Long-distance texting: Text messaging is linked with higher relationship satisfaction in long-distance relationships

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Abstract

Due 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. Long-distance relationship 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 significantly related to relationship satisfaction in either group. Overall, study findings add to a growing 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.

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Keywords

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Long-distance relationships (LDRs) make up a significant and increasing proportion of romantic relationships in our society (Statistics Canada, 2019). While there is no universally agreed upon definition of an LDR, they are often defined by a lack of in-person contact due to geographical distance (Jiang & Hancock, 2013; Maguire & Kinney, 2010; Pistole & Roberts, 2011). As recently as the 1990's, couples relied heavily on landlines to communicate during periods of separation (Carter & Renshaw, 2016). However, due to the widespread adoption of smartphone devices (O'Dea, 2020; Anderson, 2019), romantic couples can now connect from virtually anywhere, at any time. Although people in LDRs may use video-chat, voice calls, and text messaging more often out of necessity, these forms of remote communication have also become commonplace in geographically close relationships (GCRs; Boyle & O'Sullivan, 2016; Morey et al., 2013; Schade et al., 2013). Indeed, people in GCRs *also* experience periods of physical separation, albeit for shorter periods of time and without the same barriers of physical distance (Merolla, 2012; Pistole et al., 2010).

Despite the widespread use of mobile technologies to maintain close relationships (Brody & Peña, 2015), emerging research has yielded contradictory findings regarding the resulting costs and benefits for relationship outcomes. In response to these mixed findings, there have been calls for a greater consideration of the contexts in which mobile communication occurs (McFarland & Ployhart, 2015), and in romantic relationships in particular (Norton et al., 2018). Contrary to popular belief, people in LDRs tend to report similar levels of relationship satisfaction compared to people in GCRs (Billedo et al., 2015; Dargie et al., 2015; Goldsmith & Byers, 2020; Roberts & Pistole, 2009). However, the factors that contribute to a satisfying romantic relationship may be somewhat different (Lee & Pistole, 2012). Therefore, the overarching goal of the current study was to investigate LDR status as a key contextual factor that may influence the frequency and perceived responsiveness of remote communication, as well as the impact of frequent and responsive remote communication on relationship satisfaction.

The Use of Remote Communication in LDRs and GCRs

A number of theories have been put forth to increase our understanding of the role of computer-mediated communication (CMC) in the maintenance of interpersonal relationships. Merolla's model of relationship maintenance (2010; 2012) holds particular relevance to the current study because of its focus on LDRs. According to this model, LDR couples cycle through periods of physical copresence and non-copresence and the ways in which couples maintain continuity over time have implications for relationship satisfaction. Merolla (2010) defined three key periods [prospective (leading up to separation), introspective (during separation), and retrospective (after separations)] and three

categories of cognitive and behavioral strategies [dyadic (e.g., mediated partner communication), intrapersonal (e.g., having imagined interactions), and network (e.g., telling friends funny stories about one's partner)] in this process. Within Merolla's model, remote communication between romantic partners can be categorized as dyadic and introspective. These remote interactions may serve to maintain the relationship, regardless of whether partners have that explicit intent (Dainton & Stafford, 1993; Lee & Pistole, 2012; Stafford, 2003).

From the perspective of Media Multiplexity Theory (MMT), close ties are expected to use a greater number of media to communicate (Haythornwaite, 2005) and to use media more frequently (Taylor & Bararova, 2018), compared to weak ties. In romantic relationships, Merolla (2010) has argued that LDR couples are especially motivated to engage in frequent mediated communication because of the lack of opportunities for in-person interaction. Consistent with this idea, people in LDRs (vs. GCRs) have been found to engage in more frequent dyadic relationship maintenance behaviors during periods of separation (Goldsmith & Byers, 2020). In a daily diary study that directly compared communication in people who were in GCRs versus LDRs, those in LDRs engaged in longer and more frequent video calls, voice calls, and text messaging (Jiang & Hancock, 2013). Other studies have found evidence that video calling is more common in LDRs than GCRs, but that phone calls and digital messaging are used with similar frequency across LDRs and GCRs (Janning et al., 2018; Stafford & Merolla, 2007). Taylor and Bazarova (2018) documented more frequent media use in GCR couples compared to LDR couples, but this could be because they included face-to-face communication in their measure of media frequency.

