice and Dr. Krystelle Shaughnessy to use the answers I provided during this study.

Participant's signature: _____

Date: _____

INSITE Lab Research Participant's Acknowledgement of Receipt of Remuneration**SECTION A: To be completed by Principal Investigator or designated Researcher**

Study Title: A look at sexting, cybersex, and other technology-mediated sexual interactions in romantic relationships

Principal Investigator:

Erin Leigh Courtice, PhD Candidate, University of Ottawa, REDACTED

Supervisor:

Dr. Krystelle Shaughnessy (C. Psych), Principal Investigator, University of Ottawa, insite@uottawa.ca

SECTION B: To be completed by research participant

In appreciation of my involvement as a research participant in the above study, I acknowledge that I have received **\$20 cash** from the University of Ottawa.

Participant's initials: _____

Date: _____

Researcher's initials: _____

Date: _____

Appendix G (Article 3 Participant Aliases and Relevant Demographic Information)

Alias	Participant Gender	Participant Age	Partner Gender
Keeley	Woman	19	Man
Delila	Woman	23	Man
Brit	Woman	18	Man
Gregory	Man	24	Man
Spencer	Woman	19	Man
Peppa	Woman	22	Man
Quinn	Man	22	Man
Eve	Woman	17	Man
Tony	Man	33	Woman
Denis	Man	19	Woman
Shayne	Man	18	Woman
Lindsay	Woman	25	Man
Jake	Man	23	Woman
Tamara	Woman	25	Man
Nari	Woman	21	Man
Jarett	Man	22	Woman
Nick	Man	20	Woman
Bianca	Woman	24	Man
Jennifer	Woman	25	Man
Thomas	Man	26	Woman

Stella	Woman	24	Man
Sam	Man	27	Woman
Laura	Woman	30	Man
Emily	Woman	28	Woman
Elise	Woman	42	Woman

Note. All participants and their partners were cisgender.

Appendix H (Article 4, Survey 1 Information Letter, Consent, and Eligibility Screener)

Information Letter and Consent Form

Thank you very much for your interest in this study!

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. It involves completing a survey with a series of questions about your experiences using mobile/Internet-based technologies for sexual communication and interaction with your current romantic partner(s), as well as some questions about yourself and your relationship(s). It should take you about 35–45 minutes to complete. The results of this study will improve knowledge about the nature of sexual intimacy and behaviours via technology. For your participation, you will receive **one course credit** for your Introduction to Psychology class.

Please note that your participation in this study is completely voluntary. Your responses will remain anonymous and confidential. Data collected and stored in Qualtrics is managed by Qualtrics data security policies. Your data is encrypted and anonymized within this system. That means that in the unlikely event of a security breach, there will be no way to link your data back to you. Once the data is downloaded from Qualtrics we will delete it from their server (located in Toronto). We must also inform you that some of the data you give us may be stored on Canadian and American servers. If so, we will remove any details in your data that could make it easier to identify you as a participant (de-identify the data) and encrypt and password protect it. By participating in the survey, you are consenting to having your de-identified data stored on U.S. servers. Current (e.g., US Patriot act) and possible future legislation, as well as various international treaties/agreements may mean that a government agency could try to access your data. We will however encrypt and de-identify your data to make it as hard as possible for any unwanted party to access and read your data. Data collected during this study will be retained in password-protected encrypted format, on a password-protected and encrypted drive for a period of 10 years following data collection. Other genuine researchers may have access to this data past the 10 year point only if they agree to preserve the confidentiality of the information as requested in this form. Any personal information that could reasonably identify you will be removed or changed before files are shared with other researchers or results are made accessible. At no point will you be asked to provide any personally identifying information about yourself. This study poses no appreciable risk to you.

Please answer each question honestly and as accurately as possible. There are no right or wrong answers. You are free to skip any questions you do not wish to answer, and to stop participating at any time. If you decide to withdraw from the study by exiting the survey, the information you entered will not be used for this study and will be destroyed. You will still receive course credit through the ISPR, should you choose to stop participating in this study once you have begun the

survey. Please note that because of the anonymous nature of this study and the data collection procedures, we will not be able to destroy your data once you have submitted the survey. To minimize the risk of security breaches and to help ensure your confidentiality, we recommend that you use standard safety measures such as signing out of your account, closing your browser, and locking your screen or device when you are no longer using them and when you have completed the study.

Please answer each question honestly and as accurately as possible. There are no right or wrong answers.

We do ask that you complete the survey all at once without taking a break or leaving the survey open while you do something else. We also ask that you complete the survey on your own, without talking to other people about the questions or your answers.

If at any time during or following completion of this survey you experience any discomfort or unpleasant feelings, and/or you become concerned about your experiences please refer to the

resources available near your location for assistance and/or treatment information. Here are some resources in the Ottawa area that may be useful to you:

- Ottawa Distress Centre, 613-238-3311
- Tel-Aide Outaouais, 613-741-6433
- Centre d'Aide 24-7, 819-595-9999
- University of Ottawa Student Academic Success Service Counseling and Coaching Services: Tel.: 613-562-5200; Email: couns@uOttawa.ca
- University of Ottawa Centre for Psychological Services and Research: Tel: 613-562-5289 (reception); Email: cpsr@uOttawa.ca

If you have any questions about the purpose or content of the study before you begin or after you have completed the survey please contact the researcher, Erin Leigh Courtice, or the Principal Investigator, Dr. Krystelle Shaughnessy.

Erin Leigh Courtice, Ph.D. Candidate
REDACTED
School of Psychology, University of Ottawa

Krystelle Shaughnessy, Ph. D.
(613) 562-5800 ext. 8701
krystelle.shaughnessy@uottawa.ca
School of Psychology, University of Ottawa
136 Jean Jacques Lussier, Vanier Hall
Ottawa, ON, Canada
K1N 6N5

We would like to assure you that this study has received ethics approval from the University of Ottawa Research Ethics Board. However, the final decision to participate is yours. If you have any comments or concerns resulting from your participation in this study, please contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5
Tel.: (613) 562-5387
Email: ethics@uottawa.ca

We invite you to print a copy of this form for your personal records.

I have read and understand the information in the letter and I agree, of my own free will, to participate in this study.

- ☐ Agree
- ☐ Decline

IF DECLINE: Skip to the final block of the survey ('Thank You' page)

IF AGREE: Proceed with eligibility screener questions

Study Eligibility Screener

Which of the following options best describes your current relationship status?

- ☐ Single
- ☐ Single and casually dating
- ☐ Committed relationship
- ☐ Common law or de facto union
- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ You don't have an option that applies to me. My current relationship status is (please specify): _____
- ☐ Choose not to respond

IF SINGLE, SINGLE AND CASUALLY DATING, DIVORCED, OR WIDOWED: Skip to 'Not Eligible' page

If you are in a relationship, have you ever engaged in sexual interactions **via technology** (e.g., activities like sexting, phone sex, cybersex), **with your current romantic partner?**

- ☐ Yes
- ☐ No

IF NO: Skip to 'Not Eligible' page

‘Not Eligible’ Survey Page

Thank you for your interest in this study! Unfortunately, your responses have indicated that you are not eligible to participate.

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their primary romantic partners. We were interested in peoples’ motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people’s experiences with TMSI in romantic relationship contexts more broadly. We were also interested in testing the reliability, validity, and factor structures of three new measures of (i) TMSI motives, (ii) desired TMSI frequency, and (iii) TMSI satisfaction.

Please note: Since you are not eligible to participate, you will **not** receive an ISPR credit for participation. We thank you again for your interest!

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principal Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa’s Research Ethics Board. However, if you have any concerns about the ethicality of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

Appendix I (Article 4, Survey 1 Questionnaire and Measures)

Background and Sociodemographic Questions

How old are you in years? (numerical response only)

Which of the following best describes your current relationship status?

- ☐ Single
- ☐ Single and casually dating
- ☐ Committed relationship
- ☐ Common law or de facto union
- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ You don't have an option that applies to me. My current relationship status is (please specify): _____
- ☐ Choose not to respond

Which of the following options represents your gender (please select all that apply)?

- ☐ Man/cisgender man
- ☐ Woman/cisgender woman
- ☐ Man/transgender man
- ☐ Woman/transgender woman
- ☐ Gender-queer or gender non-binary
- ☐ Two-spirit
- ☐ You don't have an option that applies to me. I identify as (please specify): _____
- ☐ Choose not to respond

Which of the following options best represents the sex you were assigned at birth?

- ☐ Male
- ☐ Female
- ☐ Intersex
- ☐ You don't have an option that applies to me. At birth, I was assigned (please specify):

- ☐ Choose not to respond

Which of the following options represents your sexual orientation/identity?

- ☐ Heterosexual
- ☐ Lesbian
- ☐ Gay
- ☐ Bisexual
- ☐ Bi-curious
- ☐ Queer
- ☐ Asexual
- ☐ Unlabeled
- ☐ Unsure
- ☐ You don't have an option that applies to me. I identify as (please specify):

- ☐ Choose not to respond

Do you identify as a visible ethnic/racial minority?

- ☐ Yes
- ☐ No
- ☐ Not sure

How would you describe your ethnic identity (please list all that apply, in any order)?

What languages did you grow up speaking (please list all that apply, in any order)?

With what religious tradition, denomination, or church did **your family** most closely identify with **when you were growing up** (please select all that apply)?

- ☐ Atheist/Agnostic/Nothing/Non-Religious/Unaffiliated
- ☐ Buddhist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ You don't have an option that applies to me. My family identified as (please specify):

With what religious tradition, denomination, or church do **you currently** most closely identify with (please select all that apply)?

- ☐ Atheist/Agnostic/Nothing/Non-Religious/Unaffiliated
- ☐ Buddhist
- ☐ Christian
- ☐ Hindu
- ☐ Jewish
- ☐ Muslim
- ☐ Sikh
- ☐ You don't have an option that applies to me. I identify as (please specify):

Please use the scale below to indicate how important a role religion plays in your daily life.

Not at all important (0) Extremely important (8)

0 1 2 2 3 4 5 6 6 7 8

Importance of religion	
------------------------	--

What is the highest level of education that you have completed (please select all that apply)?

- ☐ Some school without high-school diploma
- ☐ High-school graduate
- ☐ Some college/university education (including the degree you are currently pursuing, if applicable)
- ☐ Degree from a certificate program
- ☐ Degree from a college or trade school
- ☐ Professional degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Doctorate degree
- ☐ You don't have an option that applies to me. My current level of education is (please specify): _____
- ☐ Choose not to respond

For how many years have you been sexually active? (numerical response only)

How many sexual partners have you had in your lifetime? (numerical response only)

Relationship Background Questions

How long have you been in your **current** relationship? Please count from the start of the relationship.

For example, if you dated for 2 years and have been married for 2 years and 3 months you should answer 4 years and 3 months.

Please respond in years and months.

- Months: _____
- Years: _____

Are you and your **current** partner currently living in the same household?

- Yes
- No

Display This Question:

If Are you and your current partner currently living in the same household? = Yes

For how long have you and your current partner been living in the same household?

Please respond in years and months.

- Months: _____
- Years: _____

For this study, a long-distance relationship is when:

- There is considerable geographical distance between partners,
- It would be practically impossible for partners to see one another every day, and
- Most of the communication between partners is not face-to-face.

Does this describe your current relationship?

- Yes
- No

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

For how long have you been in a long-distance relationship with your current partner?

Please respond in years and months.

- Months: _____
- Years: _____

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

In what city/province/country does your partner currently live?

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

How long ago did you last see your partner in person?

Please respond in years and months.

- Months: _____
- Years: _____

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

In the past 6 months how many days have you spent in person, with your partner?

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

Did your current relationship begin as a long-distance relationship?

- ☐ Yes
- ☐ No

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

In the past 1 month how many days have you spent in person, with your partner?

Is there anything else that you think is important for us to know about the context of your current long-distance relationship? If so, please let us know here.

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = No

Have you ever been in a long-distance relationship with your partner, for a period longer than one month?

- ☐ Yes
- ☐ No

Display This Question:

If Have you ever been in a long-distance relationship with your partner, for a period longer than on... = Yes

How long were you in a long-distance relationship with your current partner?
Please respond in years and months.

- ☐ Months: _____
- ☐ Years: _____

Display This Question:

If Have you ever been in a long-distance relationship with your partner, for a period longer than on... = Yes

Did your current relationship begin as a long-distance relationship?

- ☐ Yes
- ☐ No

Display This Question:

If Have you ever been in a long-distance relationship with your partner, for a period longer than on... = Yes

When you were in a long-distance relationship, how many days per month did you spend with your partner (on average)?

Display This Question:

If Have you ever been in a long-distance relationship with your partner, for a period longer than on... = Yes

Is there anything else that you think is important for us to know about the context of your current relationship, during the time it was long-distance? If so, please let us know here.

Are you and your current partner in a monogamous relationship (i.e., you only engage in sexual and romantic activities with each other)?

- ☐ Yes
- ☐ No

The rest of this study relates to behaviours or activities that people engage in during technology-mediated sexual communications or interactions that involve at least one other person.

Collectively, these activities are called technology-mediated sexual interactions (TMSIs), which are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. Some people also call these activities sexting, cybersex, phone sex, virtual sex, or haptic sex.

For the rest of this survey, please think about only the partner you most often engage in TMSI with. Whenever we use the term “current relationship”, please think of this person.

