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# A LONGITUDINAL DYADIC ANALYSIS OF TECHNOLOGY MEDIATED SEXUAL INTERACTIONS IN LONG DISTANCE RELATIONSHIPS

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A LONGITUDINAL DYADIC ANALYSIS OF TECHNOLOGY MEDIATED SEXUAL  
INTERACTIONS IN LONG DISTANCE RELATIONSHIPS

BY

SHULAMIT STERNIN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF  
MASTER OF ARTS

IN

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UNIVERSITY OF RHODE ISLAND

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MASTER OF ARTS THESIS

OF

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2023

## ABSTRACT

Couples in long distance romantic relationships (LDRR) infrequently have in-person sexual interactions with each other, which may have negative consequences for their sexual and relationship satisfaction and ultimately relationship stability. Technology mediated sexual interactions (TMSI) may be one way couples in LDRR achieve sexual satisfaction. The current study dyadically addressed the relationship between the frequency of TMSI, various mediums used for TMSI (video call, voice call, texting, social media), and sexual satisfaction among long-distance couples. Participants were mixed-sex couples ( $N = 73$ ) in LDRR who completed online questionnaires every two months for six months. Data were analysed using Multilevel Modeling (MLM) and the Actor-Partner Interdependence Model for both contemporaneous and time-lagged analysis. Results indicated that individuals' frequency of TMSI was positively associated with their own contemporaneous sexual satisfaction and their partner's subsequent sexual satisfaction. Contemporaneous analysis revealed that women's frequency of TMSI using texting and social media was positively associated with their own sexual satisfaction while women's frequency of voice calling for TMSI was positively associated with men's sexual satisfaction. Results also indicated a significant negative effect of women's frequency of use of video calling on men's contemporaneous sexual satisfaction and women's subsequent sexual satisfaction. Findings suggest that TMSI is associated with sexual satisfaction of couples in LDRR and that certain mediums of TMSI may be more beneficial than others. Individuals and their partners navigating the challenges of a LDRR may find that TMSI fosters sexual satisfaction, a central dimension of relationship quality and stability. Limitations and future directions are discussed.

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## CHAPTER 1

### INTRODUCTION

Long-distance romantic relationships (LDRR) have become increasingly prevalent; by some estimates, fourteen million couples report being in a LDRR in the United States (Rhodes, 2002; Stafford, 2005). Geographic separation places unique stressors on partners in LDRR (e.g., loneliness, increased uncertainty about relationship progress; Firmin et al., 2014; Stafford, 2010), yet some comparisons between LDRR and geographically close romantic relationships (GCRR) have revealed no differences on important relationship predictors such as commitment, intimacy, relationship uncertainty, and communication quality (e.g., Dargie et al., 2015; Jiang & Hancock, 2013; Kelmer et al., 2013; Roberts & Pistole, 2009). Likewise, those in LDRR report similar sexual satisfaction to individuals in GCRR (Dargie et al., 2015; Goldsmith & Byers, 2018; Kafaee & Kohut, 2021; Kelmer et al., 2013). Sexual satisfaction—the degree to which an individual is happy with the sexual aspect of their relationship (Lawrance & Byers, 1995)—is a central dimension of relationship quality (Hassebrauck & Fehr, 2002; Hurlbert et al., 1996; Hurlbert & Apt, 1994) and an important predictor of relationship satisfaction (Brezsnyak & Whisman, 2004; McNulty et al., 2016) and stability (Sprecher, 2002) but there is limited research addressing how partners in LDRR manage their sexual relationship while geographically separated.

Research on LDRR is limited by the lack of universally accepted definition of LDRR (see Borelli et al., 2015; Du Bois et al., 2016; Belus et al., 2019; Dellmann-Jenkins et al., 1994; Sahlstein & Truong, 2002). Therefore, LDRR is defined in this study as a relationship in which partners self-identify as being in a long-distance

relationship, have face-to-face contact less than once a week, and live a minimum of 50 miles or more from one another, which is the shortest distance suggested by LDRR researchers (Borelli et al., 2015; Du Bois et al., 2016).

### **Maintaining Sexual Satisfaction**

Individuals maintain relationship quality by adopting-relationship maintenance behaviors (Chien & Hassenzahl, 2020; Goldsmith & Byers, 2020b; Merolla, 2010, 2012)—which include sexual maintenance behaviours (Morella, 2010) to maintain sexual satisfaction. During times of separation, relationship maintenance behaviours are associated with greater relationship satisfaction for couples in LDRR (Belus et al., 2019) and GCRR (Dainton, 2000). As compared to GCRR, couples in LDRR may engage in a higher frequency of relationship maintenance behaviours to compensate for the challenges of geographical separation (Merolla, 2010; Pistole & Roberts, 2011; Stafford & Merolla, 2007). This may partially explain why individuals in LDRR report similar or better relationship quality than those in GCRR (Kelmer et al., 2013). Couples in LDRR engage in more frequent sexual maintenance behaviour (i.e., dyadic sexual activity) in-person or through technology mediated means (Goldsmith & Byers, 2020b) compared to couples in GCRR.

Gender plays an important role in sexual behaviour (Gotta et al., 2011; Petersen & Hyde, 2010) and should be considered when addressing sexual maintenance behaviours in the context of mixed-gender couples. Traditional heterosexual gender roles socialize men to place a higher value on sexual aspects of a relationship and women to place a higher value on non-sexual aspects of the relationship such as emotional intimacy (Baumeister et al., 2001; Ruffieux et al., 2014; Simon & Gagnon, 2003). In keeping with

traditional gender roles in the context of mixed-gender relationships, women are more relationally oriented and engage in more relational maintenance behaviours compared to men (Aylor & Dainton, 2004; Dainton & Stafford, 2000; Merolla, 2012; Stafford et al., 2000). This may explain in part some of the documented difference in sexual maintenance behaviours between men and women. For example, women in LDRR reported engaging in dyadic relationship maintenance behaviors more frequently than men (Goldsmith & Byers, 2020b) while men sexually fantasize (Renaud & Byers, 2001), masturbate (van Anders, 2012), and engage in solitary online sexual activity (Shaughnessy et al., 2011) more frequently than women.

### **Technology Mediated Sexual Interactions**

Technology mediated sexual interactions (TMSI) can be broadly defined as interactive sexual behaviour that occurs via technological platforms (including but not limited to mobile phones and Internet-enabled devices; Courtice & Shaughnessy, 2017). The limited research addressing TMSI in adult romantic relationships has generally focused on GRR, and indicates that married or dating individuals who engage in TMSI report higher relationship satisfaction (McDaniel & Drouin, 2015; Parker et al., 2013). Also, people who engage in TMSI with a primary romantic or sexual partner experience more relationship satisfaction compared to people who engage in TMSI with other types of partners (e.g., friends, casual hook-ups, strangers; Davis et al., 2016). For people in LDRR a higher frequency of sexual communication and more frequent sexting practises are related to greater sexual and relationship satisfaction (Kafae & Kohut, 2021), suggesting that TMSI may play a uniquely important role in sexual satisfaction of those in LDRR.