In sum, few studies have directly compared people in LDRs and GCRs in terms of how often they use specific types of remote communication. Those that have are 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. Drawing from Merolla's model (2010; 2012) and past empirical research, we hypothesized that participants 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 of remote communication in LDRs and GCRs

To fully understand the impact of remote communication on relationship outcomes one must consider partners' perceptions of the *quality* of these interactions (Ledbetter et al., 2016). Thus, the current study builds on MMT (Haythornwaite, 2005) and Merolla's (2010; 2012) model by addressing the perceived responsiveness of partners during 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). From this perspective, frequent remote communication would not be enough to foster a strong relationship if partners are not judged to be responsive during those interactions.

Romantic couples tend to expect a higher degree of responsiveness from their partners when communicating via mediated channels 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 partner responsiveness may be even higher in this context. Previous research supports the idea that people in LDRs may experience better communication quality (Stafford & Merolla, 2007) and greater perceived responsiveness (Jiang & Hancock, 2013) during remote communication. However, on a more practical level, 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. Due to the conflicting research and theory on this topic, we put forth two competing hypotheses: (1) that higher expectations and commitment to remote communication in LDRs will create more positive perceptions of partner responsiveness and (2) that higher expectations may set LDR couples up for disappointment, leading to lower satisfaction with partner responsiveness.

Different associations between remote communication and relationship satisfaction in LDRs and GCRs

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. Recent extensions of MMT suggest a positive reciprocal relationship between the frequency of media use and relational closeness (Taylor & Bazarova, 2018). For LDRs in particular, relationship maintainance behaviors that occur via remote communication during periods of separation have been shown to have significant associations with relationship satisfaction (Merolla, 2012). Of the various forms of remote communication available to romantic couples, voice calls have been most consistently tied with positive relationship outcomes, including feelings of love, connection, and relationship certainty (Dainton & Aylor, 2002; Goodman-Deane et al., 2016; Hertlein & Chan, 2020; Jin & Peña, 2010).

The potential costs and benefits of newer communication technologies for romantic relationships are less clear. 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), but research remains in its infancy and positive effects are not always found (Hertlein & Chan, 2020). Some studies have found that more frequent texting is linked to greater relationship satisfaction (Luo & Tuney, 2015), ratings of partner accessibility and engagement (Schade et al., 2013), and lower conflict in face-to-face

interactions (Novak et al., 2016). Texting a romantic partner to provide assurances, express affection, and communicate emotions has also been shown to have positive associations with overall relationship satisfaction (Brody & Peña, 2015; Coyne et al., 2011; Slatcher et al., 2008). However, other studies have reported null or even negative effects of frequent texting (Goodman-Deane et al., 2016; Jin & Peña, 2010; Luo, 2014).

One explanation for the mixed findings in past research may be that the association between remote communication and relationship satisfaction differs based on LDR status. Indeed, frequent texting as a strategy to cope with physical distance among romantic partners has been linked with positive relationship outcomes (Sharabi et al., 2019). According to the theory of electronic propinquity (Korzenny, 1978), mediated communication has the capacity to generate feelings of psychological closeness (i.e., electronic propinquity) even though communicators are geographically distant from one another. Among the major propositions of this theory is that when communicators have fewer channel choices, they will experience more propinquity. In support of this theory, a lab experiment showed that texting was significantly more satisfying when people did not have any other options with which to communicate (Walther & Bazarova, 2008). In fact, when participants had only one channel available to them, there was no difference in ratings of propinquity and communication satisfaction between the text-based, voice, video, or face-to-face conditions. 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. Another reason for more beneficial effects among LDR couples is that they may use remote communication more intentionally to create a feeling of being together in physical space (Kolozsvari, 2015; Oh et al., 2018). For example, through qualitative interviews, Greenberg and Neustaedter (2013) found that LDR couples would often run a video-conferencing platform in the background while engaging in other tasks to help create a "virtual co-presence" and enhanced feelings of intimacy.