Please give a brief description of your relationship with this partner, including whether or not you are in a long-distance relationship with them and how long you have been engaging in sexual interactions together:

Which of the following options best represents your current relationship partner's gender?

- ☐ Man/cisgender man
- ☐ Woman/cisgender woman
- ☐ Man/transgender man
- ☐ Woman/transgender woman
- ☐ Gender-queer or gender non-binary
- ☐ Two-spirit
- ☐ You don't have an option that applies to my partner. My partner identifies as (please specify): _____
- ☐ Choose not to respond

About how frequently do you and your current relationship partner engage in offline (in-person) sexual activity, not including penetrative sexual intercourse?

- ☐ Never
- ☐ Once or twice a month
- ☐ A few times a month
- ☐ Once a week
- ☐ A few times a week
- ☐ Almost daily or daily

About how frequently do you and your current relationship partner engage in offline (in-person) penetrative sexual intercourse?

- ☐ Never
- ☐ Once or twice a month
- ☐ A few times a month
- ☐ Once a week
- ☐ A few times a week
- ☐ Almost daily or daily

What technological devices have you used in the last 12 months to connect with your current relationship partner(s)? Check all that apply.

- ☐ Mobile phone (does not connect to the internet)
- ☐ Smart phone (does connect to the internet)
- ☐ Tablet
- ☐ E-reader
- ☐ Gaming system (X-Box, PlayStation)
- ☐ Landline phone
- ☐ Laptop
- ☐ Desktop computer
- ☐ Smart watch
- ☐ Other (please specify): _____

Technology Use Background Questions

About how old were you (in years) when you first got a personal mobile device (e.g., phone, iPod touch, iPad) from which you could take/send/receive pictures and send/receive text messages?

- ☐ Age in years: _____
- ☐ I've never had one of these

About how old were you (in years) when you first got a personal mobile device (e.g., phone, iPod touch, iPad) from which you could download and use apps and browse the Internet without an Internet connection (i.e., using cellular data)?

- ☐ Age in years: _____
- ☐ I've never had one of these

About how old were you (in years) when you first got a personal non-mobile device (e.g., computer) from which you could browse the Internet?

- ☐ Age in years: _____
- ☐ I've never had one of these

Dyadic In-Person Sexual Desire Measure

This next set of questions asks about your level of sexual desire. By desire, we mean INTEREST IN or WISH FOR IN-PERSON SEXUAL ACTIVITY.

For each item, please select the number that best shows your thoughts and feelings. Your answers will be private and anonymous.

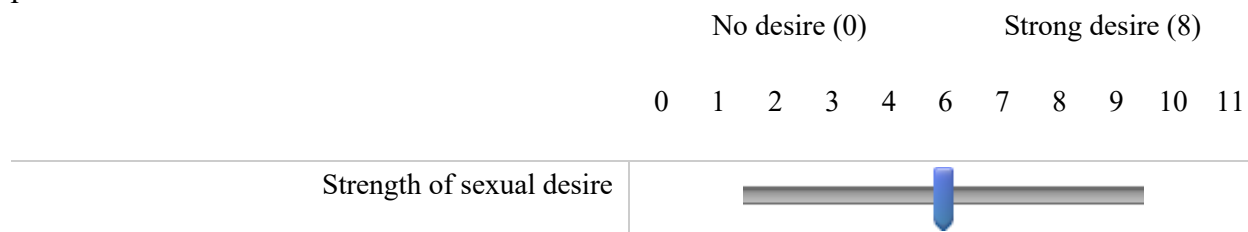
During the last month, **how often** would you **have liked** to engage in sexual activity with a partner (for example, touching each other's genitals, giving or receiving oral stimulation, intercourse, etc.)?

- ☐ Not at all
- ☐ Once a month
- ☐ Once every two weeks
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ More than once a day

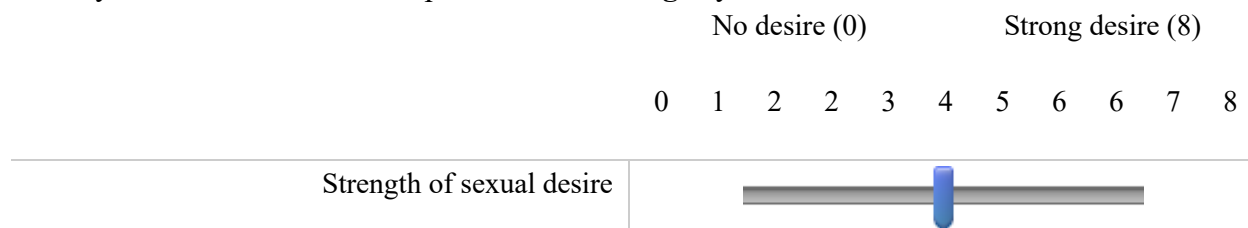
During the last month, **how often** have you had **sexual thoughts** involving a partner?

- ☐ Not at all
- ☐ Once or twice a month
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ A couple of times a day
- ☐ Many times a day

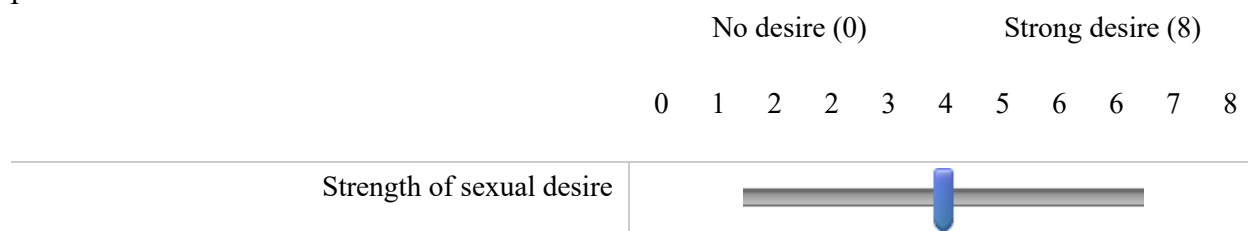
When you have sexual thoughts, **how strong** is your desire **to engage in sexual behavior** with a partner?



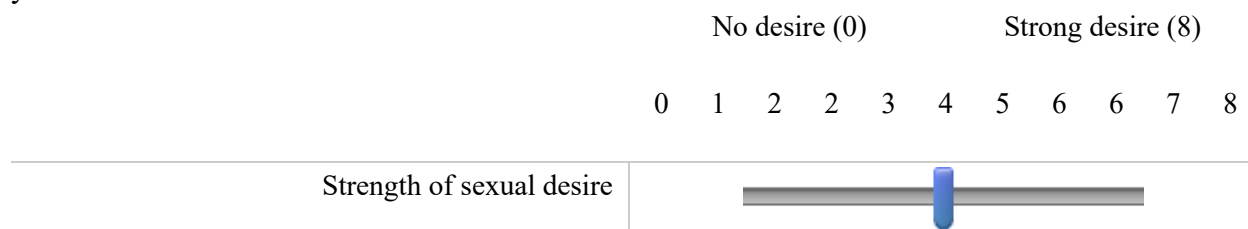
When you first see an attractive person, **how strong** is your sexual desire?



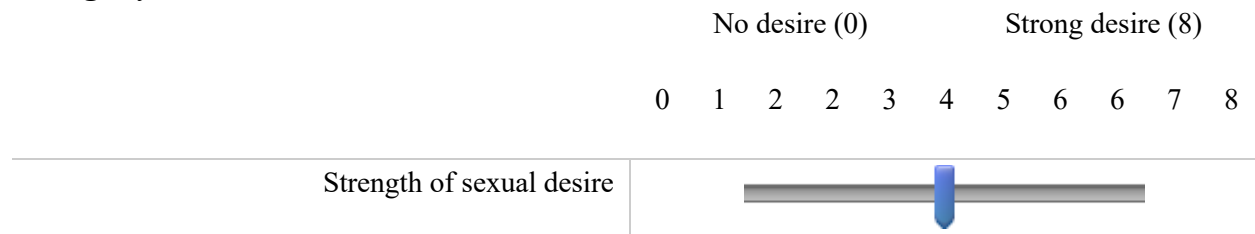
When you spend time with an attractive person - actually, to show you are paying attention, please select number 7?



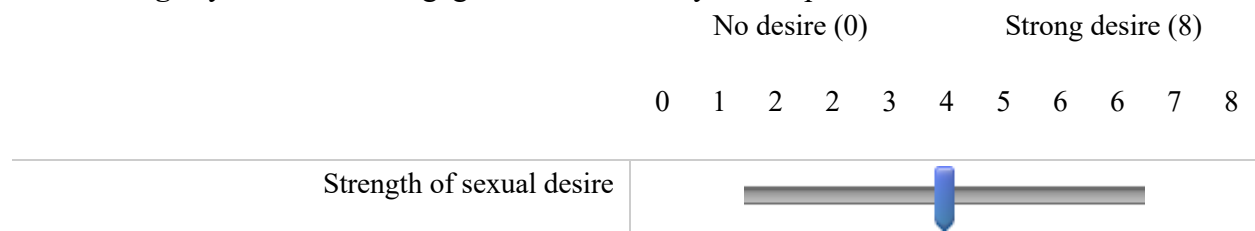
When you spend time with an attractive person (for example, at work or school), **how strong** is your sexual desire?



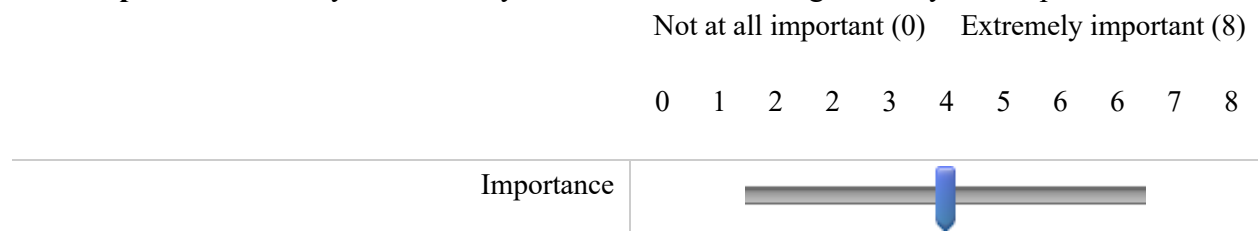
When you are in romantic situations (such as a candle lit dinner, a walk on the beach, etc.), **how strong** is your sexual desire?



How strong is your desire to engage in sexual activity with a partner?



How important is it for you to fulfill your sexual desire through activity with a partner?



Compared to other people of your age and sex, how would you rate your desire to behave sexually with a partner?

	Much less desire (0)																	Much more desire (8)
	0	1	2	2	3	4	5	6	6	7	8							
Strength of sexual desire																		

How long could you go comfortably without having sexual activity of some kind with a partner?

- ☐ Forever
- ☐ A year or two
- ☐ Several months
- ☐ A month
- ☐ A few weeks
- ☐ A week
- ☐ A few days
- ☐ One day
- ☐ Less than one day

In-Person Sexual Satisfaction Measure

For these next questions, think only about your offline and in-person sexual activities with your partner.

Overall, how would you describe your sexual life with your **current romantic partner**?

- ☐ Very bad (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very good (7)

Overall, how would you describe your sexual life with your **current romantic partner**?

- ☐ Very unpleasant (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ Very pleasant (7)

Overall, how would you describe your sexual life with your **current romantic partner**?

- ☐ Very negative (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very positive (7)

Overall, how would you describe your sexual life with your **current romantic partner**?

- ☐ Very unsatisfying (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very satisfying (7)

Overall, how would you describe your sexual life with your **current romantic partner**?

- ☐ Worthless (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very valuable (7)

TMSI Prevalence Checklist

Below is a list of possible behaviours or activities that some people engage in during technology-mediated sexual communications or interactions that involve **at least one other person** (e.g., you **and** your current partner).

Collectively, these activities are called **technology-mediated sexual interactions (TMSIs)**, which are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology.

For each activity, please indicate whether or not you have ever participated in it, using mobile or Internet-based technology on any type of device (e.g., smartphone, computer, tablet, smartwatch, etc.), **with your current committed relationship partner**.

Have you ever...

	Yes	No
1. Exchanged sexual typed messages, back and forth, with your current romantic partner (e.g. words or emojis)?	☐	☐
2. With your current romantic partner, exchanged sexual semi-nude pictures (i.e., where you each were partially naked) of yourselves, back and forth?	☐	☐
3. With your current romantic partner, exchanged sexual nude pictures (i.e., where you each were completely naked) of yourselves, back and forth?	☐	☐
4. With your current romantic partner, exchanged sexual pictures of yourselves, back and forth, where each of you were doing sexual acts?	☐	☐
5. With your current romantic partner, exchanged sexual semi-nude videos (i.e., where you each were partially naked) of yourselves, back and forth?	☐	☐
6. With your current romantic partner, exchanged sexual nude videos (i.e., where you each were completely naked) of yourselves, back and forth?	☐	☐
7. With your current romantic partner, exchanged sexual videos of yourselves, back and forth, where each of you were doing sexual acts?	☐	☐
8. With your current partner - actually, just to make sure you're paying attention, please select yes.	☐	☐
9. Exchanged sexual audio messages (e.g., voice recordings), back and forth, with your current romantic partner?	☐	☐

10. Engaged in a sexual live audio exchange (e.g., phone call) with your current romantic partner?	☐	☐
11. Engaged in a sexual live video exchange (e.g., webcam, FaceTime) with your current romantic partner?	☐	☐
12. Engaged in avatar sex through a virtual environment (e.g., Massively Multiplayer Online Role-Playing Games, Virtual Worlds) with your current romantic partner?	☐	☐
13. Engaged in sexual activities with your current romantic partner by using haptic devices (e.g., connected sex toys, vibrating underwear)?	☐	☐

How old were you the FIRST time you did one of these activities, with anyone (not just your current romantic partner)?

