**Long-distance Texting:
Text Messaging Predicts Relationship Satisfaction in Long-distance Relationships**

Susan Holtzman,^{1*} Kostadin Kushlev,² Alisha Wozny,¹ Rebecca Godard¹

¹Department of Psychology, University of British Columbia, Kelowna, BC, Canada

²Department of Psychology, Georgetown University, Washington, DC, United States

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*Corresponding Author:

Susan Holtzman, Ph.D., R.Psych.
ASC 283, 3187 University Way
Department of Psychology
University of British Columbia
Kelowna, BC, Canada
V1V 1V7
Phone: (250) 807-8730
Email: susan.holtzman@ubc.ca

Abstract

Thanks to the widespread use of smartphones, romantic couples can connect with their partners from virtually anywhere, at any time. Remote communication may be particularly important to long-distance relationships (LDRs), compared to geographically close relationships (GCRs). The goals of the current research were to examine differences between LDRs and GCRs in (1) the patterns of remote communication (video calls, voice calls and texting), and (2) how frequency and responsiveness of remote communication are related to relationship satisfaction. Data were drawn from an online survey of emerging adults ($n = 647$) who were in a relationship or dating someone (36.5% were in an LDR). Participants in LDRs engaged in more frequent video calling, voice calling and texting, compared to those in GCRs. LDR participants also perceived their partners to be more responsive during video and voice calls, compared to GCR participants. More frequent and responsive texting predicted significantly greater relationship satisfaction among participants in LDRs, but not GCRs. Meanwhile, frequency of voice calls was associated with greater relationship satisfaction in GCRs, but not in LDRs. The use of video calls was not related to relationship satisfaction in either group. Overall, study findings add to a sparse literature on remote communication in romantic couples and suggest a uniquely positive role of texting within LDRs. Further research is needed to examine the ways in which LDR and GCR couples can best capitalize on different forms of remote technology to maintain their relationships during periods of separation.

Keywords: long-distance relationships, romantic relationships, relationship satisfaction, couples, computer-mediated communication, smartphones, technology, text messaging

Long-Distance Texting: Text Messaging Predicts Higher Relationship Satisfaction in Long-Distance Relationships

Thanks to the widespread adoption of smartphone devices ("Mobile fact sheet", 2019; O'Dea, 2020) romantic couples now have the ability to connect with their partners from virtually anywhere, at any time. As a result, couples are able to share, in real-time, the various aspects of their daily life, from the most mundane to the most meaningful (Boyle & O'Sullivan, 2016). Although people in long-distance relationships (LDRs) typically use video-chatting, voice calls, and text messaging out of necessity, these forms of remote communication have also become commonplace in couples who are in geographically close relationships (GCRs; Forgays et al., 2014). In the current study, we set out to examine a notable gap in the sparse literature on remote communication in romantic couples (Murray & Campbell, 2015; Norton et al., 2018) by comparing the costs and benefits of remote communication in LDRs versus GCRs.

Long-distance relationships (LDRs) make up a significant and increasing proportion of romantic relationships in our society ("Family matters", 2019). The highest prevalence of LDRs is among university students and emerging adults, with estimates ranging from 30% to 50% (Aylor, 2003; Roberts & Pistole, 2009; Waterman et al., 2017). Contrary to popular belief, relationship satisfaction among LDRs tends to be as high as it is among GCRs (Billedo et al., 2015; Dargie et al., 2015; Goldsmith & Byers, 2018; Roberts & Pistole, 2009). However, the factors that contribute to a satisfying romantic relationship may be somewhat different (Lee & Pistole, 2012). According to Merolla's (2012) model of long-distance relationship maintenance, the remote interactions that LDR couples have with their partners during periods of separation are one of the strongest predictors of relationship satisfaction. Thus, our goals in the present research were to examine (1) whether patterns of remote communication differ between GCRs and LDRs, and (2) how frequency and responsiveness of remote communication may be related to relationship outcomes in GCRs versus LDRs.

The Use of Remote Communication Among Romantic Couples

For centuries, hand-written letters were the primary means through which couples could stay connected during periods of geographic separation. As recently as the 1990s, the landline was the most commonly used way for couples to communicate when they were not able to see each other in person (Carter & Renshaw, 2016). While hand-written letters

have become almost unheard of (Janning & Christopherson, 2015), the vast majority of romantic couples still use voice calls at least some of the time (Belus et al., 2019). However, recent statistics reflect a sharp decline in the use of landlines in favor of mobile phones and smartphones ("Mobile fact sheet", 2019). In fact, over 80% of adults, and 96% of emerging adults, living in the United States own a smartphone ("Mobile fact sheet", 2019).

Along with the rise in popularity of smartphones has come a rise in popularity of text messaging. In fact, text messaging is now widely reported to be the most commonly used function on mobile devices ("Mobile fact sheet", 2019). The popularity of text messaging is mirrored in romantic couples, with numerous studies ranking it as the most frequently used form of mobile communication (Morey et al., 2013). For example, in a large online survey of adults in romantic relationships, text messaging was the most frequently used communication medium—even compared to face-to-face interactions (Wardecker et al., 2016). The majority of young adults check in with their romantic partner multiple times a day via text (Schade et al., 2013). In one study, college students in dating relationships spent more than an hour a day texting with their partners, with 95% texting with their partner in the past 3 days; in contrast, only a quarter (27%) called their partners via mobile phone and only one out of seven had video called (Boyle & O'Sullivan, 2016).