TMSI research on adult romantic relationships has focused almost exclusively on sexting behaviour (the use of digital devices such as mobile phones to create and exchange sexually explicit content; Ringrose et al., 2012). Sexting allows partners to engage in provocative and stimulating interactions by exchanging messages or photographs that are intended to elicit arousal or sexual desire. TMSI research has largely neglected other mediums of communication such as video and voice calling (Davis et al., 2016; McDaniel & Drouin, 2015; Parker et al., 2013) potentially resulting in underreporting of TMSI behaviour (Courtice & Shaughnessy, 2017). Some research addressing the use of technology for non-sexual communication in LDRR suggests that those in LDRR engage in more frequent video calling, voice calling, texting, and more frequent use of social networking compared to those in GCRR (Billedo et al., 2015; Holtzman et al., 2021; Merolla, 2010). These types of mediums offer greater media richness (auditory, visual, and touch cues; Utz, 2007) and synchronous (immediate responding) interactions with a partner that are fast and convenient (Belus et al., 2019; Carter & Renshaw, 2016). Media rich mediums allow people to see or hear their partner and are more akin to face-to-face interactions, which may deepen the sense of connectedness in that moment (Boase & Wellman, 2006).

The deeper sense of connection afforded by media rich mediums may be an important way that people in LDRR maintain sexual satisfaction, perhaps because it allows greater responsiveness and effective communication, which is positively associated with increases in sexual satisfaction among partners in long-term relationships (Byers, 2005; Montesi et al., 2011). Couples in LDRR perceive their partners as more responsive during video and voice calls as compared to couples in GCRR and more frequent and

responsive texting is associated with greater relationship satisfaction, quality, and commitment in LDRR but not in GCRR (Holtzman et al., 2021; Merolla, 2010). In general, people tend to choose the medium of communication that fits best with the affordances of the type of interaction (Utz, 2007). These findings suggest that some forms of telecommunication (e.g., video chat) may provide advantages over others (e.g., texting) for maintaining sexual satisfaction in LDRR, yet it is not clear which mediums couples in LDRR prefer for TMSI.

### **Current Study**

This study focuses on how long-distance, mixed-gender couples use TMSI and the relation to their sexual satisfaction over a 6-month period. The frequency with which couples communicate via various modalities while at a distance may serve an adaptive purpose of maintaining contact and enhancing their connection while separated (Morella, 2010), and thus it was hypothesised that individuals' frequency of TMSI would be positively related to their own and their partner's contemporaneous and subsequent sexual satisfaction. Given that little is known about the mediums used by couples in LDRR for TMSI, the current study will conduct exploratory analysis to examine the association of TMSI and contemporaneous and subsequent sexual satisfaction across four TMSI mediums (texting, video calling, voice calling, and social media). Given that that women tend to engage in more relationship maintenance behaviours as compared to men, the current study will also explore the potential gender differences of TMSI within the context of a LDRR.

By dyadically examining the frequency of TMSI engagement and exploring the association of various mediums of TMSI and its relationship to both partners'

contemporaneous and subsequent sexual satisfaction, this study addresses several methodological limitations in the extant literature, which has typically consisted of cross-sectional studies (e.g., Morey et al., 2013) has focused almost exclusively on sexting behaviour (e.g., Holtzman et al., 2021; Kafae & Kohut, 2021), and has not included both members of a couple (Courtice & Shaughnessy, 2017). Using a multi-wave, cross-lagged, dyadic approach, data were collected from partners in LDRR every two months for 6 months. One strength of this study is the ability to examine time-lagged actor and partner associations between TMSI and sexual satisfaction over three time-lags. The emergence of actor and partner associations may elucidate the implications of TMSI as a relationship maintenance behaviour for contemporaneous and subsequent sexual satisfaction.

To control for variations in technology use across generations (Anshari et al., 2016; Pásztor & Bak, 2020) age was treated as a covariate. Given that sexual satisfaction tends to decline over time in committed relationships (Fallis et al., 2016; McNulty et al., 2016; Quinn-Nilas, 2020) relationship length was included as a covariate. Because relationship maintenance behaviours differ between LDRR and GCRR (Billedo et al., 2015; Chien & Hassenzahl, 2020) it was also important to control for the amount of physical contact between partners, and thus physical contact was also included as a covariate.

## CHAPTER 2

### METHODOLOGY

#### **Participants**

Participants were a subset ( $n = 73$ ) of couples ( $N = 97$ ) who participated in a longitudinal study of long-distance relationships. Young adults are more likely to be in LDRR (Merolla, 2010; Stafford, 2005) and to participate in TMSI (Courtice & Shaughnessy, 2017) thus, only participants who were between the ages of 17 and 45, were in a committed relationship for at least one-year, fit criteria of a long-distance relationship, and were fluent in reading and writing English were included in this study. Additionally, given that patterns of technology use in partnered relationships may differ between same- and mixed-gender couples (Twist et al., 2017) and that same- and mixed-gender couples may engage in different relationship maintenance behaviors (Arnett & Tanner, 2011, Haas, 2003; Haas & Stafford, 1998), the current sample was limited to mixed-gender couples regardless of sexual orientation.

#### **Procedures**

All procedures were approved by University Institutional Review Board. Participants were recruited through two strategies: (1) from couples who had previously participated in a study on long distance relationships and gave permission to be contacted in the future, and (2) through online advertisements (e.g., Craigslist, Reddit, Kijiji), social media (e.g., Facebook, Twitter), ads on a University campus, electronic bulletin boards, off-campus bulletin boards (e.g., community centers, libraries, coffee shops), and word of mouth.

The first recruitment strategy involved contacting couples ( $N=197$ ) who had previously participated in a study on long distance relationships. These couples were sent an email that included results about the previous study and an invitation to participate in the current study including participation requirements, eligibility criteria, and the consent form. If they were interested in participating, they were asked to reply to the email with full names, ages, phone numbers, and email addresses for both partners, and to confirm that they were both comfortable reading and writing in English. Of the 50 individuals who responded with interest, 35 couples were eligible and received questionnaires.

The second recruitment strategy involved individuals not connected to the previous study but who contacted the lab in response to recruitment efforts. These participants were sent an email with information about the study and asking them to provide their full names, ages, phone numbers, and email addresses for both partners, and to confirm that they were both comfortable reading and writing in English. Of the individuals who contacted the lab via the second recruitment strategy ( $n = 63$ ), 62 couples were eligible and received questionnaires.

Each member of an eligible couple was individually sent an email with a unique ID number, instructions, and a link to the online survey (hosted on a secure server using Remark survey software). Upon logging into the survey, participants reviewed the consent form and indicated their consent to participate by clicking “submit” before beginning the baseline survey at T1. To confirm eligibility, participants responded to questions at the beginning of the survey (i.e., frequency of contact with their partner) and those who did not meet criteria were exited from the survey.



Participants completed online questionnaires about TMSI and sexual satisfaction every 2 months over the course of 6 months for a total of four time points (Time 1-4). Demographic information was only collected at baseline (Time 1). Each partner received \$10 for completing every online questionnaire in two payments of \$20 after Time 2 (T2) and \$20 after Time 4 (T4). Payments were made by email money transfer or Amazon gift card. Participants who did not complete Time 4 questionnaires (dropouts) were compared to those who did (completers) and there were no significant differences on any demographic variables or study outcome variables between those who dropped out and those who completed the study.