Dyadic Technology-Mediated Satisfaction Measure

We are going to ask you a few more questions about your technology-mediated sexual interactions (TMSI) experiences with your **current romantic partner**.

As a reminder, **TMSIs** are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. This includes all of the activities described on the last page. Some people also call these activities **sexting**, **cybersex**, **phone sex**, **virtual sex**, or **haptic sex**.

This next set of questions asks about your level of **TMSI desire**. By desire, we mean INTEREST IN or WISH FOR TMSI.

For each item, please select the number that best shows your thoughts and feelings. Your answers will be private and anonymous.

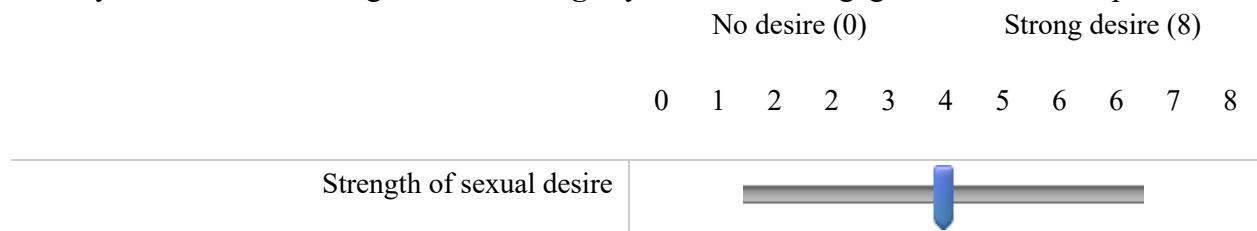
During the last month, **how often** would you have liked to engage in TMSI with a partner (for example, sending sexual text messages, photos, videos, etc.)?

- ☐ Not at all
- ☐ Once a month
- ☐ Once every two weeks
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ More than once a day

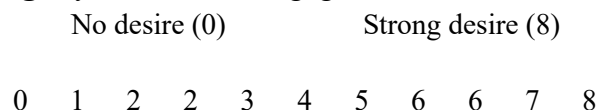
During the last month, **how often** have you had sexual thoughts about engaging in TMSI with a partner?

- ☐ Not at all
- ☐ Once or twice a month
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ A couple of times a day
- ☐ Many times a day

When you have sexual thoughts, **how strong** is your desire to engage in TMSI with a partner?



When you first see an attractive person, **how strong** is your desire to engage in TMSI?



Strength of sexual desire	
---------------------------	--

When you spend time with an attractive person - actually, to show you are paying attention, please select number 3?

	No desire (0)		Strong desire (8)								
	0	1	2	2	3	4	5	6	6	7	8
Strength of sexual desire											

When you spend time with an attractive person (for example, at work or school), **how strong** is your desire to engage in TMSI?

	No desire (0)		Strong desire (8)								
	0	1	2	2	3	4	5	6	6	7	8
Strength of sexual desire											

When you are in romantic situations (such as a candle lit dinner, a walk on the beach, etc.), **how strong** is your desire to engage in TMSI?

	No desire (0)		Strong desire (8)								
	0	1	2	2	3	4	5	6	6	7	8
Strength of sexual desire											

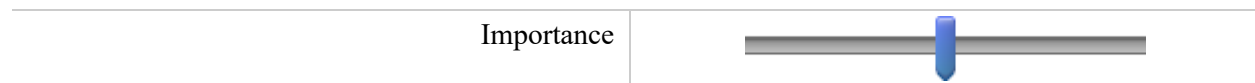
How strong is your desire to engage in TMSI with a partner?

	No desire (0)		Strong desire (8)								
	0	1	2	2	3	4	5	6	6	7	8
Strength of sexual desire											

How important is it for you to fulfill your sexual desire through TMSI with a partner?

Not at all important (0) Extremely important (8)

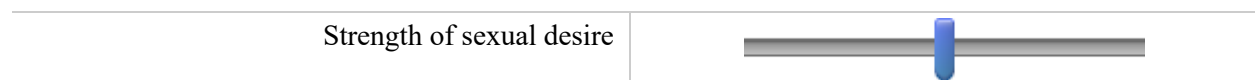
0 1 2 2 3 4 5 6 6 7 8



Compared to other people of your age and sex, how would you rate your desire to desire to engage in TMSI with a partner?

Much less desire (0) Much more desire (8)

0 1 2 2 3 4 5 6 6 7 8



How long could you go comfortably without engaging in TMSI with a partner?

- ☐ Forever
- ☐ A year or two
- ☐ Several months
- ☐ A month
- ☐ A few weeks
- ☐ A week
- ☐ A few days
- ☐ One day
- ☐ Less than one day

Technology-Mediated Sexual Satisfaction Measure

For these next questions, think only about your TMSI activities with your partner.

As a reminder, TMSIs are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. This includes all of the activities described on the last page. Some people also call these

activities sexting, cybersex, phone sex, virtual sex, or haptic sex.

Overall, how would you describe your technology-mediated sexual life with your **current romantic partner**?

- ☐ Very bad (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very good (7)

Overall, how would you describe your technology-mediated sexual life with your **current romantic partner**?

- ☐ Very unpleasant (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ Very pleasant (7)

Overall, how would you describe your technology-mediated sexual life with your **current romantic partner**?

- ☐ Very negative (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very positive (7)

Overall, how would you describe your technology-mediated sexual life with your **current romantic partner**?

- ☐ Very unsatisfying (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very satisfying (7)

Overall, how would you describe your technology-mediated sexual life with your **current romantic partner**?

- ☐ Worthless (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ Very valuable (7)

TMSI Motives Scale

You're almost done! Next, we have a few more questions about your technology-mediated sexual interactions (TMSIs) with your **current romantic partner**.

As a reminder, **technology-mediated sexual interactions (TMSIs)** are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. Some people also call these activities **sexting, cybersex, phone sex, virtual sex, or haptic sex**.

Below, please write in your TOP 3 or MAIN 3 reasons that you have engaged in a TMSI with your current romantic partner.

Reason 1 for TMSI:

Reason 2 for TMSI:

Reason 3 for TMSI:

Listed below are different reasons why people engage in TMSI. For each statement, select the response that best describes **how often, on average**, you have engaged in TMSI with your **current romantic partner** for each of these reasons.

[illegible]

To do something special for my partner	○	○	○	○	○	○
To excite my partner	○	○	○	○	○	○

[illegible]

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
To get my partner sexually aroused about our next sexual encounter	☐	☐	☐	☐	☐
To cheer myself up	☐	☐	☐	☐	☐
Because I fear my partner won't love me if I don't	☐	☐	☐	☐	☐
Because I am afraid my partner will leave if I don't	☐	☐	☐	☐	☐
To prevent my partner from asking me to engage in sexual activities offline	☐	☐	☐	☐	☐
To present an image of myself that is more attractive than I am in-person	☐	☐	☐	☐	☐

[illegible]

[illegible]

To make myself feel more comfortable with a new type of sexual activity	☐	☐	☐	☐	☐	☐
Because I feel horny	☐	☐	☐	☐	☐	☐
To do something adventurous	☐	☐	☐	☐	☐	☐
Because I feel attractive	☐	☐	☐	☐	☐	☐
Because I worry my partner won't want me if I don't	☐	☐	☐	☐	☐	☐
To get my partner emotionally excited about our next sexual encounter	☐	☐	☐	☐	☐	☐

Having answered these questions about reasons people may have for engaging in TMSI with their primary romantic partner, would you CHANGE or ADD anything to the top 3 reasons you listed earlier?

If so, please write what you would add or change here:

Body Esteem Measure

Below are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body, using the following response categories:

- 1 = Have strong negative feelings
- 2 = Have moderate negative feelings
- 3 = Have no feeling one way or the other
- 4 = Have moderate positive feelings
- 5 = Have strong positive feelings

	Have strong negative feelings (1)	Have moderate negative feelings (2)	Have no feeling one way or the other (3)	Have moderate positive feelings (4)	Have strong positive feelings (5)
Body scent	☐	☐	☐	☐	☐
Head hair	☐	☐	☐	☐	☐
Hips	☐	☐	☐	☐	☐
Physical stamina	☐	☐	☐	☐	☐
Reflexes	☐	☐	☐	☐	☐
Arms	☐	☐	☐	☐	☐
Muscular strength	☐	☐	☐	☐	☐
Waist	☐	☐	☐	☐	☐
Energy level	☐	☐	☐	☐	☐
Thighs	☐	☐	☐	☐	☐
Skin condition	☐	☐	☐	☐	☐
Biceps	☐	☐	☐	☐	☐
Weight	☐	☐	☐	☐	☐
Body build	☐	☐	☐	☐	☐
Figure/physique	☐	☐	☐	☐	☐
Buttocks	☐	☐	☐	☐	☐
Agility	☐	☐	☐	☐	☐
Health	☐	☐	☐	☐	☐
Sexual activities	☐	☐	☐	☐	☐
Chest or breasts	☐	☐	☐	☐	☐

Appearance of eyes	☐	☐	☐	☐	☐
Face	☐	☐	☐	☐	☐
Physical condition	☐	☐	☐	☐	☐
Legs	☐	☐	☐	☐	☐
Sex drive	☐	☐	☐	☐	☐
Appearance of stomach	☐	☐	☐	☐	☐
Sex organs	☐	☐	☐	☐	☐
Physical coordination	☐	☐	☐	☐	☐
Mouth	☐	☐	☐	☐	☐
Lips	☐	☐	☐	☐	☐
Nipples	☐	☐	☐	☐	☐
Body hair	☐	☐	☐	☐	☐
Pubic hair	☐	☐	☐	☐	☐
Genitals	☐	☐	☐	☐	☐

Social Desirability Measure

Below are different statements that may or may not be true about you. For each, please select the option that best indicates how true each statement is about you.

[illegible]

[illegible]

[illegible]

[illegible]

I sometimes drive faster than the speed limit.	☐	☐	☐	☐	☐	☐	☐
I never read sexy books or magazines.	☐	☐	☐	☐	☐	☐	☐
I have done things that I don't tell other people about.	☐	☐	☐	☐	☐	☐	☐
I never take things that don't belong to me.	☐	☐	☐	☐	☐	☐	☐
I have taken sick leave from work or school even though I wasn't really sick.	☐	☐	☐	☐	☐	☐	☐
I have never damaged a library book or store merchandise without reporting it.	☐	☐	☐	☐	☐	☐	☐
I have some pretty awful habits.	☐	☐	☐	☐	☐	☐	☐
I don't gossip about other people's business.	☐	☐	☐	☐	☐	☐	☐

Survey Experience Questions

The following questions are statements dealing with the feelings you may or may not have experienced while answering the questions in this survey. Use the 0-10 scales provided to

indicate the extent to which you felt each emotion overall while you were completing this survey.

The content of the questions in this survey made me feel **distressed**.

(0 = Not at all distressed, 10 = Extremely distressed).



0
1
2
3
4
5
6
7
8
9
10

The content of the questions in this survey made me feel **anxious**.

(0 = Not at all anxious, 10 = Extremely anxious).



0
1
2
3
4
5
6
7
8
9
10

The content of the questions in this survey made me feel **sad**.

(0 = Not at all sad, 10 = Extremely sad).



0
1
2
3
4
5
6
7
8
9
10

The following questions are statements dealing with your overall experience in completing this survey. Use the 1-5 scales provided to indicate the extent to which you agree or disagree with each statement. I gained something positive from thinking about the questions in this survey.

- ☐ Strongly disagree
 - ☐ Disagree
 - ☐ Neither agree nor disagree
 - ☐ Agree
 - ☐ Strongly agree
-

The content of the questions in this survey upset me more than I expected they would.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly agree

Had I known in advance what questions would be in this survey, I still would have agreed to complete the survey.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly agree

Survey Effort and Attention Questions

Lastly, it is vital to our study that we only include responses from people that devoted their full attention to this study. Otherwise, years of effort (the researchers' and the time of other participants) could be wasted.

You will receive credit for this study no matter what, however, please tell us how much effort you put forth towards this study. Remember, we have no way of knowing who you are.

"I put forth ____ effort towards this study"

- ☐ Almost no
- ☐ Very little
- ☐ Some
- ☐ Quite a bit of
- ☐ A lot of

Also, often there are several distractions present during studies (other people, TV, music, etc.). Please indicate how much attention you paid to this study. Again, **you will receive credit no matter what**. We appreciate your honesty!

"I gave this study ____ attention"

- ☐ Almost no
- ☐ Very little of my
- ☐ Some of my
- ☐ Most of my
- ☐ My full

In your honest opinion, should we use your data in our analyses in this study?