Texting appears to be the most common method of communication for long-distance couples as well, and younger adults in LDRs seem to rely more heavily on video calls than voice calls (Belus et al., 2019; Hampton et al., 2017). In addition, some evidence suggests that video calling is more common in LDRs than GCRs, whereas phone calls and digital messaging are used with similar frequency across LDRs and GCRs (Janning et al., 2018; Stafford & Merolla, 2007). In a daily diary study that directly compared communication in people who were in GCRs versus LDRs, those in LDRs engaged in both longer and more frequent communication across modalities: video calls, phone calls, and text messaging (Jiang & Hancock, 2013).

Taken together, emerging research highlights the popularity of text messaging in romantic relationships in general, and within LDRs specifically. Yet, few studies have directly compared people in LDRs and GCRs in terms of how often they use remote communication in their daily life. Importantly, the

most recent studies that directly compared communication in LDRs and GCRs were based on data collected in and before 2013, limiting the conclusions we can draw today given a rapidly evolving communication technology landscape (Anderson, 2019; Heimlich, 2010; Lenhart, 2012). Thus, the first aim of the current study was to test for differences between people in GCRs and LDRs in terms of how often they use remote communication to interact with their romantic partners. Due to the lack of opportunities for in-person interaction in LDRs, we hypothesized that those in LDRs would report more frequent texting, voice calling, and video calling compared to those in GCRs, with the biggest difference expected for video calling.

Perceived Responsiveness in Remote Communication

In addition to the frequency of remote communication, another important dimension to consider is the perceived responsiveness of partners during these remote interactions. Broadly speaking, perceived partner responsiveness refers to a way of responding that communicates understanding, validation and warmth—long considered a critical ingredient for intimacy and satisfaction in close relationships (Laurenceau et al., 1998; Reis & Shaver, 1988). Within the realm of remote communication, couples have expectations for how they would like to communicate with each other through their mobile phones (Hall et al., 2014). Romantic couples tend to expect a higher degree of responsiveness from their partners compared to other close relationships (e.g., close friends, family; Forgays et al., 2014). Since remote communication plays such an integral role in the maintenance of LDRs (Aylor, 2003), expectations for responsiveness may be even higher in this context. On one hand, these higher expectations may translate into better communication quality (Stafford & Merolla, 2007) and greater perceived responsiveness (Jiang & Hancock, 2013). However, LDR couples are also more likely to be leading asynchronous lives (e.g., different schedules, time zones), making it difficult to meet partners' expectations for responsiveness.

These conflicting scenarios provided the rationale for our second study aim, which was to test for differences between people in GCRs and LDRs in terms of how responsive they perceive their partners to be via remote communication. We put forth two competing hypotheses: (1) that higher expectations and commitment to remote communication will create more positive perceptions of partner responsiveness, and (2) that higher expectations may set couples up for disappointment, leading to lower satisfaction with partner responsiveness.

Remote Communication as a Predictor of Relationship Satisfaction

Ample research supports the notion that frequent and responsive communication can have a strongly beneficial impact on relationship satisfaction among romantic couples (Rehman & Holtzworth-Munroe, 2007; Vangelisti & Huston, 1994). However, the vast majority of this research has been conducted prior to the rise of mobile and smartphone technologies and presumes physical presence during couples' interactions. Of the various forms of remote communication, voice calls have been most consistently tied with positive relationship outcomes (Dainton & Aylor, 2002; Goodman-Deane et al., 2016). For example, a survey of college students found that more frequent mobile phone calls were associated with significantly greater feelings of love, commitment and relationship certainty (Jin & Peña, 2010). Qualitative research has also revealed perceived benefits of talking on the phone with romantic partners, such as the ability to express caring and concern and feel connected (Hertlein & Chan, 2020). In the close relationships literature more broadly, research has demonstrated the powerful effect of hearing a loved one's voice on feelings of emotional closeness and physiological markers of stress and social bonding (Seltzer et al., 2012).

Text messaging provides couples with a fast, convenient, and discrete way of staying in perpetual contact (Coyne et al., 2011; Pettigrew, 2009). However, despite its popularity and numerous affordances, evidence for the benefit of text messaging for relationship satisfaction is mixed. While some studies have found that frequent texting is linked with positive relationship outcomes (Luo & Tuney, 2015), others have reported null or even negative effects (Goodman-Deane et al., 2016; Jin and Peña, 2010; Luo, 2014). Negative effects are often attributed to the lack of verbal and nonverbal cues and the greater potential for misunderstandings (Culnan & Markus, 1987; Goodman-Deane et al., 2016). A greater benefit appears to lie in the use of texting for relationship maintenance, such as providing assurances, expressing affection and appreciation for the relationship, and emotional communication (Brody & Peña, 2015; Slatcher et al., 2008). When conceptualized in this manner, texting has been linked with higher ratings of partner accessibility and engagement (Schade et al., 2013), less conflict in face-to-face interactions (Novak et al., 2016) and higher relationship satisfaction (Brody & Peña, 2015; Coyne et al., 2011).