Of the 97 couples who were eligible and received questionnaires, 13 couples did not complete any questionnaires at first survey (Time 1) and 12 couples were not in mixed-gender relationships and all were excluded; the final sample consisted of 73 mixed-gender couples. Of the 73 couples who completed the questionnaires at T1, 64 men and 65 women completed T2 questionnaires, 53 men and 48 women completed T3 questionnaires, and 45 men and 44 women completed T4 questionnaires. Demographic information for couples at each time point are in Table 4.

At the start of the study, the average relationship length was 2.75 years ( $SD = 2.11$ ) and couples had been long-distance for an average of 1.61 years ( $SD = 1.53$ ). Many of the couples (73%) reported that they had previously lived geographically close and the distance separating partners ranged from 58-7968 miles ( $M = 2907$ ,  $SD = 2453$ ).

Demographic characteristics of men and women including age, racial identity, sexual orientation, education level and employment status are in Table 1. Women averaged 25.18 years of age ( $SD = 7.45$ ), were predominantly heterosexual (87%), and reported an

average annual income of Canadian dollar (CAD) \$22,983 ( $SD = 29,312$ ). Men averaged 24.53 years of age ( $SD = 7.09$ ), were also predominantly heterosexual (78%), and reported an average annual income of CAD \$21,770 ( $SD = 23,426$ ).

Participants who were included in the study were compared across all demographic variables to participants who were excluded from the sample. For excluded couples, the average relationship length ( $M = 3.62$ ,  $SD = 7.10$ ) was significantly longer than for those included ( $M = 2.75$ ,  $SD = 2.11$ ;  $t(83) = 0.86$ ,  $p = .002$ ), although the effect size was small ( $d = .27$ , 95% CI [-0.34 – 0.88]). There were no significant differences on any study outcome variables between participants who were included in the study as compared to participants who were excluded from the study.

Participants who were newly recruited were compared to those who had participated in a previous study on long distance relationships on all demographic and outcome variables. New recruits were younger ( $M = 23.55$  years of age,  $SD = 4.43$ ) than previous participants ( $M = 28.12$ ,  $SD = 10.47$ ;  $t(71) = 2.61$ ,  $p = .01$ );  $d = .64$ , 95% CI [.144 – 1.13]. New recruits were also in shorter ( $M = 2.27$ ,  $SD = .332$ ) relationships than previous participants ( $M = 3.61$ ,  $SD = 1.42$ ;  $t(69.8) = 3.09$ ,  $p = .03$ );  $d = .66$ , 95% CI [.17 – 1.25]. There were no significant differences on any study outcome variables between recruited participants and previous participants.

## **Measures**

**Demographic information.** Participants provided demographic information including age, ethnicity, years of education, income, gender identity, sexual orientation, length of long-distance relationship, whether they had ever lived geographically close to their partner, and

current geographical location (used to compute geographical distance between partners).

**Technology mediated sexual interaction.** TMSI was assessed using an adapted version of the measurement developed by Gordon-Messer et al., (2013). Participants were asked “In the past two months, how often have you engaged in sexual activities of any kind with your partner using this mode of communication?” Strategies for assessing TMSI behavior have typically included self-report items addressing frequency of use of various TMSI mediums on a 6 or 7 point Likert scale (i.e., Drouin et al., 2013; Lefebvre et al., 2022; McDaniel & Drouin, 2015). Given the longitudinal design of the current study participants were asked to recall TMSI behaviour from the last two months, a time-frame that falls within the typical range used by TMSI measures (Drouin et al., 2013; Oriza & Hanipraja, 2020). For each mode of communication (i.e., video chat, social media, texting/text messenger, voice only phone call) participants rated their frequency of use on a 7-point scale: 0 (*never*), 1 (*less than once a month*), 2 (*once a month*), 3 (*once every few weeks*), 4 (*once a week*), 5 (*a few times a week*), 6 (*every few days*), 7 (*daily*). A total score was computed by averaging across all four TMSI mediums. Total TMSI scores were positively correlated over all waves of data (Table 2). A dummy score was also computed by scoring whether each medium of TMSI had been used at each time point with 0 indicating no use and 1 indicating use of a given medium. The intra-class correlation coefficient (ICC; Koo & Li, 2016; Liljequist et al., 2019; Streiner, 2008) was used to assess the stability of women’s and men’s score across the four time-points. The ICC for women’s TMSI scores across all time points was between fair and good .816 (.710 - .890), the ICC for men’s TMSI scores across all four time points was between good and excellent .892 (.828- .936).

**Sexual Satisfaction.** The 6-item sexual satisfaction subscale from the Quality of Sex Inventory (QSI; Shaw, & Rogge, 2016) was used to assess current sexual satisfaction. Participants indicated their degree of agreement with items such as, “I am happy with my sex life with my partner,” on a 6-point Likert response scale that ranged from 1 (*not at all true*) to 6 (*completely true*). The QSI has demonstrated excellent internal consistency (Cronbach’s  $\alpha = .96$ ) and has shown strong convergent and construct validity with other measures of sexual satisfaction (Shaw & Rogge, 2016). Reliability ranged from  $\alpha = .946$  to  $.972$  for women and from  $\alpha = .950$  to  $.966$  for men over four waves of data.

### **Data Analysis Strategy**

Data were analysed using Multilevel Modeling (MLM) and the Mixed Procedure in IBM SPSS Statistics (Version 27; IBM Corp, 2010). The Actor-Partner Interdependence Model (APIM; Cook & Kenny, 2005) is a multilevel model that allows for within- and between-subject differences, and accounts for the over-time crossed (i.e., repeated measures of sexual satisfaction crossed with individuals) and interdependent (i.e., dyadic) structure of the data. The APIM model treats the dyad as the unit of analysis and estimates actor and partner effects. In the APIM model, within-person effects are labeled as actor effects (i.e., the extent to which women’s TMSI relates to their own sexual satisfaction), and cross-partner effects are labelled as partner effects (i.e., the extent to which women’s TMSI relates to men’s sexual satisfaction). Repeated measures (i.e., sexual satisfaction, TMSI) were modelled at Level 1 and were centred around the grand mean and standardized across time and partners (Kashy et al., 2012). Time was scored as 0 at the first measurement occasion (T1) with each subsequent timepoint as the

number of years from T1. Age, relationship length, length of the long-distance relationship, and amount of physical contact were included as Level 2 covariates as they were considered constant over all time points.

First, a two-intercept APIM was fit with gender and its interaction with predictors in all models; the model included two-intercepts that provided separate estimates for men and women (Girme et al., 2018), and allowed the path coefficients (for actor and partner effects) to vary between men and women. Next, following procedures described by Ledermann et al. (2011), pooled effects were assessed by constraining men's and women's coefficients to be equal. Although the two partners of the couple comprise theoretically distinguishable dyad members, their paths may be empirically indistinguishable, which would be indicated if constraining all pairs of corresponding paths to be equal between men and women does not significantly worsen model fit. Testing for indistinguishability allows for a more parsimonious model. In this model, actor effects measure the extent to which one's TMSI relates to one's own sexual satisfaction, and partner effects measure the extent to which one's TMSI relate to their partner's sexual satisfaction and all participants are actors and partners in the model. For models in which no gender differences were present, pooled results with men and women's paths constrained to be equal are presented.