- ☐ Yes
- ☐ No

Appendix J (Article 4, Survey 1 Debriefing Form)

We have just one more question for you before your survey will be submitted and complete. **Please read through the following information and answer the final question at the bottom of the page.**

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their committed romantic partners. We were interested in peoples' motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people's experiences with TMSI in romantic relationship contexts more broadly. We were also interested in testing the reliability, validity, and factor structures of three new measures of (i) TMSI motives, (ii) desired TMSI frequency, and (iii) TMSI satisfaction.

Your responses will be added to other people's responses (maintaining your anonymity) and used to: a) make changes to our TMSI measures, b) summarize findings from this study for Erin Courtice's dissertation and future research publications, c) use these ideas to inform future research on TMSI. You will still receive ISPR credits for your participation if you have indicated that you do not consent to your data being used for this study.

If you are interested in learning more about the topic of technology-mediated sexual interactions, we suggest the following articles:

Courtice, E. L., & Shaughnessy, K. (2017). Technology-mediated sexual interaction and relationships: A systematic review of the literature. *Sexual and Relationship Therapy*, 3-4, 269-290. doi: 10.1080/14681994.2017.1397948.

Courtice, E. L., & Shaughnessy, K. (2018). The partner context of sexual minority women's and men's cybersex experiences: Implications for the traditional sexual script. *Sex Roles*, 1-14.

Drouin, M., Vogel, K. N., Surbey, A., & Stills, J. R. (2013). Let's talk about sexting, baby: Computer-mediated sexual behaviors among young adults. *Computers in Human Behavior*, 29(5), doi: 10.1016/j.chb.2012.12.030

Shaughnessy, K., Byers, E. S. (2014) Contextualizing cybersex experience: Heterosexually identified men and women's desire for and experiences with cybersex with three types of partners. *Computers in Human Behavior*, 32,178-185. doi:10.1016/j.chb.2013.12.005

McKie, R. M., Lachowsky, N. J., & Milhausen, R. R. (2015). The positive impact of technology on young gay men's dating and sexual relationships in Canada: Results from a focus group study. *Journal of LGBT Youth*, 12(1), 19-38.

Contact Us

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principal Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

Ethics

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa's Research Ethics Board. However, if you have any concerns about the ethicality of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

Resources

It is possible that you may have become anxious, distressed, or uncomfortable while completing this study. It also is possible that participating in this study may have raised questions about yourself or your experiences. If this is indeed the case, and you are concerned about these feelings, you may want to seek support from someone else. Here are some resources in the Ottawa area that may be useful to you:

- Ottawa Distress Centre, 613-238-3311
- Tel-Aide Outaouais, 613-741-6433
- Centre d'Aide 24-7, 819-595-9999
- University of Ottawa Student Academic Success Service Counseling and Coaching Services: Tel.: 613-562-5200; Email: couns@uOttawa.ca
- University of Ottawa Centre for Psychological Services and Research: Tel: 613-562-5289 (reception); Email: cpsr@uOttawa.ca

Security

We recommend clearing your browsing history following any event that you enter personal information into web-forms, such as this survey. You can usually do this in the options tab of your web browser. We encourage you to print a copy of this debriefing form for your personal records.

Consent to Use of Information

Your consent is extremely important to us. Therefore, we ask that you read the statement below and indicate whether you are willing to allow us to use your survey answers in our study as aggregate data (no personal/identifiable information present). Should you choose not to consent to use of your information, your survey answers will be deleted and not included in the data

analysis. If you choose not to consent, you will still receive ISPR credits for participating in this study.

PLEASE NOTE: IT MAY TAKE UP TO 24 HOURS FOR YOU TO RECEIVE ISPR CREDIT FOR THIS STUDY.

I have read and understand the information in this letter and I agree, of my own free will, to allow Erin Courtice and Dr. Krystelle Shaughnessy to use the answers I provided to this survey.

- ☐ Agree
- ☐ Decline

Appendix K (Article 4, Survey 1 Supplementary Materials)

Principal Components Analysis of the Balanced Inventory of Socially Desirable Responding (BIDR-6)

To verify the internal consistency of the BIDR-6, we also conducted a post-hoc Principal Components Analysis (PCA) to ensure that the self-deceptive enhancement and the impression management subscales would hold. We approached this PCA in the same way that we did to assess our measures of in-person and technology-mediated sexual satisfaction, and our measures of dyadic in-person and technology-mediated sexual desire.

We assessed the suitability of PCA prior to analyses. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.2. Because our items were correlated, we used Promax Oblique Rotation (rather than Orthogonal rotation) to orient the results of our PCAs (see Table 5; Sakaluk & Short, 2017; Tabachnick & Fidell, 2013). The overall Kaiser-Meyer-Olkin (KMO) measure was 0.73, a classification of 'middling' according to Kaiser (1974). Bartlett's test of sphericity was statistically significant, $\chi^2(780) = 2570.37$ ($p < .001$), indicating that the data was likely factorizable. We conducted a parallel analysis before running the PCA, the results of which suggested an upper maximum of seven factors.

The PCA revealed 12 components that had eigenvalues greater than one and which explained 13.4%, 20.9%, 26.8%, 31.7%, 36.1%, 40.1%, 43.8%, 47.2%, 50.2%, 53.1%, 56.0%, and 58.6% of the total variance, respectively. Visual inspection of the scree plot indicated that either two or three components should be retained (Cattell, 1966). We examined results from forced-extraction PCAs for a two-factor solution in line with the design of the original scale. The initial two-component solution explained 20.9% of the total variance. However, this solution was difficult to interpret; 20 items (ten from the self-deceptive enhancement subscale and ten from

the impression management subscale) loaded above .32 on Component 1, ten items (seven from the self-deceptive enhancement subscale, three from the impression management subscale) loaded above .32 on Component 2, and the remaining nine items did not load on any component. These findings suggested that the BIDR-6 may not be appropriate for measuring socially desirable responses in our sample.

TMSI Motives Scale Item Decisions and Justification

TMSIMS Item	Flagged for Removal (Yes/No)	Decision	Justification for Possible Removal	Justification for Possible Retention
Intimacy1: To make my partner feel good	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question • Loaded lower than most other Intimacy items on Factor 1	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Intimacy2: To feel emotionally closer to my partner	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Intimacy3: To do something special for my partner	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Intimacy4: To excite my partner	Yes	Retained with modifications	• 6.5% of participants indicated item ‘did not make sense’	• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research • Wording could be modified to improve clarity (e.g., “To sexually excite my partner”)

Intimacy5: To make my partner happy	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Intimacy6: To feel closer to my partner	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Intimacy7: To be more intimate with my partner	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Intimacy8: To express love for my partner	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Highest loading Intimacy item on Factor 1 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Enhancement1: For the thrill of it	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Enhancement2: To try something new	Yes	Dropped	• Lowest loading Enhancement item on Factor 1	• Loaded above .32 on Factor 1 • No cross-loadings above .32

			• Not well reflected in responses to Top 3 TMSI Motives question	
Enhancement3: Because it feels good	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Enhancement4: To experience sexual pleasure	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 1 • No cross-loadings above .32
Enhancement5: For excitement	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Enhancement6: To satisfy sexual needs	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research
Enhancement7: Because I feel horny	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Well reflected in responses to Top 3 TMSI Motives question and in past research

Enhancement8: To do something adventurous	Yes	Dropped	- Loaded lower than most other Enhancement items on Factor 1 - Not well reflected in responses to Top 3 TMSI Motives question	- Loaded above .32 on Factor 1 - No cross-loadings above .32
ApproachOffline1: To get emotionally excited about my next sexual encounter with my partner	No	Retained		- Loaded above .32 on Factor 1 - No cross-loadings above .32 - Well reflected in responses to Top 3 TMSI Motives question and in past research - Wording could be modified to capture other items that were ultimately dropped (e.g., "To get excited about my next sexual encounter with my partner")
ApproachOffline2: To make myself feel more comfortable with sexual activities	Yes	Retained with caution	Cross-loaded above .32 on Factor 3	Well reflected in responses to Top 3 TMSI Motives question and in past research
ApproachOffline3: To get my partner to feel more comfortable with sexual activity	Yes	Dropped	- Cross-loaded above .32 on Factor 3 - Not well reflected in responses to Top 3 TMSI Motives question	Loaded above .32 on Factor 1
ApproachOffline4: To get my partner sexually	Yes	Dropped	Not well reflected in responses to Top 3 TMSI Motives question	- Loaded above .32 on Factor 1 - No cross-loadings above .32

aroused about our next sexual encounter			• 2.3% of participants indicated item ‘did not make sense’ • Appears to be better captured by modified ApproachOffline8	
ApproachOffline5: To get my partner to feel more comfortable with a new type of sexual activity	No	Retained		• Loaded above .32 on Factor 1 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
ApproachOffline6: To get sexually aroused about my next sexual encounter with my partner	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives Question • Appears to be better captured by modified ApproachOffline1	• Loaded above .32 on Factor 1 • No cross-loadings above .32
ApproachOffline7: To make myself feel more comfortable with a new type of sexual activity	Yes	Dropped	• Did not load above .32 on Factor 1 • Not well reflected in responses to Top 3 TMSI Motives question	
ApproachOffline8: To get my partner emotionally excited about our next sexual encounter	Yes	Retained with modifications	• Cross-loaded above .32 on Factor 3 • 1.9% of participants indicated item ‘did not make sense’	• Loaded above .32 on Factor 1 • Well reflected in responses to Top 3 TMSI Motives question and in past research • Wording could be modified to improve clarity (e.g., “To

				get my partner excited about our next sexual encounter”)
Coping1: To deal with disappointment	Yes	Dropped	• 4.6% of participants indicated item ‘did not make sense’ • Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Coping2: Because I was bored	Yes	Retained with caution	• Loaded below .32 on Factor 2	• Heavily represented in responses to Top 3 TMSI Motives question and in past research
Coping3: To cope with upset	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question • Appears to be captured by other Coping items that we decided to retain	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Coping4: To cheer myself up	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
Coping5: To manage my emotions	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32

				• Reflected in responses to Top 3 TMSI Motives question and in past research
Coping6: To feel better when I feel lonely	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
Coping7: To feel better when I feel low	Yes	Dropped	• Cross loaded above .32 on Factor 3 • Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2
Coping8: To feel better when I was feeling stressed or anxious	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question • Appears to be captured by other Coping items that we decided to retain	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Appeasement1: Because I worry my partner will be angry if I don't	Yes	Dropped	• Item initially had high skewness and kurtosis • Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32

Appeasement2: To prevent my partner from losing interest in our sex life	Yes	Dropped	• Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Appeasement3: Because I fear my partner won't love me if I don't	Yes	Dropped	• Item initially had high skewness and kurtosis • Not well reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Appeasement4: Because I am afraid my partner will leave if I don't	Yes	Retained	• Item initially had high skewness and kurtosis	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Highest loading Appeasement item on Factor 2 • Reflected in responses to Top 3 TMSI Motives question and in past research
Appeasement5: To keep my partner interested in me	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
Appeasement6: To prevent my partner from cheating on me	Yes	Retained	• Item initially had high skewness and kurtosis	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research

Appeasement7: To prevent my partner from no longer loving me	Yes	Dropped	• Item initially had high skewness and kurtosis • Not reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Appeasement8: Because I worry my partner won't want me if I don't	Yes	Retained	• Item initially had high skewness and kurtosis	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
AvoidOffline1: To experiment with sexual activities without doing them in-person	Yes	Retained with caution	• Cross-loaded above .32 on Factor 1	• Reflected in past research
AvoidOffline2: To decrease my anxiety about engaging in sexual activities with my partner offline	Yes	Dropped	• Not reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
AvoidOffline3: To prevent my partner from asking me to engage in sexual activities offline	Yes	Dropped	• Item initially had high skewness and kurtosis • Not reflected in responses to Top 3 TMSI Motives question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
AvoidOffline4: To present an image of myself that is	Yes	Dropped	• Cross-loaded above .32 on Factor 3	• Loaded above .32 on Factor 2

more attractive than I am in-person			• Not reflected in responses to Top 3 TMSI Motives question	
AvoidOffline5: To maintain my virginity	Yes	Dropped	• Item initially had high skewness and kurtosis • Not reflected in Top 3 TMSI Motives Question	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
AvoidOffline6: Because I am uncomfortable with in-person dirty talk	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in responses to Top 3 TMSI Motives question and in past research
AvoidOffline7: Because I know I won't be in the mood for in-person sexual activities	No	Retained	• Item initially had high skewness and kurtosis	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
AvoidOffline8: To prevent myself from getting an STI or experiencing unwanted pregnancy	No	Retained	• Item initially had high skewness and kurtosis	• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
Affirmation1: Because I look good that day	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
Affirmation2: To feel more self-confident	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research

Affirmation3: To feel more interesting	Yes	Dropped	• Not reflected in Top 3 TMSI Motives Question	• Loaded above .32 on Factor 2 • No cross-loadings above .32
Affirmation4: To prove my attractiveness	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
Affirmation5: To reassure myself of my desirability	Yes	Dropped	• Cross-loaded above .32 on Factor 1 • Lowest loading Affirmation item on Factor 3 • Not reflected in Top 3 TMSI Motives Question	• Loaded above .32 on Factor 3
Affirmation6: To feel better about my body	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research
Affirmation7: To show that I am confident about my body	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research and responses to Top 3 TMSI Motives Question
Affirmation8: Because I feel attractive	No	Retained		• Loaded above .32 on Factor 2 • No cross-loadings above .32 • Reflected in past research and responses to Top 3 TMSI Motives Question

Appendix L (Article 4, Survey 2 Information Letter, Consent, and Eligibility Screener)

Information Letter and Consent Form for Qualtrics Participants

Thank you very much for your interest in this study!