Thus, the third and final aim 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 GCR or LDR status. We hypothesized that greater frequency and responsiveness of all three forms of remote communication would be related to higher relationship satisfaction and that greater frequency and responsiveness 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 mediated communication and well-being. Emerging adults were recruited via a psychology research subject pool at a mid-sized university in Kelowna, Canada and received course credit for participating. A focus on emerging adults is well-justified given that (1) 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) and (2) emerging adults are among the highest users of mediated communication (Forgays et al., 2014). Data for the current study were 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 7 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 married/common law, separated/divorced or single (i.e., not dating someone or in a relationship) 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 ($\rho = .11$). The mean age of the sample was 19.75 (median = 19, $SD = 1.55$, range = 18–25). Approximately three-quarters (73.6%) of the sample reported being female and the remaining 26.4% reported being male. All participants were students living in Canada at the time of data collection and were predominantly (78.3%) Canadian-born. The majority reported a European/White ethnicity (71.9%), followed by East or Southeast Asian (12.7%), South Asian (8.7%), Aboriginal or Indigenous (4.6%), African (2.8%), Latin, Central, or South American (1.9%), Arab (1.4%), Caribbean (0.5%), and other ethnicities (5.3%). 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. The majority of the sample identified their sexual orientation as heterosexual (93.7%), and the remainder identified as gay/lesbian (0.9%), bisexual (4.0%), and other identities (e.g., pansexual, heteroflexible; 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." Participants who self-identified as being in an LDR reported seeing their partner (in-person): less than once/month (32.6%), once/month (33.1%), 2–3 times/month (19.9%), once/week (4.2%), and more than once/week (10.2%). In contrast, the vast majority of participants in GCRs (92.7%) reported seeing their partner (in-person) more than once/week. The remainder reported seeing their partners once/week (4.9%), 2–3 times/month (1.2%) and less than once/month (0.2%).

Measures

Participants completed a battery of questionnaires about their use of digitally mediated communication, social relationships, well-being, 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 Likert scale from 1 to 5 (possible total score ranging from 7 to 35), 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. All study analyses were conducted using SPSS Version 24.

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 could be considered large for video calling, and small for voice calling and texting ([Funder & Ozer, 2019](#)).

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 and voice calling, indicating that participants in LDRs (vs. GCRs) view their partners as more responsive when using these two remote communication modes and these correspond to small effect sizes. However,

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			

[a]Long-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.

contrary to expectations, there was no significant association between LDR status and texting responsiveness.

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.

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

Table 2. Effects of frequency of remote communication and LDR status on relationship satisfaction.

Variable	Model 1		Model 2		Model 3	
	B	SE	b	SE	b	SE
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**	

Note. LDR = long-distance relationship; GCR = geographically close relationship.
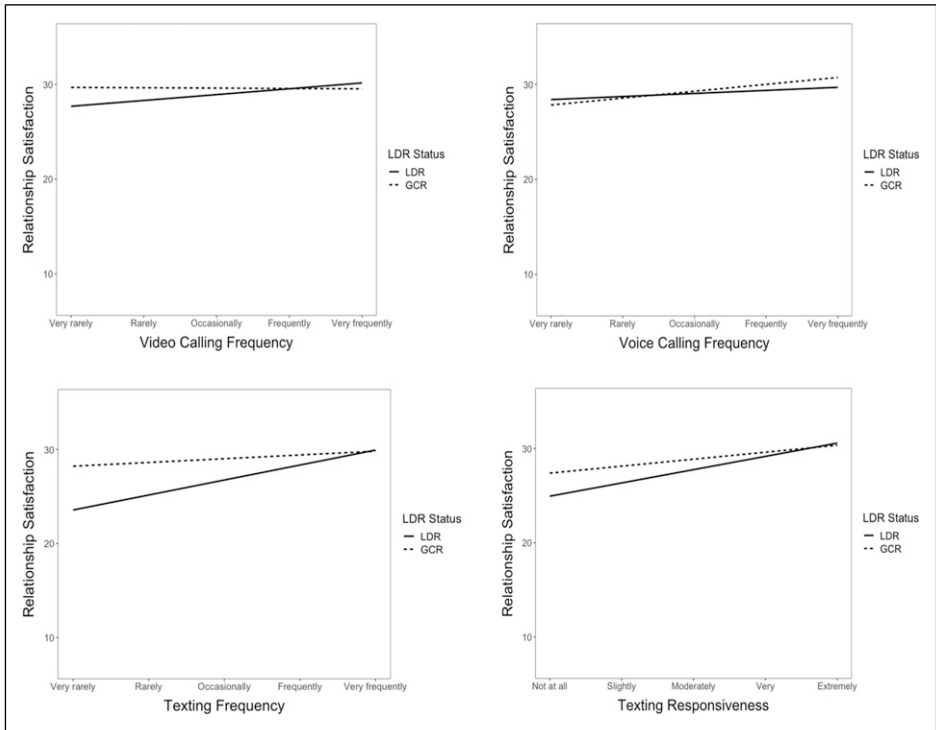*p<.05, **p<.01, ***p<.001.