For contemporaneous analyses, the association between the overall frequency of TMSI (or the frequency of use of each TMSI medium) at Time T and sexual satisfaction at Time T was examined by fitting an over-time APIM. For the time-lagged analysis, the association of the overall frequency of TMSI (or the frequency of use of each TMSI medium) at Time T and sexual satisfaction at Time T+1 was examined, while controlling

for sexual satisfaction at Time T (Kashy et al., 2012). For the contemporaneous and time-lagged analysis, the effects of the overall frequency of TMSI use was examined first, followed by the examination of the effect of each TMSI medium.

### **Missing Data**

The MIXED procedure in SPSS uses a restricted maximum likelihood estimation approach—it can handle data that are missing at random over time, by utilizing all available data without requiring the same number of observations across participants (Kenny et al., 2006). If an individual was missing fewer than 20% of items on the 6-item sexual satisfaction subscale of the QSI (i.e., Hawthorne et al., 2005; Parent, 2013; Shrive et al., 2006), the missing items were imputed using individual mean substitution (i.e., the individual's mean score for the completed items on a given scale were used to impute any missing item responses on that scale). Mean substitution is the recommended approach for handling partially missing scale data (Hawthorne et al., 2005) at lower rates of missingness (below 20%) as it produces similar results as compared to multiple imputations, but it may produce inflated correlations among items and alphas at smaller sample sizes ( $n < 200$ ; Parent, 2013). Thus, if more than 20% of items on the QSI were missing, mean substitution was not used as it may lead to biased scale scores (Hawthorne et al., 2005; Parent, 2013); for such participants the score of sexual satisfaction was treated as missing at the given time point. However, the participant's observed scores at other time points (with fewer than 20% of items missing) were still included in the analyses. Missing study variable data are presented in Table 3. The current sample size is similar to that of other dyadic studies using MLM (Rosen et al., 2014; Rossi et al., 2022; Whittaker et al., 2022) and is also in line with estimates of the number of dyads needed

for obtaining reliable and valid estimates from MLM dyadic data analysis (Du & Wang, 2016).

## CHAPTER 3

### FINDINGS

#### **Descriptive Analyses**

Means and standard deviations at each time point for TMSI, TMSI mediums, and sexual satisfaction for men and women are in Table 5. Mean differences by gender were examined using a one way MANOVA and a Bonferroni correction (Bonferroni, 1936) to mitigate the risk of Type I error. With an alpha of .05, there were no significant differences between men and women on primary study variables (i.e., TMSI).

The assumption of normality was checked for all outcome variables (i.e., TMSI) using Q-Q and histogram plots. The data points fell on relatively straight, positively sloped lines on the Q-Q plots for all variables and appeared to estimate a normal curve on the histogram plots for all variables. This was taken as support for the assumption of normality. The Mahalanobis distance was used to assess for multivariate outliers, none were detected. The assumption of homoscedasticity of residuals was checked by plotting the standardized predicted values of the outcome variables on the x-axis of a scatterplot, and the standardized residual values of the outcome variables on the y-axis. The data points for each outcome variable generally fell in an even band around zero suggesting that the variations of the residual values for all predicted outcome scores are approximately equal, supporting the assumption of homoscedasticity.

#### **Average Change in Sexual Satisfaction and TMSI Over Time**

The average change in study variables (sexual satisfaction, TMSI) over time was assessed using MLM. It should be noted that due to convergence issues the intercepts in this model were fixed. As shown in Table 6, TMSI and sexual satisfaction did not change



linearly or quadratically; however, time was still included as a Level 1 covariate to detrend sexual satisfaction in all study models.

### **The Association of Sexual Satisfaction with TMSI**

**Overall Frequency of TMSI.** All of the analyses were conducted with and without age, relationship length, and length of the long-distance relationship as covariates. To simplify interpretation, when results did not differ, the analyses without the covariates are reported.

It was hypothesized that there would be a positive association between individuals' frequency of TMSI use and their own and partner's sexual satisfaction. No significant sex differences were found, thus, the results in Table 7 are pooled estimates of actor and partner effects. As shown in Figure 1, individuals' frequency of TMSI was positively associated with their own sexual satisfaction (actor effects) but was unrelated to their partner's sexual satisfaction (partner effects). Time-lagged associations were tested next. It was hypothesized that individual's frequency of TMSI use would be positively associated with their own and their partner's subsequent sexual satisfaction. Again, no gender differences were found thus the results in Table 8 are pooled estimates. As shown in Figure 2, individuals' TMSI frequency was unrelated to their own subsequent sexual satisfaction (actor effects) but was positively associated with their partner's subsequent sexual satisfaction (partner effects).

**Medium of TMSI.** The association between TMSI and sexual satisfaction was measured across four mediums (texting, video calling, voice calling, and social media). The association between frequency of use of each medium of TMSI and sexual satisfaction was tested by including the frequency of all TMSI mediums as predictors in a

single model testing for contemporaneous and lagged effects. Significant gender differences were found in contemporaneous and lagged models and thus, results with men's and women's paths unconstrained are presented. The inclusion of the covariates of age, relationship length, and length of the long-distance relationship in both models affected the results, thus the modeling results with these covariates included are reported. Results are presented in Table 9 for the contemporaneous results and in Table 10 for the lagged results. As shown in Figure 3, there was a significant positive effect of women's frequency of TMSI using texting and social media on their own contemporaneous sexual satisfaction, a significant positive effect of women's frequency of voice calling for TMSI on men's contemporaneous sexual satisfaction and a significant negative effect of women's frequency of use of video calling on men's contemporaneous sexual satisfaction. As seen in Figure 4, results indicated that women's frequency of TMSI using video calling was significantly negatively associated their own subsequent sexual satisfaction.

## CHAPTER 4

### DISCUSSION

This study investigated the association between TMSI use and sexual satisfaction in couples in long-distance relationships. It was hypothesized that there would be a positive association between individuals' TMSI frequency and their own and partner's sexual satisfaction for both contemporaneous and time-lagged analyses. Consistent with this hypothesis, contemporaneous analyses revealed that for men and women, TMSI frequency was positively associated with their own sexual satisfaction; however, contrary to the hypothesis, TMSI frequency was unrelated to partner sexual satisfaction. Conversely, time-lagged analysis revealed that for men and women, TMSI frequency was positively associated with partner's subsequent sexual satisfaction but unrelated to one's own subsequent sexual satisfaction. The results of this study support the idea that engaging in TMSI may improve people's sexual satisfaction in the moment but may only foster partners' subsequent sexual satisfaction. The contemporaneous and time-lagged results support the hypothesis that TMSI contributes to sexual satisfaction of both members of a couple in a long-distance relationship. These results are consistent with previous studies wherein couples who engage in more dyadic relationship maintenance behaviours (such as TMSI) report greater relationship satisfaction (Belus et al., 2019); and individuals in GRR who engage in TMSI (McDaniel & Drouin, 2015; Parker et al., 2013) report greater relationship satisfaction, which may in turn contribute to improved sexual satisfaction (Goldsmith & Byers, 2020a; Millman, 2012).

Given that TMSI was associated with contemporaneous sexual satisfaction, an alternate explanation is that sexually satisfied individuals in LDRR tend to initiate TMSI

with their partners more frequently. However, it may be that self-initiated TMSI is more likely to be motivated by sexual approach goals (behavior is directed by a positive/desirable event or possibility; Elliot & Covington, 2001), which may be more sexually satisfying (Impett & Peplau, 2002).