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. It involves completing a survey with a series of questions about your experiences using mobile/Internet-based technologies for sexual communication and interaction with your current romantic partner(s), as well as some questions about yourself and your relationship(s). It should take you about 35–45 minutes to complete. The results of this study will improve knowledge about the nature of sexual intimacy and behaviours via technology.

Please note that your participation in this study is completely voluntary. You will be compensated monetarily through Qualtrics, as per the terms of agreement set by Qualtrics. Your responses will remain anonymous and confidential. Data collected and stored in Qualtrics is managed by Qualtrics data security policies. Your data is encrypted and anonymized within this system. That means that in the unlikely event of a security breach, there will be no way to link your data back to you. Once the data is downloaded from Qualtrics we will delete it from their server (located in Toronto). We must also inform you that some of the data you give us may be stored on Canadian and American servers. If so, we will remove any details in your data that could make it easier to identify you as a participant (de-identify the data) and encrypt and password protect it. By participating in the survey, you are consenting to having your de-identified data stored on U.S. servers. Current (e.g., US Patriot act) and possible future legislation, as well as various international treaties/agreements may mean that a government agency could try to access your data. We will however encrypt and de-identify your data to make it as hard as possible for any unwanted party to access and read your data. Data collected during this study will be retained in password-protected encrypted format, on a password-protected and encrypted drive for a period of 10 years following data collection. Other genuine researchers may have access to this data past the 10-year point only if they agree to preserve the confidentiality of the information as requested in this form. Any personal information that could reasonably identify you will be removed or changed before files are shared with other researchers or results are made accessible. At no point will you be asked to provide any personally identifying information about yourself. This study poses no appreciable risk to you.

Please answer each question honestly and as accurately as possible. There are no right or wrong answers. You are free to skip any questions you do not wish to answer, and to stop participating at any time. If you decide to withdraw from the study by exiting the survey, the information you entered will not be used for this study and will be destroyed. Please note that because of the anonymous nature of this study and the data collection procedures, we will not be able to destroy your data once you have submitted the survey.

To minimize the risk of security breaches and to help ensure your confidentiality, we recommend that you use standard safety measures such as signing out of your account, closing your browser, and locking your screen or device when you are no longer using them and when you have

completed the study.

Please answer each question honestly and as accurately as possible. There are no right or wrong answers.

We do ask that you complete the survey all at once without taking a break or leaving the survey open while you do something else. We also ask that you complete the survey on your own, without talking to other people about the questions or your answers.

If at any time during or following completion of this survey you experience any discomfort or unpleasant feelings, and/or you become concerned about your experiences please refer to the resources available near your location for assistance and/or treatment information. Here are some resources that may be useful to you:

The American Psychological Association resources for thinking about therapy and finding a psychologist in the United States. <http://www.apa.org/helpcenter/therapy.aspx>
1-800-273-TALK for an emotional support and crisis prevention line across the United States

The Canadian Psychological Association resources for thinking about therapy and finding a psychologist in Canada. <https://cpa.ca/public/findingapsychologist/>

If you have any questions about the purpose or content of the study before you begin or after you have completed the survey please contact the researcher, Erin Leigh Courtice, or the Principal Investigator, Dr. Krystelle Shaughnessy.

Erin Leigh Courtice, Ph.D. Candidate
REDACTED
School of Psychology, University of Ottawa

Krystelle Shaughnessy, Ph. D.
(613) 562-5800 ext. 8701
krystelle.shaughnessy@uottawa.ca
School of Psychology, University of Ottawa
136 Jean Jacques Lussier, Vanier Hall
Ottawa, ON, Canada K1N 6N5

We would like to assure you that this study has received ethics approval from the University of Ottawa Research Ethics Board. However, the final decision to participate is yours. If you have any comments or concerns resulting from your participation in this study, please contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5.

Tel.: (613) 562-5387

Email: ethics@uottawa.ca

We invite you to print a copy of this form for your personal records.

I have read and understand the information in the letter and I agree, of my own free will, to participate in this study.

Please note: There are questions throughout this survey that will monitor your attention. Failure to correctly answer these questions may impact your eligibility for full compensation, so please make sure you're paying attention!

- ☐ Agree
- ☐ Decline

IF DECLINE: Skip to the final block of the survey ('Thank You' page)

IF AGREE: Proceed with eligibility screener questions

Information Letter and Consent Form for University of Ottawa Integrated System for
Participation in Research Participants

Thank you very much for your interest in this study!

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. It involves completing a survey with a series of questions about your experiences using mobile/Internet-based technologies for sexual communication and interaction with your current romantic partner(s), as well as some questions about yourself and your relationship(s). It should take you about 35–45 minutes to complete. The results of this study will improve knowledge about the nature of sexual intimacy and behaviours via technology.

Please note that your participation in this study is completely voluntary. You will be compensated with **one course credit** towards your Introductory Psychology course. Your responses will remain anonymous and confidential. Data collected and stored in Qualtrics is managed by Qualtrics data security policies. Your data is encrypted and anonymized within this system. That means that in the unlikely event of a security breach, there will be no way to link your data back to you. Once the data is downloaded from Qualtrics we will delete it from their server (located in Toronto). We must also inform you that some of the data you give us may be stored on Canadian and American servers. If so, we will remove any details in your data that could make it easier to identify you as a participant (de-identify the data) and encrypt and password protect it. By participating in the survey, you are consenting to having your de-identified data stored on U.S. servers. Current (e.g., US Patriot act) and possible future legislation, as well as various international treaties/agreements may mean that a government agency could try to access your data. We will however encrypt and de-identify your data to make it as hard as possible for any unwanted party to access and read your data. Data collected during this study will be retained in password-protected encrypted format, on a password-protected and encrypted drive for a period of 10 years following data collection. Other genuine researchers may have access to this data past the 10-year point only if they agree to preserve the confidentiality of the information as requested in this form. Any personal information that could reasonably identify you will be removed or changed before files are shared with other researchers or results are made accessible. At no point will you be asked to provide any personally identifying information about yourself. This study poses no appreciable risk to you.

Please answer each question honestly and as accurately as possible. There are no right or wrong answers. You are free to skip any questions you do not wish to answer, and to stop participating at any time. If you decide to withdraw from the study by exiting the survey, the information you entered will not be used for this study and will be destroyed. Please note that because of the anonymous nature of this study and the data collection procedures, we will not be able to destroy your data once you have submitted the survey.

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REDACTED
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- ☐ Agree
- ☐ Decline

IF DECLINE: Skip to the final block of the survey ('Thank You' page)

IF AGREE: Proceed with eligibility screener questions

Information Letter and Consent Form for Social Media Participants

Information Letter and Consent

Thank you very much for your interest in this study!

Erin Leigh Courtice, a PhD candidate from Dr. Krystelle Shaughnessy's INSITE (Individual and Social Influences of Technology) Lab at the University of Ottawa, is conducting this study. It involves completing a survey with a series of questions about your experiences using mobile/Internet-based technologies for sexual communication and interaction with your current romantic partner(s), as well as some questions about yourself and your relationship(s). It should take you about 35–45 minutes to complete. The results of this study will improve knowledge about the nature of sexual intimacy and behaviours via technology.

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- ☐ Agree
- ☐ Decline

IF DECLINE: Skip to the final block of the survey ('Thank You' page)

IF AGREE: Proceed with eligibility screener questions

Study Eligibility Screener

Which of the following **BEST** describes your current relationship status (select all that apply)?

- ☐ Committed relationship
- ☐ Married / common law / de facto partnership
- ☐ Dating but not in a committed relationship
- ☐ Single (no relationships, some sexual contacts)
- ☐ Single (no sexual or romantic contacts)

IF SINGLE, SINGLE AND CASUALLY DATING, DIVORCED, OR WIDOWED: Skip to 'Not Eligible' page

If you are in a relationship, have you ever engaged in **sexual interactions via technology** (e.g., activities like sexting, phone sex, cybersex), with **YOUR CURRENT PARTNER**?

- ☐ Yes
- ☐ No

IF NO: Skip to 'Not Eligible' page

‘Not Eligible’ Survey Page

Thank you for your interest in this study! Unfortunately, your responses have indicated that you are not eligible to participate.

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their primary romantic partners. We were interested in peoples’ motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people’s experiences with TMSI in romantic relationship contexts more broadly. We were also interested in testing the reliability, validity, and factor structures of three new measures of (i) TMSI motives, (ii) desired TMSI frequency, and (iii) TMSI satisfaction.

Please note: Since you are not eligible to participate, you may not receive credit for participation.

We thank you again for your interest!

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principal Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa’s Research Ethics Board. However, if you have any concerns about the ethicality of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

Appendix M (Article 4, Survey 2 Questionnaire and Measures)

Background and Sociodemographic Questions

How old are you in **YEARS**? (numerical response only) _____

Please select **ALL** of the following that fit with your current gender identity (options presented in alphabetical order):

- ☐ Agender
- ☐ Cisgender (my gender is the same as the sex I was assigned at birth – e.g., I am a woman and female)
- ☐ Genderfluid
- ☐ Genderqueer
- ☐ Man
- ☐ Non-binary
- ☐ Questioning
- ☐ Transgender (my gender is different from the sex I was assigned at birth – e.g., I am a woman, but I was not assigned female at birth)
- ☐ Two-spirit
- ☐ Woman
- ☐ You don't have an option that applies to me. I identify as (please specify):

- ☐ Choose not to respond

Is your gender the same as the sex you were assigned at birth (e.g., you are a woman and female OR you are a man and male)?

- ☐ Yes
- ☐ No
- ☐ I'd like to provide more information (please specify):

- ☐ Choose not to respond

Please select **ALL** of the following that fit with your current sexual orientation/identity (options are presented in alphabetical order):

- ☐ Asexual
 - ☐ Bisexual
 - ☐ Demisexual
 - ☐ Gay
 - ☐ Heteroflexible / mostly heterosexual
 - ☐ Heterosexual or straight
 - ☐ Homoflexible / mostly gay or lesbian
 - ☐ Lesbian
 - ☐ Pansexual
 - ☐ Queer
 - ☐ Questioning
 - ☐ You don't have an option that applies to me. I identify as (please specify):

 - ☐ Choose not to respond
-

Please select **ALL** of the ethnic group(s) that you identify with (options are presented in alphabetical order):

- ☐ African (both parents born in Africa)
- ☐ African American / African Canadian
- ☐ Alaskan Indigenous or Aleut
- ☐ American Indian, South or Central
- ☐ Black Caribbean
- ☐ Black South or Central American
- ☐ Caribbean Indian
- ☐ Chinese
- ☐ Eastern European
- ☐ Filipino
- ☐ Indigenous
- ☐ Inuit
- ☐ Guamanian
- ☐ Hawaiian
- ☐ Japanese
- ☐ Korean
- ☐ Métis
- ☐ Middle Eastern
- ☐ North American
- ☐ North American Indigenous
- ☐ North European
- ☐ Other Pacific Islander
- ☐ Other Southeast Asian (e.g., Cambodian, Laotian, Thai)
- ☐ Other White
- ☐ Samoan
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- ☐ Vietnamese
- ☐ Western European
- ☐ White Caribbean
- ☐ White South

- You don't have an option that applies to me. I identify as (please specify):

- Choose not to respond

Which of the following **BEST** fits the highest level of education that you have completed?
Please select all that apply.

- Some school without high-school diploma
- High school diploma or equivalent (e.g., GED)
- Some college / university education (including the degree you are currently pursuing, if applicable) without degree
- Bachelor's degree from a college or university
- College degree
- Some post-graduate education
- Post-graduate degree (e.g., Master's, PhD, Professional degree)
- You don't have an option that applies to me. My current level of education is (please specify): _____
- Choose not to respond

Relationship Background Questions

Which of the following **BEST** describes your current relationship status? Please select all that apply.

- Committed relationship
- Married / common law / de facto partnership
- Dating but not in a committed relationship
- Single (no relationships, some sexual contacts)
- Single (no sexual or romantic contacts)
- You don't have an option that applies to me. My current relationship status is (please specify): _____
- Choose not to respond

Skip To: End of Block If Which of the following BEST describes your current relationship status? Please select all that ap... = Dating but not in a committed relationship

Skip To: End of Block If Which of the following BEST describes your current relationship status? Please select all that ap... = Single (no relationships, some sexual contacts)

Skip To: End of Block If Which of the following BEST describes your current relationship status? Please select all that ap... = Single (no sexual or romantic contacts)

Which of the following **BEST** describes yours and your partner's relationship style? Please select all that apply.

- ☐ Monogamous (i.e., you only engage in sexual and romantic activities with each other)
- ☐ Consensually non-monogamous (i.e., you and/or your partner engage in sexual activities with people outside your relationship, with each other's permission)
- ☐ Polyamorous relationship (i.e., you and/or your partner engage in loving sexual and/or romantic relationships with others, and with each other's permission)
- ☐ Other (please specify): _____
- ☐ Choose not to respond

Display This Question:

If Which of the following BEST describes yours and your partner's relationship style? Please select... = Consensually non-monogamous (i.e., you and/or your partner engage in sexual activities with people outside your relationship, with each other's permission)

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Polyamorous relationship (i.e., you and/or your partner engage in loving sexual and/or romantic relationships with others, and with each other's permission)

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Other (please specify):

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Choose not to respond

For the rest of this survey, please think about only one of your romantic partners. This may be the romantic partner that you label as your 'primary' or 'anchor' partner.