Video chatting offers its own unique affordances; most notably the ability to see and hear one's partner in real-time (Hertlein & Chan, 2020). However, this technology has only recently become widely available, and research remains in its infancy.

There are some indications that video-chatting is related to greater relationship satisfaction (Goodman-Deane et al., 2016; Hampton et al., 2017; Janning et al., 2018). However, a number of downsides have been documented, including scheduling challenges, technical difficulties, and a lack of privacy (Hertlein & Chan, 2020). From the perspective of the hyperpersonal model (Walther, 1996), it has also been argued that video chatting reduces an individual's capacity for positive self-presentation (Carter & Renshaw, 2016; Coyne et al., 2011; Rabby & Walther, 2003; Walther, 1996, 2007). Particularly compared to texting, it is more challenging to hide negative feelings (e.g., stress, frustration, jealousy, disappointment) that may lead to negative partner evaluations and reduced relationship satisfaction (Milek et al., 2015; Swaab et al., 2012).

Putting Remote Communication into Context

In the age of the smartphone, both LDR and GCR couples are likely to be frequent users of remote communication. However, there are a number of reasons to expect a more beneficial effect on relationship satisfaction among LDR couples. According to electronic propinquity theory (Korzeny, 1978), mediated communication has the capacity to generate feelings of emotional closeness, resulting in a net benefit when partners do not have an alternative means of communication (Kushlev et al., 2019; Kushlev & Leita, 2020). In support of this theory, a lab experiment showed that texting was significantly more satisfying when people did not feel that they had any other option to communicate (Walther & Bazarova, 2008). First and foremost, then, remote communication may have a more positive impact among LDR couples because they are typically using it out of necessity, not out of choice.

Second, people in LDRs may use remote communication more intentionally to create a feeling of being together in physical space (Oh et al., 2018). Qualitative research has revealed that the online world (including texting, phone calls and video conferencing), may serve as a couples' "shared space" when they are unable to be in close physical proximity (Kolozsvari, 2015). For example, through qualitative interviews, Greenberg & Neustaedter (2013) found that LDR couples would often run a video-conferencing platform in the background while engaging in other tasks, and that this helped to create a "virtual co-presence" and enhanced feelings of intimacy. Perhaps for this reason, Skype has been found to be a significant predictor relationship satisfaction for people in LDRs (Hampton et al., 2017).

Third, smartphones can enable LDR couples to engage in the same type of "mundane" day-to-day

interactions that have been previously reserved for people in GCR, and that are critical for the maintenance of close relationships (Duck, 1994; Duck & Pittman, 1994). In a survey of college students, disclosure to one's partner about a range of topics via CMC (and not the depth of those topics) was associated with greater perceptions of intimacy within their relationship (Boyle & O'Sullivan, 2016).

Emerging research highlights the pressing need for a more nuanced consideration of the contexts in which mobile communication occurs (McFarland & Ployhart, 2015) and how this may play out in romantic relationships specifically (Norton et al., 2018). Thus, the third and final aim of the current study was to examine the association of the frequency and responsiveness of remote communication with relationship satisfaction, and to determine whether this association may vary based on GCR or LDR status. Based on the literature in this area, we hypothesized that greater frequency and greater responsiveness of all three forms of remote communication would be related to higher relationship satisfaction. As argued above, we further hypothesized that greater frequency and responsiveness of remote communication would be more strongly linked to relationship satisfaction within the context of LDRs, compared to GCRs.

Method

Procedure and Participants

A large sample of emerging adults ($N = 1496$) completed an online survey investigating computer-mediated communication and wellbeing. A focus on emerging adults in the study of remote communication is well-justified. Emerging adults were recruited via a psychology research subject pool at a mid-sized Canadian university and received course credit for participating. Data was collected between March 2017 and April 2018, with a stopping rule of the end of the school year. To be eligible, participants were required to (a) be between the ages of 18-25, (b) own a cell phone, (c) have sent and/or received a text from that cell phone during the past seven days, and (d) be fluent in English. To be included in the current study, participants were also required to be dating someone or in a relationship. Participants who were single, married/common law, or separated/divorced were excluded from the analyses presented here.

The final sample consisted of 647 emerging adults. Sensitivity analyses showed that our sample size gave us 80% power to detect small effect sizes ($p = .11$). The sample was 73.6% female with a mean age of 19.75 ($SD = 1.55$). The majority were Canadian-born (78.3%) and reported a European/White ethnicity (71.9%). Approximately three-quarters (76.7%) of the 647 participants were in a relationship, and 23.3%

were dating someone. Relationship duration was available for a subset (36%) of the sample. The mean relationship duration was 23.31 months ($SD = 17.46$) and 16.72 months ($SD = 15.18$) for those in a relationship and dating someone, respectively. This was a predominantly heterosexual (93.7%) sample, and the remainder identified as gay/lesbian (0.9%), bisexual (4.0%), and other identities (1.4%). Over one-third (36.5%) of the sample was in a long-distance relationship, which we defined as “unable to see each other, in-person, on a frequent basis due to geographical separation.”