This study also examined the association of TMSI and sexual satisfaction across four mediums (texting, video calling, voice calling, and social media). Contemporaneous analysis revealed that women's frequency of TMSI using texting and social media was positively associated with their own sexual satisfaction and women's frequency of voice calling for TMSI was positively associated with men's sexual satisfaction. This suggests that synchronous and asynchronous mediums of TMSI may contribute to sexual satisfaction in LDRR. Although mediums which are generally asynchronous (i.e., texting) may limit immediate partner feedback and are less media rich than synchronous mediums, they allow partners to communicate without being simultaneously available (Boase & Wellman, 2006), which could be an important factor for couples in LDRR. Couples who are not simultaneously available (i.e., time differences, work schedules) or who cannot respond for long periods of time but would like to engage in TMSI with their partners may benefit from less synchronous forms of communication. Asynchronous mediums can also allow partner to spend more time carefully composing a response message—a potential asset for more in-depth conversations (McKenna et al., 2002). In general, people tend to choose the medium that fits best with the affordances of the task or type of interaction (Utz, 2007); while synchronous and media rich mediums of TMSI (voice, video) may be more similar to face-to-face interactions, the asynchronicity and accessibility of text and social media may be preferred by those in LDRR who live across

time zones. This may in part, explain why women's use of texting and social media (more asynchronous mediums) were significantly related to their own sexual satisfaction. However, women's use of voice calling, a more synchronous and media rich TMSI medium compared to texting and social media, contributed to men's sexual satisfaction. It may be that voice calling TMSI is preferred by men who tend to engage more frequently in more sexual maintenance behaviour that require active sexual engagement (e.g., masturbation; van Anders, 2012).

Results also indicated a significant negative effect of women's frequency of use of video calling on men's contemporaneous sexual satisfaction and women's subsequent sexual satisfaction. It may be that partners of sexually dissatisfied men increase their TMSI in response to their partner's dissatisfaction and they do this using video calling—a medium that most resembles face-to-face interactions. Women who engage in sexual interactions with their sexually dissatisfied partners to improve their partner's sexual satisfaction are extrinsically motivated (i.e., they are engaging in a sexual interaction for reasons other than their own inherent satisfaction; Brunell & Webster, 2013; Deci & Ryan, 2000; Ryan & Deci, 2020). Extrinsically motivated sexual interactions are related to declines in sexual satisfaction (Gravel et al., 2016; Muise, 2017), which may in part, explain women's decline in their own subsequent sexual satisfaction. Alternatively, these results may be understood within the context of sexual performance anxiety; when women engage in video TMSI with their partners, men, who experience higher rates of sexual performance anxiety as compared to women (Pyke, 2020), may experience performance anxiety and related sexual performance concerns (i.e., premature ejaculation and psychogenic erectile dysfunction), which may lead to decreases in sexual satisfaction

for themselves and their partners (McCabe, 2005; Pyke, 2020) when using video TMSI. This may, in part, explain why men prefer voice calling for TMSI given that some of the sexual performance concerns may be alleviated by the lack of visual engagement with their partner. Women's preference for more asynchronous forms of TMSI (i.e., texting, social media) may similarly be related to the alleviation of sexual performance anxiety (Pyke, 2020) but may also be explained by asynchronous forms of communication allowing the time to formulate a reply (McKenna et al., 2002) or to engage in reminiscing, which in turn may contribute to greater relational satisfaction (Birnbaum et al., 2019; Borelli et al., 2015; Lenger & Gordon, 2019).

Contemporaneous and time-lagged results across the various TMSI mediums only revealed effects of women's TMSI on their own and their partner's sexual satisfaction. In the context of mixed-gender relationships, women tend to emphasize and engage in relationship maintenance behaviours more frequently than men (Aylor & Dainton, 2004; Dainton & Stafford, 2000; Merolla, 2012; Stafford et al., 2000) which may, in part, explain why the effects of different mediums on sexual satisfaction in the current study were only significant for women.

### **Limitations and Future Directions**

Despite several notable strengths, the limitations of this study should be addressed. Individuals who volunteer to participate in studies on sexuality may be more sexually experienced and have more positive sexual attitudes (Dawson et al., 2019; Wiederman, 1999) as compared to those choosing not to participate in such studies. Given the potential for volunteer bias, results must be generalized with caution. In addition, the sample was limited to mixed-gender couples and conclusions may not be

applicable to other types of couples (e.g., same-gender couples) as patterns of technology use in partnered relationships may differ between same- and mixed-gender couples (Twist et al., 2017). Also, the use of a forced-choice item questionnaire developed for this study to identify mediums of TMSI may have limited the types of TMSI mediums participants identified using within the context of their LDRR. Also, it was not possible to determine the types of messages being sent via the various mediums (i.e., video message, voice note) in the current study which may further effect findings. Future research may have be strengthened by the inclusion of qualitative narrative response questions addressing the experience of couples in LDRR, their frequency of TMSI, mediums used for TMSI, and motivation for engaging in TMSI. Although the longitudinal measurement of sexual satisfaction is a strength of this study, it must be noted that data were collected every two months over a six-month period which may be too short an interval to observe longitudinal changes. As a result, conclusions about the long-term effects of TMSI on sexual satisfaction may be limited. Future research may be strengthened by studying TMSI and sexual satisfaction over a longer time interval to better understand how TMSI may buffer against declines in sexual satisfaction over time. Although this study provides some insight into the patterns of TMSI use and sexual satisfaction of individuals in LDRR it is correlational in design and thus causation cannot be determined. Future research that includes an experimental manipulation (e.g., asking partners to use various forms of TMSI and assessing relationship satisfaction before and after) may strengthen our understanding of how TMSI may contribute to or detract from the sexual satisfaction of couples in LDRR.

## **Conclusion**

The findings from this study suggest that TMSI is associated with the sexual satisfaction for couples in LDRR and that certain mediums of TMSI may be more beneficial for couples' sexual satisfaction than others. Unexpectedly, TMSI using video calling, a medium that most closely resembles face-to-face interactions was negatively related to men's contemporaneous sexual satisfaction and women's subsequent sexual satisfaction. The synchronous form of video calling for TMSI may exacerbate sexual performance anxiety (Pyke, 2020) and contribute to decreases in sexual satisfaction, while texting and social media mediums may provide couples in LDRR with an opportunity for TMSI that better accommodates their long-distance needs. As such, individuals and their partners navigating the challenges of a LDRR may find that TMSI fosters sexual satisfaction, a central dimension of relationship quality and stability.