Below, please briefly describe your relationship with the partner that you've chosen:

Display This Question:

If Which of the following BEST describes yours and your partner's relationship style? Please select... = Consensually non-monogamous (i.e., you and/or your partner engage in sexual activities with people outside your relationship, with each other's permission)

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Polyamorous relationship (i.e., you and/or your partner engage in loving sexual and/or romantic relationships with others, and with each other's permission)

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Other (please specify):

Or Which of the following BEST describes yours and your partner's relationship style? Please select... = Choose not to respond

For the rest of this survey, please consider only this person that you just described for all questions about **YOUR PARTNER**.

Please select **ALL** of the following that fit with **YOUR PARTNER'S** current gender identity:

- ☐ Woman
- ☐ Man
- ☐ Cisgender (their gender is the same as the sex they were assigned at birth – e.g., they are a woman and female)
- ☐ Transgender (my partner's gender is different from the sex they were assigned at birth – e.g., they are a woman, but they were not assigned female at birth)
- ☐ Non-binary
- ☐ Two-spirit
- ☐ Agender
- ☐ Genderqueer
- ☐ Genderfluid
- ☐ Questioning
- ☐ You don't have an option that applies to my partner. My partner identifies as (please specify): _____
- ☐ Choose not to respond

How long have you been in a relationship with **YOUR PARTNER**?

Please count from the start of the relationship.

For example, if you dated for 2 years and have been married for 2 years and 3 months you should answer 4 years and 3 months.

Please respond in years and months.

- Months: _____
- Years: _____

Are you and **YOUR PARTNER** currently living in the same household?

- Yes
- No

Display This Question:

If Are you and YOUR PARTNER currently living in the same household? = Yes

How long have you and **YOUR PARTNER** been living in the same household?

Please respond in years and months.

- Months: _____
- Years: _____

For this study, a **long-distance relationship** is when:

- There is considerable geographical distance between partners,
- It would be practically impossible for partners to see one another every day, and
- Most of the communication between partners is not face-to-face.

Are you **YOUR PARTNER** currently in a long-distance relationship?

- Yes
- No

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

About how far away does **YOUR PARTNER** live from you?

If you are unsure, you can use Google Maps to measure the approximate difference between the city that you live in and the city that your partner lives in.

Please provide an estimate in **KILOMETERS**.

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

For how long have you been in a long-distance relationship with **YOUR PARTNER**?
Please respond in years and months.

- Months: _____
- Years: _____

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

How long has it been since you last saw **YOUR PARTNER** in-person?

Please respond in years and months.

- Months: _____
- Years: _____

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

In the past **6 MONTHS**, how many **total days** have you spent with **YOUR PARTNER** in-person?

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

In the past **MONTH**, how many **total days** have you spent with **YOUR PARTNER** in-person?

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

Did your current relationship begin as a long-distance relationship?

- Yes
- No

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = Yes

Is there anything else that you think is important for us to know about the context of your current long-distance relationship? If so, please let us know here.

Display This Question:

If For this study, a long-distance relationship is when: - There is considerable geographical distan... = No

Have you **EVER** been in a long-distance relationship with **YOUR PARTNER**?

- ☐ Yes
- ☐ No

Display This Question:

If Have you EVER been in a long-distance relationship with YOUR PARTNER? = Yes

How long were you in a long-distance relationship with **YOUR PARTNER**?

Please respond in years and months.

- ☐ Months: _____
- ☐ Years: _____

Display This Question:

If Have you EVER been in a long-distance relationship with YOUR PARTNER? = Yes

About how far away did you and **YOUR PARTNER** live from each other **when you were in a long-distance relationship**?

If you are unsure, you can use Google Maps to measure the approximate difference between the city that you live in and the city that your partner lives in.

Please provide an estimate in **KILOMETERS**.

Display This Question:

If Have you EVER been in a long-distance relationship with YOUR PARTNER? = Yes

Did your relationship with **YOUR PARTNER** begin as a long-distance relationship?

- ☐ Yes
- ☐ No

Display This Question:

If Have you EVER been in a long-distance relationship with YOUR PARTNER? = Yes

During the time that you and **YOUR PARTNER** were in a long-distance relationship, how many **days per month** (on average) did you spend with your partner, in-person?

Display This Question:

If Have you EVER been in a long-distance relationship with YOUR PARTNER? = Yes

Is there anything else that you think is important for us to know about the context of your current relationship, during the time it was long-distance? If so, please let us know here.

In the past **12 MONTHS**, about how often have you and **YOUR PARTNER** engaged in **in-person** sexual activity, **not including** penetrative sexual intercourse?

- ☐ Never
- ☐ Once or twice a month
- ☐ A few times a month
- ☐ Once a week
- ☐ A few times a week
- ☐ Almost daily or daily

In the past **12 MONTHS**, about how often have you and **YOUR PARTNER** engaged in **in-person penetrative** sexual intercourse?

- ☐ Never
- ☐ Once or twice a month
- ☐ A few times a month
- ☐ Once a week
- ☐ A few times a week
- ☐ Almost daily or daily

What technological devices have you used in the last **12 MONTHS** to connect with **YOUR PARTNER**? Please select all that apply.

- ☐ Mobile phone (does not connect to the internet)
- ☐ Smart phone (does connect to the internet)
- ☐ Tablet
- ☐ E-reader
- ☐ Gaming system (X-Box, PlayStation)
- ☐ Landline phone
- ☐ Laptop
- ☐ Desktop computer
- ☐ Smart watch
- ☐ Other (please specify): _____

Relationship Satisfaction Measure

For the following questions, please indicate the degree to which you agree with each of the following statements regarding **your relationship with YOUR PARTNER**.

I feel satisfied with our relationship.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

My relationship is much better than others' relationships.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

My relationship is close to ideal.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

Our relationship makes me very happy.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

Our relationship does a good job of fulfilling my needs for intimacy, companionship, etc.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

Relationship Commitment Measure

For the following questions, please indicate the degree to which you agree with each of the following statements regarding **your relationship with YOUR PARTNER**.

I want our relationship to last for a very long time.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I am committed to maintaining my relationship with my partner.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I would not feel very upset if our relationship were to end in the near future.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

It is likely that I will date someone other than my partner within the next year.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I believe that to show I'm paying attention I should select option 6.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I feel very attached to our relationship – very strongly linked to my partner.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I want our relationship to last forever.

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

I am oriented toward the long-term future of my relationship (for example, I imagine being with my partner several years from now).

- ☐ DO NOT AGREE AT ALL (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ AGREE SOMEWHAT (4)
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ AGREE COMPLETELY (8)

In-Person Sexual Satisfaction Measure

For these next questions, think only about your offline and in-person sexual activities with your partner.

Overall, how would you describe your sexual life with **YOUR PARTNER**?

- ☐ VERY BAD (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY GOOD (7)

Overall, how would you describe your sexual life with **YOUR PARTNER**?

- ☐ VERY UNPLEASANT (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ VERY PLEASANT (7)

Overall, how would you describe your sexual life with **YOUR PARTNER**?

- ☐ VERY NEGATIVE (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY POSITIVE (7)

Overall, how would you describe your sexual life with **YOUR PARTNER**?

- ☐ VERY UNSATISFYING (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY SATISFYING (7)

Overall, how would you describe your sexual life with **YOUR PARTNER**?

- ☐ WORTHLESS (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY VALUABLE (7)

Dyadic In-Person Sexual Desire Measure

This next set of questions asks about your level of sexual desire **for YOUR PARTNER**. By desire, we mean **INTEREST IN or WISH FOR IN-PERSON SEXUAL ACTIVITY**.

For each item, please select the number that best shows your thoughts and feelings.

During the last month, **how often** would you **have liked** to engage in sexual activity with **YOUR PARTNER** (for example, touching each other's genitals, giving or receiving oral stimulation, intercourse, etc.)?

- ☐ Not at all
- ☐ Once a month
- ☐ Once every two weeks
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ More than once a day

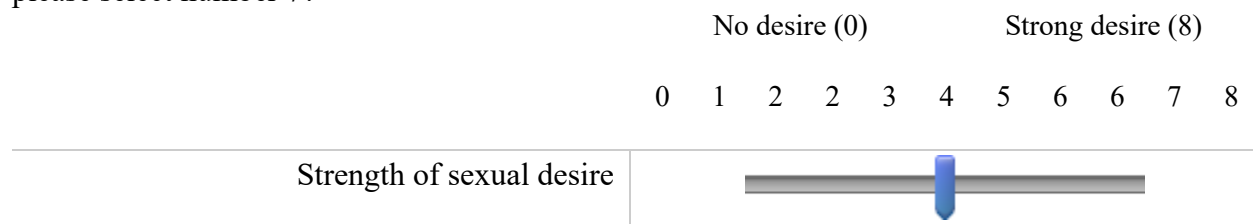
During the last month, **how often** have you had **sexual thoughts** involving **YOUR PARTNER**?

- ☐ Not at all
- ☐ Once or twice a month
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ A couple of times a day
- ☐ Many times a day

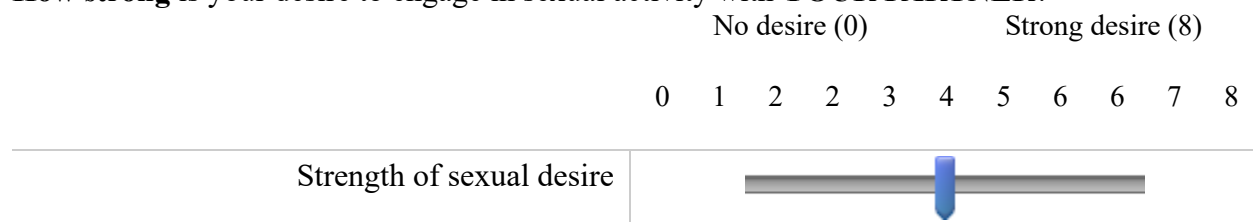
When you have sexual thoughts, **how strong** is your desire **to engage in sexual behavior** with **YOUR PARTNER**?

	No desire (0)	Strong desire (8)
	0	1 2 2 3 4 5 6 6 7 8
Strength of sexual desire		

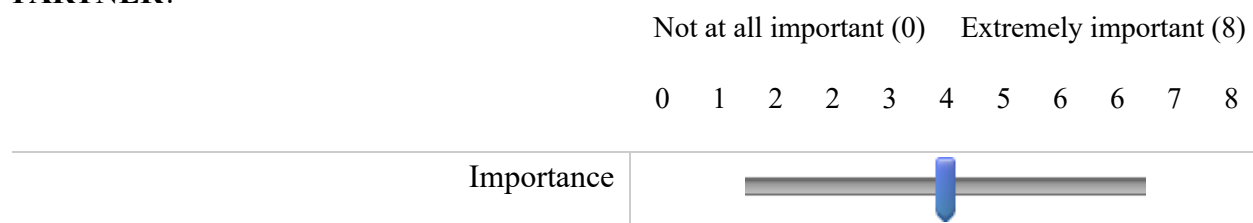
When you spend time with an attractive person - actually, to show you are paying attention, please select number 7?



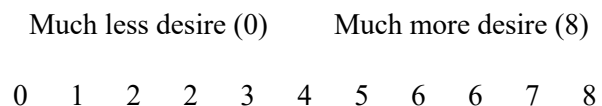
How strong is your desire to engage in sexual activity with **YOUR PARTNER**?



How important is it for you to fulfill your sexual desire through activity with **YOUR PARTNER**?



Compared to other people of your age and sex, how would you rate your desire to behave sexually with **YOUR PARTNER**?



TMSI Frequency Checklist

The next set of questions, over the next few pages, are possible behaviours or activities that people may or may not do by using mobile or Internet-based technologies and devices.

Each item describes an activity or behaviour that is done with at least one other specific person.

This list does not include activities that involve uploading or publishing sexual content online to a public or semi-public forum (e.g., to a pornography or social media website).

Please use the scale we give you to indicate how often you have participated in each activity willingly with **YOUR PARTNER** by using mobile or Internet-based technology on any type of device (e.g., smartphone, computer, tablet, smartwatch, etc.) **in the past 12 MONTHS**.

Remember that the items are about sexual messages, content, and activities that you create or help create.

These questions are about **TYPED MESSAGES** (e.g., text messages, messages sent over messenger, direct messages on social media apps, emails, etc). These messages can have emojis or emoticons in them.

How often have you... **Exchanged** sexual typed messages, **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual typed message to YOUR PARTNER **without receiving any response back** from them?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual typed message from YOUR PARTNER **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

These questions are about **SEXUAL PICTURES/PHOTOS** that you shared back and forth with your partner.

Here, a **NUDE** picture is one where the person in the photo is completely naked, for example in a full body photo or a close-up picture of genitals.

A **SEMI-NUDE** picture is one where the person in the photo is only partially naked, for example wearing underwear or lingerie.