Measures

Participants completed a battery of questionnaires about their use of digitally-mediated communication, social relationships, wellbeing, and demographics. Only those measures included in the current study are described below.

Participants were asked to indicate how often they communicate with their romantic partner using video calls (e.g., Skype, Facetime), voice calls, and text messaging using a six-point Likert scale, ranging from never to very frequently. Participants also indicated how responsive their partner is when communicating through video calls, voice calls and texting using a six-point Likert scale, ranging from not at all to extremely. The Relationship Assessment Scale (RAS) was used to measure overall relationship satisfaction (Hendrick, 1988). It consists of seven items, each rated on a five-point Likert scale, with higher ratings reflecting higher relationship satisfaction. The RAS is considered appropriate for use in a variety of different types of romantic relationships and has demonstrated excellent reliability and validity in past research (Vaughn & Matyastik Baier, 1999). Cronbach's alpha for the RAS was .87 in the current study. Demographic information, including age, gender, sexual orientation, relationship status, ethnicity, and country of birth was also collected from participants.

Table 1
Descriptive Statistics and Correlations among Study Variables (N = 647)

Variable	1	2	3	4	5	6	7	Total Sample Mean (SD)	LDR Sample Mean (SD)	GCR Sample Mean (SD)
1. Frequency Video Chat	-							3.83 (1.38)	4.67 (1.25)	3.35 (1.20)
2. Frequency Voice Call	.33***	-						4.60 (1.08)	4.83 (1.06)	4.47 (1.07)
3. Frequency Text Messaging	.19***	.25***	-					5.50 (0.74)	5.61 (0.73)	5.44 (0.74)
4. Responsiveness Video Chat	.52***	.30***	.19***	-				3.71 (1.31)	4.10 (1.11)	3.49 (1.36)
5. Responsiveness Voice Call	.20***	.47***	.18***	.53***	-			4.09 (0.99)	4.22 (0.98)	4.01 (0.98)
6. Responsiveness Text Messaging	.14**	.10*	.42***	.29	.36***	-		4.05 (.092)	4.13 (0.90)	4.00 (0.93)
7. Relationship Satisfaction	.04	.12**	.11**	.22***	.28***	.18***	-	29.47 (5.02)	29.29 (5.28)	29.57 (4.87)
8. LDR Status ^a	.46***	.16***	.11**	.23***	.10*	.06	-			
							.03			

Note. ^aLong Distance Relationship (LDR) = 1, Geographically Close Relationship (GCR) = 0. Correlations are Pearson's correlations except for those involving LDR status, which are point-biserial correlations.

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

Results

Preliminary Analyses

For both long distance and geographically close relationships, text messaging was the most frequently used form of remote communication, followed by voice calls and then video calls (for descriptive statistics and correlations see Table 1). An initial examination of the distribution statistics for the study variables revealed five outliers on the relationship satisfaction variable and four outliers on the texting frequency variable (defined as $z \geq 3.29$). To determine whether these had a significant impact on the main study findings, we ran the main analyses (bivariate analyses and multiple regression) after adjusting the outlying data points to the next highest value in the sample (Tabachnick & Fidell, 2019). Likely owing to our large sample size (Field, 2018), there was no meaningful difference in the results obtained using these adjusted values (see Tables S1 and S2 in the Supplemental Online Materials). Therefore, all analyses presented below were conducted using the raw, unadjusted data.

Main Analyses

Aim 1: To Test for Differences between LDRs and GCRs in Frequency of Remote Communication. To test Hypothesis 1, we examined point-biserial correlations between LDR status (LDR vs. GCR) and the frequency of video calling, voice calling, and texting (see Table 1). Consistent with our hypothesis, participants in LDRs used all three remote communication modes more frequently than participants in GCRs. This effect was largest for video calling ($r_{pb} = .46$), followed by voice calling ($r_{pb} = .16$) and texting ($r_{pb} = .11$).

Aim 2: To Test for Differences between LDRs and GCRs in Perceived Responsiveness of Remote Communication. To test the hypothesis that people in LDRs perceive their partners to be more responsive in remote communication, we examined point-biserial correlations between LDR status and perceived responsiveness during video calling, voice calling, and texting (see Table 1). Consistent with our hypothesis, there were significant positive correlations between LDR status and both video calling ($r_{pb} = .23$) and voice calling ($r_{pb} = .10$), indicating that participants in LDRs (vs. GCRs) view their partners as more responsive when using these two remote communication modes. However, contrary to expectations, there was no significant association between LDR status and texting responsiveness ($r_{pb} = .06$).

Aim 3: To Examine the Association between Remote Communication and Relationship Satisfaction, and the Moderating Role of LDR Status. First, we conducted a multiple linear regression analysis using relationship satisfaction as the outcome variable and LDR status (LDR = 1, GCR = 0), frequency of remote communication (texting, voice calling, and video calling; mean centered), and three interaction terms (LDR status x centered frequency variables; Aiken & West, 1991) as predictors (see Table 2). Model 1 contained a non-significant main effect of LDR status (partial $r = -.03$). Model 2 contained significant main effects for texting frequency (partial $r = .10$) and voice calling frequency (partial $r = .09$), but not video calling frequency (partial $r = .01$).