Figure 1. Simple slopes plots for interactions between LDR status and frequency and responsiveness of remote communication on relationship satisfaction.

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.

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

Table 3. Effects of responsiveness during remote communication and LDR status on relationship satisfaction.

Variable	Model 1		Model 2		Model 3	
	B	SE	b	SE	b	SE
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	

Note. LDR = long-distance relationship; GCR = geographically close relationship.
*p<.05, ***p<.001.

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 stronger association 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.

Discussion

A growing reliance on smartphone technologies for social interactions has triggered a flood 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

Participants in LDRs reported more frequent texting, voice calls, and video chatting to communicate with their romantic partners, compared to participants in GCRs. These findings are consistent with our hypothesis that LDR couples will compensate for a lack of in-person interactions by using remote communication (Merolla, 2012) and replicate prior work in this area (Jiang & Hancock, 2013; Goldsmith & Byers, 2020). While Janning and colleagues (2018) also found a difference in video calling, 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 there was a large effect size for the association between LDRs status and video calling frequency. 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 individual difference variables, such as gender (Kimbrough et al., 2013; Schade et al., 2013; Wardecker et al., 2016) and attachment style (Morey et al., 2013).

The link between remote communication and relationship satisfaction

In the current study, we found partial support for our hypotheses that the frequency and responsiveness of 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. People in LDRs (compared to GCRs) who use high levels of texting are more likely doing so in an attempt to compensate for a lack in-person interactions (Merolla, 2010), and as our findings suggest, this is linked with higher relationship quality. Similarly, Sharabi and colleagues' (2019) found that university students in "textual relationships" (i.e., texting as the primary means of communicating) who were using texting specifically as a strategy to cope with distance reported higher relationship quality.

Although we did not capture the content of text messages, we suspect that couples in LDRs may also 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, since GCR couples tend to engage in more shared tasks and responsibilities (Pistole et al., 2010), the brief and convenient nature of texting may lend itself to be used more for practical matters (e.g., requesting information, coordinating social plans, discussing joint responsibilities), which may not have the same relational benefit. Almost two-thirds of our LDR participants saw their partners (in-person) once a month (33.1%) or less than once a month (32.6%). 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 maintaining 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. 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. Recent work by Ruppel and colleagues (2018) highlights that dyads use communication technologies in complementary ways to meet different relationship needs. In the context of the current study, people in satisfying GCRs may be more likely to use phone calls as a complement to texting because they already have opportunities for face-to-face contact. On the other hand, frequent voice calls may

fall short at helping LDRs compensate for a lack of in-person contact because of their lack of visual cues. Hampton and colleagues (2017) similarly failed to find an association between frequent phone calls and relationship satisfaction in LDRs. Further research in needed to explore the ways in which LDR and GCR couples use voice calls to complement other communication strategies (Caughlin & Sharabi, 2013), the function that voice calls serve (Ruppel et al., 2018), and general attitudes towards voice calling (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. For GCRs, video calls may be perceived as redundant or unnecessary. For LDRs, the small, positive effect size for video calling (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, such as gender and personality factors.