How often have you... **Exchanged** sexual pictures, **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Exchanged** sexual **NUDE** pictures, **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
 - ☐ Yes, but not in the past 12 months
 - ☐ Once in the past 12 months
 - ☐ Twice in the past 12 months
 - ☐ Once a week during the past 12 months
 - ☐ Two times per week in the past 12 months
 - ☐ More than twice a week in the past 12 months
 - ☐ Everyday in the past 12 months
 - ☐ More than once a day in the past 12 months
-

How often have you... **Exchanged** sexual **SEMI-NUDE** pictures, **back and forth**, with YOUR PARTNER?

- Never in my life
- Yes, but not in the past 12 months
- Once in the past 12 months
- Twice in the past 12 months
- Once a week during the past 12 months
- Two times per week in the past 12 months
- More than twice a week in the past 12 months
- Everyday in the past 12 months
- More than once a day in the past 12 months

The next questions are similar to the previous ones except, we are now asking you about experiences where you have either **ONLY SENT** or **ONLY RECEIVED** sexual pictures to/with your partner – it was **NOT** a back and forth experience.

Here, a **NUDE** picture is one where the person in the photo is completely naked, for example in a full body photo or a close-up picture of genitals.

A **SEMI-NUDE** picture is one where the person in the photo is only partially naked, for example wearing underwear or lingerie.

How often have you... **Sent** a sexual picture of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual **NUDE** picture of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual **SEMI-NUDE** picture of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual picture **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual **NUDE** picture **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual **SEMI-NUDE** picture **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

The next questions are about **SEXUAL VIDEOS OR VIDEO CLIPS** that someone would make of themselves, which they then send/receive (e.g., through Snapchat, SMS text, WhatsApp, Messenger, etc.).

Here, a **NUDE** video is one where the person in the video is completely naked, for example in a full body video or a close-up video of genitals.

A **SEMI-NUDE** video is one where the person in the video is only partially naked, for example wearing underwear or lingerie.

How often have you... **Exchanged** sexual **NUDE** videos, **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Exchanged** sexual **SEMI-NUDE** videos, **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual video of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual **NUDE** video of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual **SEMI-NUDE** video of yourself to YOUR PARTNER **without receiving any response back from them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual video **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual **NUDE** video **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual **SEMI-NUDE** video **of** YOUR PARTNER, **from** your partner, **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

These next questions are about **SEXUAL ACTIVITIES** you've engaged in **LIVE** (in real-time) with your partner.

How often have you... Had a sexual **LIVE VIDEO** exchange (e.g., webcam, FaceTime) with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... Had a sexual **LIVE AUDIO** exchange (e.g., phone call, live video without a camera) with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... Used an **AVATAR** to have sex with YOUR PARTNER in a virtual environment (e.g., Massively Multiplayer Online Role-Playing Games, Virtual Worlds)?

- Never in my life
- Yes, but not in the past 12 months
- Once in the past 12 months
- Twice in the past 12 months
- Once a week during the past 12 months
- Two times per week in the past 12 months
- More than twice a week in the past 12 months
- Everyday in the past 12 months
- More than once a day in the past 12 months

These next questions are about **SEXUAL AUDIO MESSAGES**, like voice memos or recordings.

How often have you... **Exchanged** sexual **AUDIO** messages (e.g., voice recordings or memos), **back and forth**, with YOUR PARTNER?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Sent** a sexual **AUDIO** message to YOUR PARTNER **without receiving any response back from them**?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Received** a sexual **AUDIO** message from YOUR PARTNER **without sending any response back to them?**

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

These next questions are about **SEXUAL ACTIVITIES** you've had with another person by using **HAPTIC DEVICES** (e.g., sex toys connected by Wi-Fi or Bluetooth, vibrating underwear).

How often have you... **Controlled** YOUR PARTNER's haptic device while **they also** controlled your haptic device?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... **Controlled** YOUR PARTNER's haptic device, but they **did not** have control of a haptic device for you?

- ☐ Never in my life
- ☐ Yes, but not in the past 12 months
- ☐ Once in the past 12 months
- ☐ Twice in the past 12 months
- ☐ Once a week during the past 12 months
- ☐ Two times per week in the past 12 months
- ☐ More than twice a week in the past 12 months
- ☐ Everyday in the past 12 months
- ☐ More than once a day in the past 12 months

How often have you... Had YOUR PARTNER **control your** haptic device, but you **did not** have control of a haptic device for them?

- Never in my life
- Yes, but not in the past 12 months
- Once in the past 12 months
- Twice in the past 12 months
- Once a week during the past 12 months
- Two times per week in the past 12 months
- More than twice a week in the past 12 months
- Everyday in the past 12 months
- More than once a day in the past 12 months

Dyadic Technology-Mediated Satisfaction Measure

We are going to ask you a few more questions that relate to your experiences engaging in technology-mediated sexual interactions (TMSIs) with **YOUR PARTNER**. As a reminder, **TMSIs** are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. This includes all of the activities described on the last page. Some people also call these activities **sexting, cybersex, phone sex, virtual sex, or haptic sex**.

This next set of questions asks about your level of **TMSI desire for YOUR PARTNER**. By desire, we mean **INTEREST IN** or **WISH FOR TMSI**.

For each item, please select the number that best shows your thoughts and feelings. Your answers will be private and anonymous.

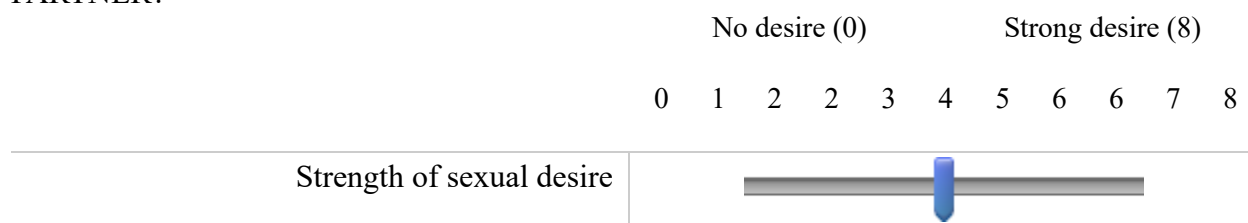
During the last month, **how often** would you have liked to engage in TMSI with YOUR PARTNER (for example, sending sexual text messages, photos, videos, etc.)?

- ☐ Not at all
- ☐ Once a month
- ☐ Once every two weeks
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ More than once a day

During the last month, **how often** have you had sexual thoughts about engaging in TMSI with YOUR PARTNER?

- ☐ Not at all
- ☐ Once or twice a month
- ☐ Once a week
- ☐ Twice a week
- ☐ 3 to 4 times a week
- ☐ Once a day
- ☐ A couple of times a day
- ☐ Many times a day

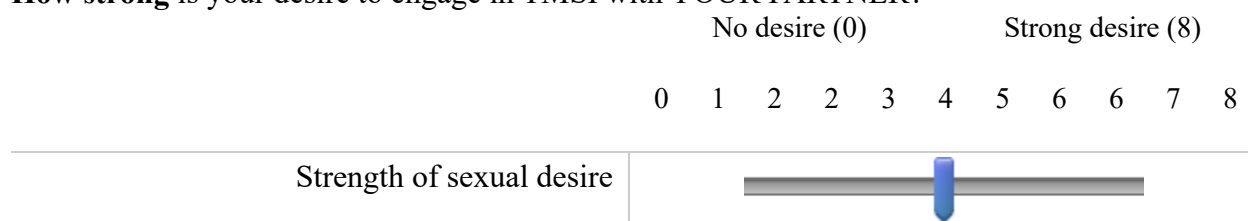
When you have sexual thoughts, **how strong** is your desire to engage in TMSI with YOUR PARTNER?



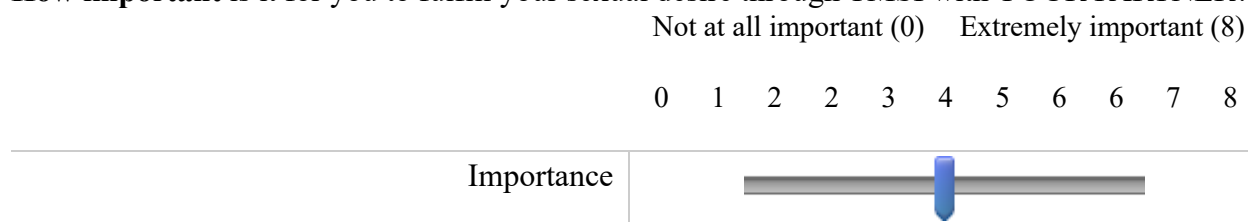
When you spend time with an attractive person - actually, to show you are paying attention, please select number 3?



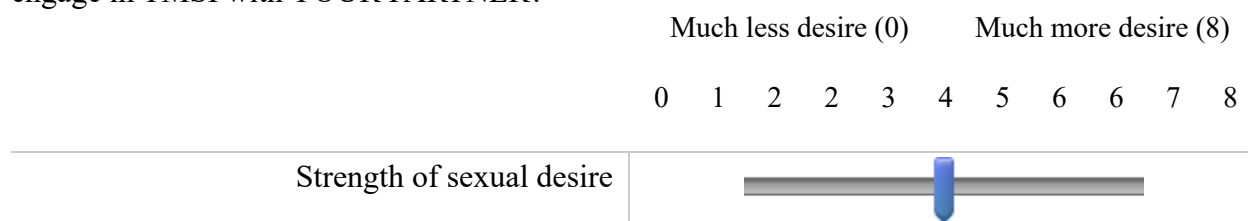
How strong is your desire to engage in TMSI with YOUR PARTNER?



How important is it for you to fulfill your sexual desire through TMSI with YOUR PARTNER?



Compared to other people of your age and sex, how would you rate your desire to desire to engage in TMSI with YOUR PARTNER?



Technology-Mediated Sexual Satisfaction Measure

For these next questions, think only about your **TMSI activities** with YOUR PARTNER.

As a reminder, TMSIs are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. This includes all of the activities described on the last page. Some people also call these activities sexting, cybersex, phone sex, virtual sex, or haptic sex.

Overall, how would you describe your technology-mediated sexual life with YOUR PARTNER?

- ☐ VERY BAD (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY GOOD (7)

Overall, how would you describe your technology-mediated sexual life with YOUR PARTNER?

- ☐ VERY UNPLEASANT (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ VERY PLEASANT (7)

Overall, how would you describe your technology-mediated sexual life with YOUR PARTNER?

- ☐ VERY NEGATIVE (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY POSITIVE (7)

Overall, how would you describe your technology-mediated sexual life with YOUR PARTNER?

- ☐ VERY UNSATISFYING (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY SATISFYING (7)

Overall, how would you describe your technology-mediated sexual life with YOUR PARTNER?

- ☐ WORTHLESS (0)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ VERY VALUABLE (7)

TMSI Motives Scale

You're almost done! Next, we have a few more questions about your technology-mediated sexual interactions (TMSIs) with **YOUR PARTNER**. As a reminder, **technology-mediated sexual interactions (TMSIs)** are any type of sexual interaction or communication (e.g., exchanging sexual texts, photos, videos) that occur through the use of digital technology. Some people also call these activities **sexting, cybersex, phone sex, virtual sex, or haptic sex**.

	NEVER OR ALMOST NEVER (1)	2	3	4	ALWAYS OR ALMOST ALWAYS (5)
To express love for my partner	☐	☐	☐	☐	☐
For excitement	☐	☐	☐	☐	☐
To feel better when I feel lonely	☐	☐	☐	☐	☐
To feel better about my body	☐	☐	☐	☐	☐
To get myself excited about my next sexual encounter with my partner	☐	☐	☐	☐	☐
To cheer myself up	☐	☐	☐	☐	☐
Because I look good that day	☐	☐	☐	☐	☐
To show that I am confident about my body	☐	☐	☐	☐	☐
To prevent my partner from cheating on me	☐	☐	☐	☐	☐
To make my partner happy	☐	☐	☐	☐	☐

	NEVER OR ALMOST NEVER (1)	2	3	4	ALWAYS OR ALMOST ALWAYS (5)
To excite my partner	☐	☐	☐	☐	☐
Because I feel attractive	☐	☐	☐	☐	☐
Because I feel horny	☐	☐	☐	☐	☐
To make myself feel more comfortable with sexual activities	☐	☐	☐	☐	☐
To get my partner excited about our next sexual encounter	☐	☐	☐	☐	☐
To experiment with sexual activities without doing them in-person	☐	☐	☐	☐	☐
To show you're paying attention, please select option 3	☐	☐	☐	☐	☐
To get my partner to feel more comfortable with a new type of sexual activity	☐	☐	☐	☐	☐
Because I am uncomfortable with in-person dirty talk	☐	☐	☐	☐	☐

Because I know I won't be in the mood for in-person sexual activities	○	○	○	○	○
To feel more self-confident	○	○	○	○	○

	NEVER OR ALMOST NEVER (1)	2	3	4	ALWAYS OR ALMOST ALWAYS (5)
To keep my partner interested in me	☐	☐	☐	☐	☐
To prevent myself from getting an STI or experiencing unwanted pregnancy	☐	☐	☐	☐	☐
Because I worry my partner won't want me if I don't	☐	☐	☐	☐	☐
To manage my emotions	☐	☐	☐	☐	☐
To do something special for my partner	☐	☐	☐	☐	☐
To satisfy sexual needs	☐	☐	☐	☐	☐
Because I was bored	☐	☐	☐	☐	☐
For the thrill of it	☐	☐	☐	☐	☐
Because I am afraid my partner will leave if I don't	☐	☐	☐	☐	☐
To prove my attractiveness	☐	☐	☐	☐	☐

Life Satisfaction Measure

Below are five statements that you may agree or disagree with.