In Model 3, we added the interaction terms between LDR status and frequency of the three types of remote communication. In line with our hypotheses, all three interactions were significant (video calling: partial $r = .08$, voice calling: partial $r = -.08$, texting: partial $r = .09$), suggesting that the association between frequency of remote communication and relationship satisfaction varied significantly based on LDR status. However, the specific nature of the interactions was not all as anticipated. Simple slopes plots (see Figure 1) revealed that higher texting frequency was associated with greater relationship satisfaction in LDRs ($b = 1.46$, $SE = .47$, $p = .002$, partial $r = .20$), but not GCRs ($b = .10$, $SE = .33$, $p = .75$, partial $r = .02$). In contrast, more frequent voice calling was associated with greater relationship satisfaction in GCRs ($b = .83$, $SE = .24$, $p = .001$, partial $r = .17$), but not LDRs ($b = -.01$, $SE = .33$, $p = .99$, partial $r = .00$). Finally, video calling was not significantly related to relationship satisfaction in either LDRs ($b = .46$, $SE = .40$, $p = .11$, partial $r = .11$) or GCRs ($b = -.26$, $SE = .21$, $p = .22$, partial $r = -.06$), although the relationships were in opposite directions. Fit statistics indicated that Models 2 and 3 both provided significant improvement compared to the previous model.

A parallel set of analyses tested the role of partner responsiveness. A multiple linear regression analysis included relationship satisfaction as the outcome variable and LDR status, responsiveness during remote communication, and the three interaction terms as predictor variables (see Table 3). Model 1 contained a non-significant effect of LDR status (partial $r = -.03$). In Model 2, perceptions of greater responsiveness when communicating through video calls (partial $r = .09$) and voice calls (partial $r = .18$) were related to significantly higher relationship satisfaction. However, there was no significant main effect of texting responsiveness (partial $r = .08$).

After adding the interaction terms in Model 3, a significant interaction emerged between LDR

status and texting responsiveness (partial $r = .10$). A simple slopes analysis (see Figure 1) revealed that greater responsiveness during texting was associated with higher relationship satisfaction in LDRs ($b = 1.03$, $SE = .40$, $p = .01$, partial $r = .17$), but not GCRs ($b = .11$, $SE = .27$, $p = .67$, partial $r = .02$). Thus, similar to texting frequency, texting responsiveness had a more positive effect for LDRs. However, unlike the results for video and voice calling frequency (and contrary to our hypotheses), the interactions between LDR status and video calling responsiveness (partial $r = -.03$) and voice calling responsiveness (partial $r = -.02$) were non-significant. Model 2 fit significantly better than Model 1, but Model 3 did not provide significant improvement over Model 2.

Exploratory Analyses

Emerging research suggests that, in the context of heterosexual couples, men and women may

differ in their preferences and styles of digital communication (Kimbrough et al., 2013; Schade et al., 2013). Therefore, we explored whether patterns and effects of remote communication differed for males and females in our sample. For ease of interpretation, these were conducted with participants who identified as being heterosexual ($n = 613$; 73.1% female). The full results are presented in the SOM (see Tables S3-S4). Compared to males, females reported more frequent voice calling ($r = .10$, $p = .01$) and perceived their partners to be less responsive when communicating through text ($r = -.09$, $p = .03$). A significant interaction emerged between gender and video call frequency, such that more frequent video calling was related to significantly lower relationship satisfaction among males ($b = -.73$, $SE = .30$, $p = .017$, partial $r = -.19$), but not females ($b = .16$, $SE = .18$, $p = .37$, partial $r = .04$, see Figure S1). No other gender differences emerged.

Figure 1. *Simple Slopes Plots for Interactions between LDR Status and Frequency and Responsiveness of Remote Communication on Relationship Satisfaction*

Table 2*Effects of Frequency of Remote Communication and LDR Status on Relationship Satisfaction*

	Model 1		Model 2		Model 3	
Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Fixed effects						
Intercept	29.57***	.25	29.69***	.26	29.56***	.26
LDR status (LDR=1, GCR=0)	-.276	.410	-.610	.458	-.811	.468
Video calling frequency			.037	.168	-.257	.214
Voice calling frequency			.483*	.195	.827**	.245
Texting frequency			.631*	.274	.104	.342
LDR status X video calling frequency					.712*	.343
LDR status X voice calling frequency					-.832*	.401
LDR status X texting frequency					1.355*	.566
	Estimate		Estimate		Estimate	
Fit statistics						
Adjusted R square	-.001		.019		.033	
F change	.45		5.35**		4.16**	

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

Table 3*Effects of Responsiveness During Remote Communication and LDR Status on Relationship**Satisfaction*

	Model 1		Model 2		Model 3	
Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Fixed effects						
Intercept	29.57***	.248	29.76***	.238	29.76***	.239
LDR status (LDR=1, GCR=0)	-.276	.410	-.781	.401	-.820*	.408
Video call responsiveness			.385*	.175	.385	.209
Voice call responsiveness			1.066***	.233	1.199***	.298
Texting responsiveness			.433	.211	.293	.228
LDR status X video call responsiveness					-.152	.385
LDR status X voice call responsiveness					-.298	.462
LDR status X texting responsiveness					1.139*	.453
	Estimate		Estimate		Estimate	
Fit statistics						
Adjusted R square	-.001		.092		.097	
F change	.45		22.87***		2.22	