## TABLES AND FIGURES

**Table 1**

*Demographic Characteristics of Study Sample (N=73 Couples)*

	Women		Men	
	<i>n</i>	%	<i>n</i>	%
<u>Racial Identity</u>				
White	33	45.2	29	39.7
Black/African	4	5.5	2	2.7
East Asian	13	17.8	22	30.1
Latinx	5	6.8	3	4.1
East Indian/South Asian	9	12.3	6	8.2
Middle Eastern	2	2.7	3	4.1
First Nations	1	1.4	0	0
Other	6	8.2	5	8.6
<u>Sexual Orientation</u>				
Heterosexual	64	87.7	57	78.1
Bisexual	3	4.1	10	13.7
Gay	1	1.4	0	0
Other	1	1.4	2	2.7
Missing	4	5.5	4	5.5
<u>Education Level</u>				

Below Highschool	2	2.7	0	0
Highschool or GED	21	28.8	21	28.8
Associates Degree	5	6.8	4	5.5
Bachelor's degree	26	35.6	32	43.8
Post-graduate degree	13	17.8	11	15.1
Other	6	8.2	4	5.5

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**Table 2***Correlations of Total TMSI at each Time Point for Men and Women*

		1	2	3	4	5	6	7	<i>n</i>	<i>M</i>	<i>SD</i>
1	T1 Women	-							73	3.38	1.86
2	T2 Women	.66**	-						65	3.60	1.85
3	T3 Women	.60**	.55**	-					48	3.14	1.69
4	T4 Women	.47**	.45**	.57**	-				45	3.01	1.74
5	T1 Men	.71**	.46**	.37**	.54**	-			73	3.69	1.94
6	T2 Men	.53**	.47**	.28**	.33*	.65**	-		64	3.64	1.82
7	T3 Men	.57**	.44**	.41**	.42**	.68**	.72**	-	53	3.33	1.85
8	T4 Men	.52**	.49**	.56**	.53**	.60**	.67**	.74**	45	3.30	1.87

*Note.* TMSI = Technology mediated sexual interaction. T1= Time 1; T2= Time 2; T3= Time 3; T4= Time 4.

\* $p < .05$ . \*\* $p < .01$  (2-tailed).

**Table 3***Proportions of Missing Data Over Time by Gender*

	Women (%)	Men (%)
<b>Time 1</b>		
Sexual Satisfaction	0 (0%)	0 (0%)
TMSI	0 (0%)	0 (0%)
Text TMSI	1 (1.7%)	1 (1.7%)
Video TMSI	2 (3.4%)	2 (3.4%)
Voice TMSI	9 (15.5%)	12 (20.7%)
Social Media TMSI	3 (5.2%)	6 (10.3%)
<b>Time 2</b>		
Sexual Satisfaction	7 (9.6%)	24 (32.9%)
TMSI	7 (11.0%)	9 (12.3%)
Text TMSI	9 (15.5%)	11 (19.0%)
Video TMSI	7 (12.1%)	10 (17.2%)
Voice TMSI	17 (29.3%)	17 (29.3%)
Social Media TMSI	10 (17.2%)	13 (22.4%)
<b>Time 3</b>		
Sexual Satisfaction	24 (32.9%)	20 (27.4%)
TMSI	25 (34.2%)	20 (27.4%)
Text TMSI	20 (34.5%)	17 (29.3%)
Video TMSI	20 (34.5%)	10 (17.2%)
Voice TMSI	26 (44.8%)	26 (44.8%)

Social Media TMSI	23 (39.7%)	19 (32.8%)
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Time 4

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Sexual Satisfaction	27 (37.0%)	27 (37.0%)
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TMSI	28 (38.4%)	28 (38.4%)
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Text	24 (41.4%)	25 (43.1%)
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Video	23 (39.5%)	24 (41.4%)
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Voice	33 (56.9%)	32 (55.2%)
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Social Media	29 (50.0%)	25 (43.1%)
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*Note.*  $N = 73$  couples; TMSI = Technology mediated sexual interaction; Video TMSI = TMSI using video calling; Social Media TMSI = TMSI using social media; Text TMSI = TMSI using text messaging; Voice TMSI = TMSI using voice calling; Sexual Satisfaction = measured by the Quality of Sex Inventory. Missing data is calculated as a percentage of the total sample size ( $N = 73$ ).

**Table 4***Demographic Information for Participants at Each Time Point*

	Women			Men		
	<i>n</i>	Mean	<i>SD</i>	<i>n</i>	Mean	<i>SD</i>
Time 1						
Age	73	25.18	7.45	73	24.53	7.09
Income (CAD)	67	22982.76	29311.93	61	21770.75	23425.64
Long-distance Length	55	1.61	1.53	55	1.61	1.53
Relationship Length	73	2.75	2.11	73	2.75	2.11
Time 2						
Age	73	25.18	7.45	73	24.53	7.09
Income (CAD)	67	22982.76	29311.93	61	21770.75	23425.64
Long-distance Length	55	1.61	1.53	55	1.61	1.53
Relationship Length	73	2.75	2.11	73	2.75	2.11
Time 3						
Age	65	25.37	7.23	64	24.67	1.37
Income (CAD)	61	23804.46	30372.99	54	22778.52	24561.37
Long-distance Length	50	1.62	1.58	49	1.64	1.59
Relationship Length	65	2.88	2.12	64	2.82	2.29
Time 4						
Age	44	34.91	7.10	44	24.91	7.10
Income (CAD)	41	20920.66	18980.99	41	20920.65	18980.99

Long-distance Length	36	1.53	1.37	36	1.534	1.37
Relationship Length	44	2.78	2.06	44	2.78	2.21

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*Note.* Age = age of the participant; Income (CAD) = reported annual income in Canadian Dollars; Long-distance Length = the length of time of the current relationship has been long-distance in years; Relationship Length = the length of the current relationship in years.

**Table 5***Means, Standard Deviations of Study Variables at Each Time Point and MANOVA**Analysis of Mean Differences by Gender*

	Women		Men	
	<i>M(n)</i>	<i>SD</i>	<i>M(n)</i>	<i>SD</i>
T1 TMSI	3.38 (73)	1.86	3.69 (73)	1.94
T2 TMSI	3.64 (65)	1.85	3.65 (64)	1.82
T3 TMSI	3.14 (48)	1.70	3.33 (53)	1.85
T4 TMSI	3.01 (45)	1.74	3.30 (45)	1.87
T1 Video TMSI	3.70 (71)	2.23	3.80 (71)	2.17
T1 Text TMSI	4.20 (70)	2.44	4.34 (70)	2.50
T1 Voice TMSI	2.72 (61)	2.27	3.29 (59)	2.22
T1 Social Media TMSI	3.03 (69)	2.43	3.42 (66)	2.32
T2 Video TMSI	4.14 (64)	2.20	3.90 (61)	2.06
T2 Text TMSI	4.35 (60)	2.32	4.25 (60)	2.38
T2 Voice TMSI	3.25 (51)	2.30	3.19 (52)	2.18
T2 Social Media TMSI	2.77 (61)	2.36	3.02 (57)	2.19
T3 Video TMSI	3.50 (47)	2.23	3.35 (52)	2.18



T3 Text TMSI	3.64 (45)	2.27	4.06 (50)	2.26
T3 Voice TMSI	2.74 (39)	1.98	3.10 (40)	2.16
T3 Social Media TMSI	2.68 (41)	2.18	2.56 (49)	2.39
T4 Video TMSI	3.14 (44)	2.09	3.72 (43)	2.24
T4 Text TMSI	3.69 (42)	2.17	3.81 (42)	2.39
T4 Voice TMSI	2.45 (33)	2.11	2.88 (34)	2.18
T4 Social Media TMSI	2.81 (37)	2.01	2.88 (42)	2.20
T1 SS	29.45(73)	6.69	30.16(73)	6.32
T2 SS	28.59(66)	7.57	29.51(66)	6.09
T3 SS	28.61(49)	7.14	29.17(53)	6.67
T4 SS	27.39(46)	7.31	29.55(46)	6.49

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MANOVA Analysis

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	df	F value	P value	Wilk's $\Lambda$	$\eta^2$
TMSI	4	.125	.973	.994	.006
Video TMSI	4	.860	.492	.958	.042
Social Media TMSI	4	.064	.992	.996	.004
Text TMSI	4	.40	.808	.978	.022
Voice TMSI	4	.177	.949	.986	.014

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*Note.*  $n = 146$ ; T1 = Time one; T2 = Time two; T3 = Time 3; T4 = Time 4; TMSI = Technology mediated sexual interaction; Video TMSI = TMSI using video calling; Social Media TMSI = TMSI using social media; Text TMSI = TMSI using text messaging; Voice TMSI = TMSI using voice calling; SS = Sexual Satisfaction.