Using the 1 – 7 scale below, please indicate your agreement with each item by placing the appropriate number on the line preceding that item.

In most ways my life is close to my ideal.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Slightly Disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

The conditions of my life are excellent.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Slightly Disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

I am satisfied with my life.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Slightly Disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

So far I have gotten the important things I want in life.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Slightly Disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

If I could live my life over, I would change almost nothing.

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Slightly Disagree
- ☐ Neither agree nor disagree
- ☐ Slightly agree
- ☐ Agree
- ☐ Strongly agree

Social Desirability Measure

Read each item and decide whether it is true (T) or false (F) for you.

Try to work rapidly and answer each question by selecting TRUE or FALSE.

	TRUE	FALSE
I'm always willing to admit it when I make a mistake.	☐	☐
I always try to practice what I preach.	☐	☐
I never resent being asked to return a favor.	☐	☐
I have never been irked by when people expressed ideas very different from my own.	☐	☐
I have never deliberately said something that hurt someone's feelings.	☐	☐
I like to gossip at times.	☐	☐
There have been occasions when I took advantage of someone.	☐	☐
I sometimes try to get even rather than forgive and forget.	☐	☐
At times I have really insisted on having things my own way.	☐	☐
There have been occasions where I felt like smashing things.	☐	☐

Survey Effort and Attention Questions

It is vital to our study that we only include responses from people that devoted their full attention to this study. Otherwise, years of effort (the researchers' and the time of other participants) could be wasted.

"I put forth ____ effort towards this study"

- ☐ Almost no
- ☐ Very little
- ☐ Some
- ☐ Quite a bit of
- ☐ A lot of

Also, often there are several distractions present during studies (other people, TV, music, etc.). Please indicate how much attention you paid to this study.

"I gave this study ____ attention"

- ☐ Almost no
- ☐ Very little of my
- ☐ Some of my
- ☐ Most of my
- ☐ My full

In your honest opinion, should we use your data in our analyses in this study?

- ☐ Yes
- ☐ No

Appendix N (Article 4, Survey 2 Debriefing Form)

Congratulations, you're all done, thank you!

The overall goal of this study is to improve research on and understanding about the ways that people participate in technology-mediated sexual interactions (TMSIs) using mobile and/or Internet technologies, with their committed romantic partners. We were interested in peoples' motivations for and outcomes of engaging in TMSIs with their primary partners, and to explore people's experiences with TMSI in romantic relationship contexts more broadly. We were also interested in testing the reliability, validity, and factor structures of three new measures of (i) TMSI motives, (ii) desired TMSI frequency, and (iii) TMSI satisfaction.

Your responses will be added to other people's responses (maintaining your anonymity) and used to: a) make changes to our TMSI measures, b) summarize findings from this study for Erin Courtice's dissertation and future research publications, c) use these ideas to inform future research on TMSI. You will still receive ISPR credits for your participation if you have indicated that you do not consent to your data being used for this study.

If you are interested in learning more about the topic of technology-mediated sexual interactions, we suggest the following articles:

Courtice, E. L., & Shaughnessy, K. (2017). Technology-mediated sexual interaction and relationships: A systematic review of the literature. *Sexual and Relationship Therapy*, 3-4, 269-290. doi: 10.1080/14681994.2017.1397948.

Courtice, E. L., & Shaughnessy, K. (2018). The partner context of sexual minority women's and men's cybersex experiences: Implications for the traditional sexual script. *Sex Roles*, 1-14.

Drouin, M., Vogel, K. N., Surbey, A., & Stills, J. R. (2013). Let's talk about sexting, baby: Computer-mediated sexual behaviors among young adults. *Computers in Human Behavior*, 29(5), doi: 10.1016/j.chb.2012.12.030

Shaughnessy, K., Byers, E. S. (2014) Contextualizing cybersex experience: Heterosexually identified men and women's desire for and experiences with cybersex with three types of partners. *Computers in Human Behavior*, 32,178-185. doi:10.1016/j.chb.2013.12.005

McKie, R. M., Lachowsky, N. J., & Milhausen, R. R. (2015). The positive impact of technology on young gay men's dating and sexual relationships in Canada: Results from a focus group study. *Journal of LGBT Youth*, 12(1), 19-38.

Contact Us

If you have any questions or concerns about this study, please contact the researcher, Erin Leigh Courtice (REDACTED) or Principal Investigator, Dr. Krystelle Shaughnessy (krystelle.shaughnessy@uottawa.ca).

Ethics

We would like to assure you that this study has been reviewed and received ethics approval by the University of Ottawa's Research Ethics Board. However, if you have any concerns about the ethicality of this study following your participation, please contact the University of Ottawa Research Ethics Board at (613-562-5387, ethics@uottawa.ca).

Resources

It is possible that you may have become anxious, distressed, or uncomfortable while completing this study. It also is possible that participating in this study may have raised questions about yourself or your experiences. If this is indeed the case, and you are concerned about these feelings, you may want to seek support from someone else. Here are some resources that may be useful to you:

The American Psychological Association resources for thinking about therapy and finding a psychologist in the United States. <http://www.apa.org/helpcenter/therapy.aspx> 1-800-273-TALK for an emotional support and crisis prevention line across the United States

The Canadian Psychological Association resources for thinking about therapy and finding a psychologist in Canada. <https://cpa.ca/public/findingapsychologist/>

Security

We recommend clearing your browsing history following any event that you enter personal information into web-forms, such as this survey. You can usually do this in the options tab of your web browser. We encourage you to print a copy of this debriefing form for your personal records.

Appendix O (Article 4, Survey 2 Supplementary Materials)

Item-Level Statistics for the Technology Motives Scale (TMSIMS)

TMSIMS Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
Enhancement1: For the thrill of it	4	3.43	1.33	-0.55	-0.81
Enhancement2: For excitement	4	3.76	1.25	-0.86	-0.25
Enhancement3: To satisfy sexual needs	4	3.47	1.30	-0.53	-0.79
Enhancement4: Because I feel horny	4	3.80	1.28	-0.88	-0.31
Intimacy1: To do something special for my partner	4	3.62	1.22	-0.70	-0.38
Intimacy2: To excite my partner	4	3.99	1.15	-1.21	0.80
Intimacy3: To make my partner happy	4	3.69	1.25	-0.74	-0.38
Intimacy4: To express love for my partner	4	3.81	1.21	-0.91	-0.04
ApproachOffline1: To get myself excited about my next sexual encounter with my partner	4	3.53	1.38	-0.62	-0.84
ApproachOffline2: To make myself feel more comfortable with sexual activities	4	2.78	1.38	0.14	-1.25
ApproachOffline3: To get my partner to feel more comfortable with a new type of sexual activity	4	2.81	1.42	0.06	-1.35

ApproachOffline4: To get my partner excited about our next sexual encounter	4	3.76	1.29	-0.90	-0.25
Coping1: Because I was bored	4	2.32	1.31	0.58	-0.82
Coping2: To cheer myself up	4	2.76	1.38	0.18	-1.19
Coping3: To manage my emotions	4	2.22	1.36	0.70	-0.87
Coping4: To feel better when I feel lonely	4	2.63	1.42	0.28	-1.28
Appeasement1: Because I am afraid my partner will leave if I don't	4	1.74	1.22	1.51	0.99
Appeasement2: To keep my partner interested in me	4	2.69	1.43	0.22	-1.32
Appeasement3: To prevent my partner from cheating on me	4	1.95	1.40	1.20	-0.07
Appeasement4: Because I worry my partner won't want me if I don't	4	1.83	1.25	1.28	0.27
AvoidOffline1: To experiment with sexual activities without doing them in-person	4	2.63	1.41	0.28	-1.24
AvoidOffline2: Because I am uncomfortable with in-person dirty talk	4	2.03	1.30	0.97	-0.33
AvoidOffline3: Because I know I won't be in the mood for in-person sexual activities	4	1.97	1.30	1.08	-0.16
AvoidOffline4: To prevent myself from getting an STI or experiencing unwanted pregnancy	4	1.67	1.21	1.66	1.44

Note. $N = 412$. Multivariate outliers are excluded.

Item-Level Statistics for Relationship Satisfaction Measure

Relationship Satisfaction Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
1. I feel satisfied with our relationship.	8	7.80	1.60	-1.89	4.29
2. My relationship is much better than others' relationships.	8	7.20	1.91	-1.09	0.70
3. My relationship is close to ideal.	8	7.13	1.91	-1.13	0.87
4. Our relationship makes me very happy.	8	7.79	1.74	-1.88	3.69
5. Our relationship does a good job of fulfilling my needs for intimacy, companionship, etc.	8	7.53	1.86	-1.56	2.17

Note. $N = 412$. Multivariate outliers are excluded.

Item-Level Statistics for In-Person Sexual Satisfaction Measure

In-Person Sexual Satisfaction Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
1. Overall, how would you describe your sexual life with your current romantic partner? – <i>Very bad to Very good</i>	7	6.78	1.49	-1.56	2.88
2. Overall, how would you describe your sexual life with your current romantic partner? – <i>Very unpleasant to Very pleasant</i>	7	7.07	1.24	-1.86	4.96
3. Overall, how would you describe your sexual life with your current romantic partner? – <i>Very positive to Very negative</i>	7	7.03	1.36	-1.67	3.02
4. Overall, how would you describe your sexual life with your current romantic partner? – <i>Very unsatisfying to Very satisfying</i>	7	6.83	1.47	-1.57	2.80
5. Overall, how would you describe your sexual life with your current romantic partner? – <i>Worthless to Very valuable</i>	7	7.05	1.36	-1.79	3.73

Note. $N = 412$. Multivariate outliers are excluded.

Item-Level Statistics for Technology-Mediated Sexual Satisfaction Measure

Technology-Mediated Sexual Satisfaction Item	Descriptive Statistics				
	Range	Mean	SD	Skewness	Kurtosis
1. Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very bad to Very good</i>	7	5.80	1.84	-0.61	-0.24
2. Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very unpleasant to Very pleasant</i>	7	6.05	1.78	-0.89	0.29
3. Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very positive to Very negative</i>	7	6.04	1.91	-0.74	-0.30
4. Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Very unsatisfying to Very satisfying</i>	7	5.75	1.91	-0.58	-0.45
5. Overall, how would you describe your technology-mediated sexual life with your current romantic partner? – <i>Worthless to Very valuable</i>	7	5.84	1.92	-0.65	-0.33

Note. $N = 412$. Multivariate outliers are excluded.

Item-Level Statistics for Dyadic In-Person Sexual Desire Measure

Dyadic In-Person Sexual Desire Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
1. During the last month, how often would you prefer to engage in sexual activity with a current romantic partner (for example, touching each other's genitals, giving or receiving oral stimulation, intercourse, etc.)?	7	4.66	1.75	-0.67	0.07
2. During the last month, how often have you had sexual thoughts involving a partner?	7	4.61	1.84	-0.47	-0.66
3. When you have sexual thoughts, how strong is your desire to engage in sexual behavior with a partner?	7	6.53	1.35	-1.17	2.00
4. How strong is your desire to engage in sexual activity with a partner?	7	6.89	1.28	-1.63	3.71
5. How important is it for you to fulfill your sexual desire through activity with a partner?	8	6.57	1.50	-1.15	1.38
6. Compared to other people of your age and sex, how would you rate your desire to behave sexually with a partner?	7	6.27	1.47	-0.84	0.64

Note. *N* = 412. Multivariate outliers are excluded.

Item-Level Statistics for Dyadic Technology-Mediated Sexual Desire Measure

Dyadic Technology-Mediated Sexual Desire Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
1. During the last month, how often would you prefer to engage in TMSI with a current romantic partner (for example, sending sexual text messages, photos, videos, etc.)?	7	2.62	2.07	0.41	-0.89
2. During the last month, how often have you had sexual thoughts about engaging in TMSI with your partner?	7	2.44	2.11	0.64	-0.67
3. When you have sexual thoughts, how strong is your desire to engage in TMSI with a partner?	8	5.00	2.30	-0.59	-0.56
4. How strong is your desire to engage in TMSI with a partner?	8	4.98	2.34	-0.62	-0.61
5. How important is it for you to fulfill your sexual desire through TMSI with a partner?	8	4.21	2.53	-0.11	-1.17
6. Compared to other people of your age and sex, how would you rate your desire to engage in TMSI with a partner?	8	4.31	2.41	-0.16	-1.03

Note. $N = 412$. Multivariate outliers are excluded.

Item-Level Statistics for Life Satisfaction Measure

Life Satisfaction Item	Descriptive Statistics				
	Range	Mean	<i>SD</i>	Skewness	Kurtosis
1. In most ways my life is close to my ideal.	6	4.82	1.55	-0.72	-0.35
2. The conditions of my life are excellent.	6	4.94	1.52	-0.74	-0.12
3. I am satisfied with my life.	6	5.11	1.51	-0.94	0.29
4. So far I have gotten the important things I want in life.	6	5.05	1.58	-0.84	0.00
5. If I could live my life over, I would change almost nothing.	6	4.16	1.85	-0.22	-1.13

Note. $N = 412$. Multivariate outliers are excluded.