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

Table 3*Effects of Responsiveness During Remote Communication and LDR Status on Relationship**Satisfaction*

	Model 1		Model 2		Model 3	
Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Fixed effects						
Intercept	29.57***	.248	29.76***	.238	29.76***	.239
LDR status (LDR=1, GCR=0)	-.276	.410	-.781	.401	-.820*	.408
Video call responsiveness			.385*	.175	.385	.209
Voice call responsiveness			1.066***	.233	1.199***	.298
Texting responsiveness			.433	.211	.293	.228
LDR status X video call responsiveness					-.152	.385
LDR status X voice call responsiveness					-.298	.462
LDR status X texting responsiveness					1.139*	.453
	Estimate		Estimate		Estimate	
Fit statistics						
Adjusted R square	-.001		.092		.097	
F change	.45		22.87***		2.22	

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

Discussion

A growing reliance on smartphone technologies for social interactions has triggered an onslaught of research into the social and mental health implications for individuals (Liu et al., 2019). Meanwhile, the empirical literature on mobile communication in romantic relationships remains sparse (Murray & Campbell, 2015; Norton et al., 2018). Although LDR couples have been finding ways to cultivate satisfying relationships long before the dawn of smartphones, results from the current study provide evidence for a uniquely beneficial role of frequent and responsive text messaging for people in LDRs (but not GCRs). These results run contrary to a substantial literature suggesting a null or even negative impact of frequent texting for relationships (Goodman-Deane et al., 2016; Jin & Peña, 2010; Luo, 2014), and highlight the critical need for researchers to consider the situational contexts in which couples use remote communication (Tong & Walther, 2011).

Remote Communication in LDRs versus GCRs

Consistent with our hypotheses, participants in LDRs reported more frequent use of texting, voice calls and video chatting to communicate with their romantic partners, compared to participants in GCRs. These findings were consistent with our hypotheses and replicate prior work by Jiang and Hancock (2013). Janning and colleagues (2018) also found a difference in video calling; however, not all studies have found a difference in the use of phone calls and digital messaging (Janning et al., 2018; Stafford & Merolla, 2007). These discrepancies could be related to our larger sample size (which provided the statistical power to detect small effects) as well as the more widespread use of smartphones at the time of our data collection.

Video calling is currently the only (widely available) technology that allows couples to interact face-to-face during periods of separation. Thus, it is not surprising that the largest difference between LDRs and GCRs was in their use of video calling. The greater use of phone calls also likely reflects LDR couples' attempts to compensate for their lack of in-person interactions. Although text messaging does not provide the same visual and auditory cues afforded by video and voice calls, people in LDRs may still use texting to help mimic the types of in-person interactions they would otherwise be having if they were living in close proximity. For example, sending short messages to say "good morning" and "good night," and sharing the mundane details of day-to-day experiences may serve to enhance the perception that one's partner is present and included in their daily lives (Masuda & Duck, 2002; Tong & Walther, 2011).

As anticipated, and in line with past research (Jiang & Hancock, 2013; Stafford & Merolla, 2007), we also found significant differences between LDRs and GCRs in terms of perceived partner responsiveness during remote communication. Similar to the findings for communication frequency, the differences between LDRs and GCRs were greatest for video calling, followed by voice calls. Particularly among LDR couples, there may be an implicit or explicit agreement regarding the importance of being responsive when using remote communication. However, contrary to our expectations, ratings of text messaging responsiveness did not differ between participants in LDRs and GCRs. Due to the quick, convenient, asynchronous nature of texting, the number of messages that a couple could conceivably exchange in a day is virtually limitless. Therefore, perceptions of text message responsiveness may be driven more by partners' similarity in texting preferences, rather than whether or not they are in an LDR (Ohadi et al., 2018). Satisfaction with texting responsiveness may also be influenced by relationship characteristics and individual difference variables. For example, in our exploratory analyses, females (compared to males) reported lower satisfaction with their partner's responsiveness when texting. This is consistent with previous research suggesting that females tend to text more frequently and with greater detail (Kimbrough et al., 2013; Schade et al., 2013), and perceive texting to be more intimate (Wardecker et al., 2016), compared to males.

The Link Between Remote Communication and Relationship Satisfaction

In the current study, we found strong support for our hypothesis that remote communication would be differentially related to relationship satisfaction, depending on whether participants were in an LDR or GCR. This was most evident for text messaging. Specifically, more frequent and responsive texting was associated with significantly greater relationship satisfaction among participants in LDRs, but not GCRs. Although the correlational nature of our data prevents causal inferences, the specific association between texting frequency (but not calling frequency) with relationship satisfaction in LDRs (but not GCRs) is difficult to explain solely by the effect of satisfaction on frequent texting. These findings were significant even after controlling for other forms of remote communication (i.e., video and voice calls), which adds further weight to the possibility of a uniquely positive role of text messaging within LDRs.