**Table 6**

*Average Change in Sexual Satisfaction and TMSI Over Time*

	<i>B</i>	<i>SE</i>	<i>t</i>
Sexual Satisfaction (QSI)			
Intercept	30.03***	0.61	49.01
Time <sub>(T)</sub>	-7.57	4.93	-1.54
Time <sup>2</sup> <sub>(T)</sub>	4.19	5.34	0.79
TMSI			
Intercept	3.58***	0.15	23.68
Time <sub>(T)</sub>	-1.61	1.51	-1.06
Time <sup>2</sup> <sub>(T)</sub>	1.34	1.63	0.82

*Note.*  $N = 73$ ; QSI = Quality of Sex Inventory-Satisfaction; TMSI = Technology mediated sexual interaction. No gender differences were present.

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

**Table 7***Contemporaneous Associations Between TMSI on Sexual Satisfaction*

	B	SE	t
Sexual Satisfaction (QSI)			
Intercept	29.85***	.69	1.02
Time <sub>(T)</sub>	-.40*	.18	-2.19
Actor Frequency of TMSI	.99***	.16	5.88
Partner Frequency of TMSI	-.21	.17	-1.30

*Note.*  $N = 73$ ; QSI = Quality of Sex Inventory-Satisfaction; TMSI = Technology mediated sexual interaction.

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

**Table 8***Time-Lagged Associations of TMSI on Sexual Satisfaction*

	B	SE	t
Sexual Satisfaction <sub>(T+1)</sub> (QSI)			
Intercept	29.60	0.71	41.77
Time <sub>(T+1)</sub>	-.39	2.8	-1.41
Actor Frequency of TMSI <sub>(T)</sub>	-.15	.21	-.71
<b>Partner Frequency of TMSI<sub>(T)</sub></b>	<b>.68**</b>	.22	3.18

*Note.*  $N = 73$ ; QSI = Quality of Sex Inventory-Satisfaction; TMSI = Technology mediated sexual interaction.

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

**Table 9**

*Contemporaneous Association of Gender Differences of the Frequency of each Medium of TMSI on Sexual Satisfaction*

	Women			Men		
	Sexual Satisfaction (QSI)					
	<i>B</i>	<i>SE</i>	<i>t</i>	<i>B</i>	<i>SE</i>	<i>t</i>
Intercept	30.82***	1.37	1.23	32.30***	1.31	2.40
Time <sub>(T)</sub>	-.58	.30	-1.89	-1.23**	.426	-2.89
<u>Actor Effects</u>						
Video TMSI	.203	.40	.51	.71	.36	1.97
<b>Social Media TMSI</b>	.71**	.31	2.31	.41	.33	1.27
<b>Texting TMSI</b>	.70**	.27	2.58	.35	.34	1.01
Voice TMSI	-.29	.32	-.91	.24	.34	.71
<u>Partner Effects</u>						
<b>Video TMSI</b>	-.92**	.28	-3.34	-.07	.48	-.157
Social Media TMSI	-.02	.25	-.085	-.63	.36	-1.73
Texting TMSI	-.12	.29	-.40	-.22	.33	-.69
<b>Voice TMSI</b>	.86**	.28	3.08	-.01	.33	.02

*Note.* Model controlling for age, relationship length, length of long-distance relationship

TMSI = Technology mediated sexual interaction; Video TMSI = TMSI using video calling; social media TMSI = TMSI using social media; Text TMSI = TMSI using text

messaging; Voice TMSI = TMSI using voice calling; QSI = Quality of Sex Inventory-Satisfaction.

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

**Table 10**

*Time-Lagged Associations of Gender Differences of the Direct Effects of Frequency of each Medium of TMSI on Subsequent Sexual Satisfaction*

	Women			Men		
	B	SE	t	B	SE	t
<b>Model Controlling for Age, Relationship Length, Length of long-distance relationship</b>						
Intercept	29.00	1.91	15.16	33.66	3.43	9.81
Time <sub>(T+1)</sub>	3.25	6.69	.49	-27.97	18.03	-1.55
<u>Actor Effects</u>						
Video TMSI	-1.44***	.37	-3.92	.81	.66	1.24
Social Media TMSI	.57	.37	1.54	-.82	.48	-1.71
Texting TMSI	-.31	.36	-.88	-.11	.45	-.24
Voice TMSI	.58	.39	1.50	.12	.53	.24
<u>Partner Effects</u>						
Video TMSI	1.16	.60	1.94	-.02	.55	-.04
Social Media TMSI	.32	.41	.79	.20	.46	.43
Texting TMSI	.53	.36	1.46	-.19	.45	-.43
Voice TMSI	-.38	.54	-.713	.85	.50	1.72

*Note.* Model Controlling for Age, Relationship Length, Length of the long-distance relationship

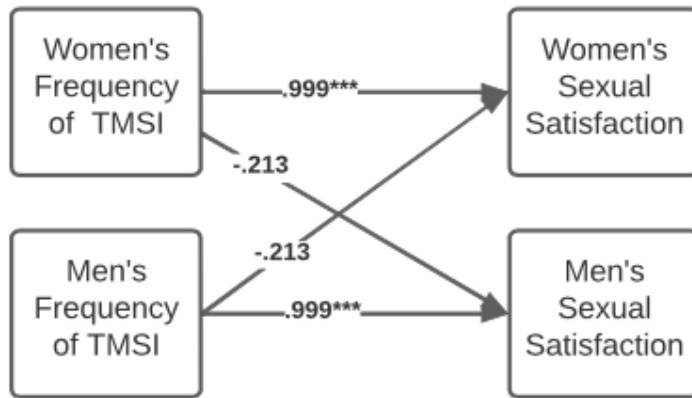
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TMSI = Technology mediated sexual interaction; Video TMSI = TMSI using video calling; Social Media TMSI = TMSI using social media; Text TMSI = TMSI using text messaging; Voice TMSI = TMSI using voice calling; QSI=Quality of Sex Inventory-Satisfaction.