Theoretical and clinical implications

Our study results have several important theoretical and clinical implications. In line with MMT (Haythornthwaite, 2005), more frequent use of remote communication was related to greater relationship satisfaction, but LDR status provided an important context in which to interpret these results. That is, text messaging and (to a lesser extent) video chatting were more strongly and positively linked with relationship satisfaction in LDRs, compared to GCRs. These results support electronic propinquity theory (Korzenny, 1978), which proposes that CMC will result in more positive outcomes when partners lack alternative means of communicating (c.f., Kushlev & Leitao, 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 & Leitao, 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. The weak findings for videochatting and relationship quality video calls contradicts the cues-filtered out theories (Culnan & Markus, 1987), which argue that the effectiveness of social interactions should increase as the number of available verbal and non-verbal cues increase. As Tong and 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. Clearly, not all forms of mediated-communication are created equal (Hampton et al., 2017). Our findings make a strong case for unpacking Merolla's (2010)

concept of introspective dyadic communication to consider the specific modes of remote communication that are used during periods of separation. Significant associations between perceived responsiveness during remote communication and relationship satisfaction also suggest that Merolla's model could be extended to consider how dyadic maintenance behaviors are perceived and evaluated by the other person in the relationship.

Given correlational nature of our data and small effect sizes for the third aim, it is premature to conclude that an increase in remote communication such as texting could 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 & Tuney, 2015). As argued by Funder and Ozer (2019), small effect sizes should not be discounted, especially when estimated from larger samples. Frequent smartphone interactions have become normative in the daily lives of emerging adults in LDRs and GCRs, and thus even small effects could have a cumulative effect over time. As we deepen our understanding of the types of maintenance behaviors that can contribute to perceptions of responsiveness and relationship quality during remote interactions, we will be able to increase the power of interventions (Perlman, 2001).

Strengths, limitations, and future directions

The present sample was comprised of 647 emerging adults (36.5% of whom were in an LDR), which allowed for a powerful comparison between GCRs and LDRs. Indeed, we would have arrived at much different conclusions about the patterns and relationship correlates of remote communication had we not taken LDR status into account. Our findings also highlight the importance of examining the unique and independent effects of different communication channels, rather than lumping diverse media into a single index. 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 enrolled in an undergraduate-level psychology course, 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. Additionally, we did not collect information regarding participants', socioeconomic status or disability information, which should be examined in future research. 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). Building on recent work that extends MMT, further research is needed to understand how couples transition

between offline and online interactions and the extent to which couples integrate (vs. segregate) certain conversational topics across communication channels (Caughlin & Sharabi, 2013; Wang et al., 2019).

From a measurement standpoint, we did not assess the content of couples' remote interactions and assessments were limited to the perspective of one member of the dyad. We also relied on single-item self-report to measure frequency of remote communication. Previous research has demonstrated only small to moderate correlations between subjective and objective measures of smartphone use (Ellis et al., 2019). While future research should incorporate objective measures, our findings do suggest that partners' *perceptions* of how often they communicate remotely holds importance in romantic relationships, even if these perceptions systematically over- or underestimate actual remote communication. Our measure of perceived responsiveness was also a single-item for each communication channel, and we did not explicitly define responsiveness for participants. Emerging research provides examples of factors that might impact perceptions of responsiveness when communicating via text, such as response time (Atchley & Warden, 2012) and similarity in the use of emojis (Coyle & Carmichael, 2019), but research remains in its infancy. The impact of video and voice messages, GIFs, memes, and photos on perceptions of responsiveness during text message exchanges also warrants future consideration.

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, 2020). 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."

Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This research was not pre-registered. The data used in the research are available. The data can be obtained by emailing: susan.holtzman@ubc.ca. The materials used in the research are available. The materials can be obtained by emailing: susan.holtzman@ubc.ca.

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Supplemental material

Supplemental material for this article is available online.

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