Although we did not capture the content of text messages, we suspect that couples in LDRs may be more likely to use texting in ways that will enhance intimacy and emotional connection, such as

expressing positivity and appreciation (Brody & Peña, 2015), sharing about a wide range of topics (Boyle & O'Sullivan, 2016), and sharing about the mundane details of daily life (Duck & Pittman, 1994). In contrast, GCR couples may be more likely to text about logistical matters, such as requesting information and coordinating social plans, which may not have the same relational benefit. Text messaging may afford unique benefits to couples who are separated for long periods, by allowing them to reminisce about a partner by re-reading texts (Carter & Renshaw, 2016), providing a sense of virtual co-presence (Greenberg & Neustaedter, 2013), and relationship continuity over time. For example, couples are able to exchange messages from the moment they separate (e.g., "miss you already") to the moment they reunite again (e.g., "almost there, can't wait to see you!").

A significant association between perceived partner responsiveness during voice calls and relationship satisfaction emerged for both LDRs and GCRs in our sample, suggesting this could be a more general marker for strong romantic relationships. Contrary to our study hypotheses, a positive association between frequent voice calling and greater relationship satisfaction was found only for GCRs. Therefore, couples in GCRs who are willing and able to make the time to talk on the phone may be reaping the established benefits of voice communication (Dainton & Aylor, 2002; Kraus, 2017; Schroeder et al., 2017; Seltzer et al., 2012). However, a reverse association may also be true. That is, GCR couples who are more satisfied in their relationship could be more likely to crave the emotional closeness afforded by a phone call. Yet, the question still remains - why would LDR couples not experience similarly positive effects from frequent voice calls? One possibility is that LDR couples use voice calls more frequently out of necessity, rather than being a reflection or predictor of greater relationship satisfaction. Indeed, almost half of emerging adults say they would rather communicate with their romantic partner by text, rather than phone (Forgays et al., 2014).

Of the three forms of remote communication, video calling had the weakest links with relationship satisfaction. Contrary to our hypothesis, perceptions of partner responsiveness during video calls were not significantly related to relationship satisfaction for either LDRs or GCRs. However, in partial support of our hypothesis, the association between frequent video calling and relationship satisfaction was significantly different for LDRs versus GCRs. The effects were in opposite directions, but neither reached statistical significance. The positively-valenced effect of video calling among LDRs (partial $r = .11$, $p = .11$) is consistent with previous research describing the

relational benefits of video calls for LDRs (Hampton et al., 2017). However, technical difficulties, scheduling challenges, and less frequent use may limit its ability to impact relationship satisfaction over and above other forms of remote communication (Greenberg & Neustaedter, 2013). The weak effects may also signal the presence of moderating effects. For example, our supplemental analyses revealed that frequent video calling was related to lower relationship satisfaction among male, but not female, participants.

Theoretical and Clinical Implications

Our study results have several important theoretical and clinical implications. First, remote communication was more strongly and positively linked with relationship satisfaction in LDRs. This supports electronic propinquity theory (Korzeny, 1978), which proposes that CMC will result in more positive outcomes when partners lack alternative means of communicating (c.f., Kushlev & Leita, 2020; Kushlev et al., 2019). A growing discourse in the field of CMC relates to the extent to which smartphones may be displacing versus complementing in-person interactions with close others (Kushlev & Leita, 2020; Lieberman & Schroeder, 2020). When higher levels of remote communication are used in the context of LDRs, we can be more confident that it is being used to supplement (not replace) in-person interactions, which can also help account for the positive effects of remote communication in LDRs. It is interesting to note that video calls failed to predict relationship satisfaction over and above the use of texting and voice calls in the current study. This finding contradicts past research (Janning et al., 2018) as well as the cues-filtered out theories (Culnan & Markus, 1987) in the computer-mediated communication literature, which collectively argue that the effectiveness of social interactions should increase as the number of available verbal and non-verbal cues increase. As Tong & Walther (2011) have pointed out, "lightweight tools" such as text messaging may actually be more appealing and effective than phone calls or video calls because they enable users to engage in frequent relationship maintenance without investing a great deal of time or cognitive effort.

Given correlational nature of our data and small effect sizes, it is premature to conclude that an increase in texting would generate meaningful increases in relationship satisfaction. However, recent experimental research suggests that sending positive text messages to romantic partners can lead to small but significant increases in relationship satisfaction for the sender (Luo & Tunney, 2015). Because we did not capture the content of couples' remote interactions, we are unable to recommend specific behaviors that might

contribute to greater relationship satisfaction. As we deepen our understanding of the types of relationship maintenance behaviors that can contribute to responsiveness and relationship quality, we will be able to increase the power of such interventions (Perlman, 2001). Importantly, a failure to find significant benefits of texting and video calls for GCRs does not rule out the possibility of positive effects. Emerging research suggests that communication technology must be considered in the context of individual difference factors, such as attachment style (Morey et al., 2013).