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

**Figure 1**

*Actor-Partner Effects of Frequency of TMSI use on Sexual Satisfaction*



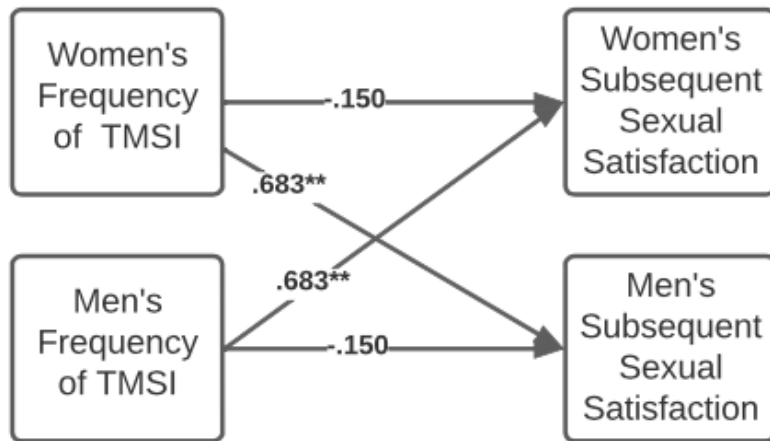
*Note.* There were no gender differences for frequency of TMSI use. All effects remain significant when controlling for age, the length of the long-distance relationship, the length of the relationship, and the amount of in-person contact between partners.

$N = 73$ ; \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



**Figure 2**

*Actor-Partner Effects of Frequency of TMSI use on Subsequent Sexual Satisfaction*

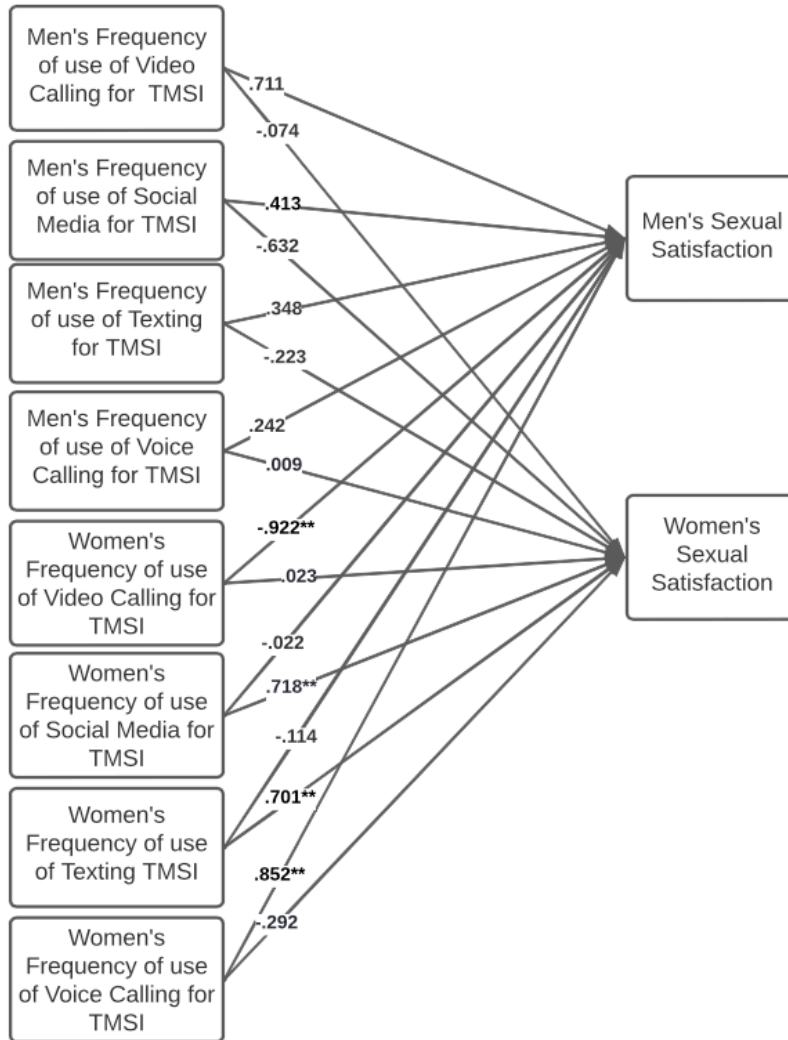


*Note.* No gender effects were found, results remained significant when controlling for age, the length of the long-distance relationship, the length of the relationship, and the amount of in-person contact between partners.

$N = 73$ ;  $*p < .05$ .  $**p < .01$ .  $***p < .001$ .

**Figure 3**

*Frequency of use of each TMSI Medium on Sexual Satisfaction*

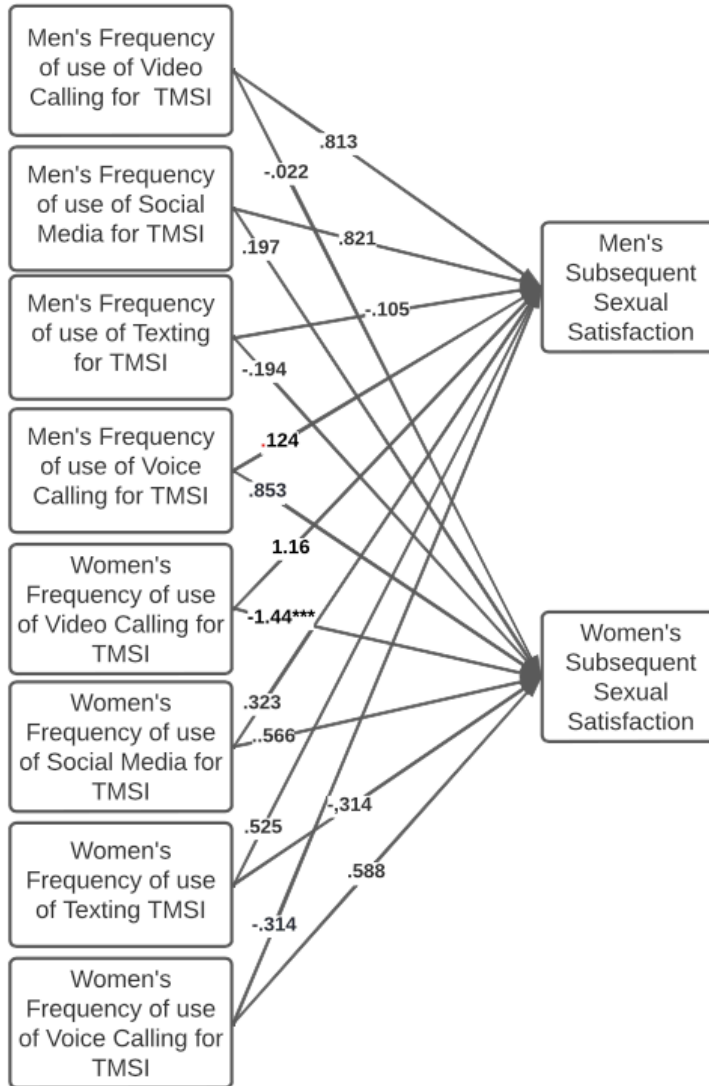


*Note:* Age, length of the long-distance relationship, and length of the relationship were controlled in this model.

*N*=73; \**p*<.05, \*\**p*<.01, \*\*\**p*<.001.

**Figure 4**

*Frequency of use of each TMSI Medium on Subsequent Sexual Satisfaction*



*Note:* This model was run controlling for the covariates of age, the length of the long-distance relationship, and the length of the relationship.

*N* = 73; \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

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