Strengths, Limitations, and Future Directions

To our knowledge, this represents the largest investigation of patterns and outcomes of remote communication among people in LDRs and GCRs to date. Over one-third of participants were in an LDR, which allowed for a powerful comparison between GCRs and LDRs. Indeed, we would have arrived at much different conclusions had we not taken LDR status into account. Despite these strengths, the correlational nature of our data precludes causal inferences. Experimental research is necessary to establish causality and longitudinal research will help ascertain the long-term effects on relationship satisfaction and longevity. Our sample was limited to emerging adults and the majority were female, heterosexual and European/White ethnicity. The generalizability of our findings to groups with different norms and expectations for remote communication requires further investigation. Despite making the important distinction between GCRs and LDRs, we did not take into account other potentially important relationship characteristics, such as whether couples met online, communication preferences, jealousy and relationship certainty. The current study also included relationship satisfaction as its only outcome. Although frequent and responsive remote communication had a generally positive association with relationship satisfaction, it is possible that couples who are highly engaged with their romantic partners over their phone may do so at the expense of in-person relationships (McDaniel et al., 2018; Sbarra et al., 2019). Lastly, we did not explicitly define responsiveness for participants and we obtained the perspective of only one member of the dyad. Emerging research provides examples of factors that might impact perceptions of responsiveness when communicating via text, such as response time (Atchley & Warden, 2012; Forays et al., 2014) and similarity in the use of emojis (Coyle & Carmichael, 2019), but research remains in its infancy.

Conclusions

Consistent with past research, LDR and GCR participants reported almost identical levels of

relationship satisfaction in the current study (Billedo et al., 2015; Dargie et al., 2015; Goldsmith & Byers, 2018). In contrast, we identified striking differences between LDRs and GCRs in terms of the association between remote communication frequency and responsiveness, and relationship satisfaction. Broadly speaking, our findings highlight the need for further research into the ways in which LDR and GCR couples can best capitalize on remote technology to maintain their relationships during periods of separation. There are new communication technologies on the horizon, such as virtual reality and holograms, but these are not yet available for widespread use (Maloney & Freeman, 2020). It remains to be seen how increasingly advanced and complex technologies will compete with a simple and well-timed text saying, “I’m thinking about you.”

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Table 1*Descriptive Statistics and Correlations among Study Variables (N = 647)*

Variable	1	2	3	4	5	6	7	Total Sample Mean (SD)	LDR Sample Mean (SD)	GCR Sample Mean (SD)
1. Frequency Video Chat	-							3.83 (1.38)	4.67 (1.25)	3.35 (1.20)
2. Frequency Voice Call	.33***	-						4.60 (1.08)	4.83 (1.06)	4.47 (1.07)
3. Frequency Text Messaging	.19***	.25***	-					5.50 (0.74)	5.61 (0.73)	5.44 (0.74)
4. Responsiveness Video Chat	.52***	.30***	.19***	-				3.71 (1.31)	4.10 (1.11)	3.49 (1.36)
5. Responsiveness Voice Call	.20***	.47***	.18***	.53***	-			4.09 (0.99)	4.22 (0.98)	4.01 (0.98)
6. Responsiveness Text Messaging	.14**	.10*	.42***	.29	.36***	-		4.05 (.092)	4.13 (0.90)	4.00 (0.93)
7. Relationship Satisfaction	.04	.12**	.11**	.22***	.28***	.18***	-	29.47 (5.02)	29.29 (5.28)	29.57 (4.87)
8. LDR Status ^a	.46***	.16***	.11**	.23***	.10*	.06	-.03			

Note. ^aLong Distance Relationship (LDR) = 1, Geographically Close Relationship (GCR) = 0. Correlations are Pearson's correlations except for those involving LDR status, which are point-biserial correlations.

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

Table 2*Effects of Frequency of Remote Communication and LDR Status on Relationship Satisfaction*

	Model 1		Model 2		Model 3	
Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Fixed effects						
Intercept	29.57***	.25	29.69***	.26	29.56***	.26
LDR status (LDR=1, GCR=0)	-.276	.410	-.610	.458	-.811	.468
Video calling frequency			.037	.168	-.257	.214
Voice calling frequency			.483*	.195	.827**	.245
Texting frequency			.631*	.274	.104	.342
LDR status X video calling frequency					.712*	.343
LDR status X voice calling frequency					-.832*	.401
LDR status X texting frequency					1.355*	.566
	Estimate		Estimate		Estimate	
Fit statistics						
Adjusted R square	-.001		.019		.033	
F change	.45		5.35**		4.16**	

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

Table 3*Effects of Responsiveness During Remote Communication and LDR Status on Relationship**Satisfaction*

	Model 1		Model 2		Model 3	
Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Fixed effects						
Intercept	29.57***	.248	29.76***	.238	29.76***	.239
LDR status (LDR=1, GCR=0)	-.276	.410	-.781	.401	-.820*	.408
Video call responsiveness			.385*	.175	.385	.209
Voice call responsiveness			1.066***	.233	1.199***	.298
Texting responsiveness			.433	.211	.293	.228
LDR status X video call responsiveness					-.152	.385
LDR status X voice call responsiveness					-.298	.462
LDR status X texting responsiveness					1.139*	.453
	Estimate		Estimate		Estimate	
Fit statistics						
Adjusted R square	-.001		.092		.097	
F change	.45		22.87***		2.22	

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

Figure 1

Simple Slopes Plots for Interactions between LDR Status and Frequency and Responsiveness of Remote Communication on Relationship Satisfaction