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*New Media Society* 2012 14: 316 originally published online 24 August 2011

DOI: 10.1177/1461444811415047

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# Calling and texting (too much): Mobile maintenance expectations, (over)dependence, entrapment, and friendship satisfaction

new media & society

14(2) 316–331

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DOI: 10.1177/1461444811415047

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## Abstract

This article uses dialectical theory to examine how mobile phone use in close friendships affects relational expectations, the experiences of dependence, overdependence, and entrapment, and how those experiences affect relational satisfaction. Results suggest that increased mobile phone use for the purpose of relational maintenance has contradictory consequences for close friendships. Using mobile phones in close relationships increased expectations of relationship maintenance through mobile phones. Increased mobile maintenance expectations positively predicted dependence, which increased satisfaction, and positively predicted overdependence, which decreased satisfaction. Additionally, entrapment, the guilt and pressure to respond to mobile phone contact, uniquely predicted dissatisfaction. The results are interpreted in relation to the interdependent dialectical tensions of friendship, media entrapment, and the logic of perpetual contact.

## Keywords

dialectical theory, entrapment, friendship satisfaction, mobile phone, perpetual contact

## Introduction

Mobile phones have become useful relational maintenance devices for vast segments of the global population. By 2010, there were five billion mobile connections

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worldwide. For every computer with an internet connection, there are three cell phones (BBC News, 2010). Although reliable statistics are hard to come by, the International Telecommunications Union estimates that throughout the globe in 2010 there were nearly 80 mobile phone subscriptions per 100 inhabitants, while only 30 subscriptions to the internet per 100 inhabitants, and under 20 fixed phone line subscriptions per 100 inhabitants (ITU, 2010). Mobiles are used for both voice calls and texting. In the USA, which lags behind Europe and Asia on mobile phone adoption (Ling, 2004), text messaging has only recently topped voice calls on mobile phones (Nielsenwire, 2008). Between 2006 and 2008 the number of text messages sent by Americans increased by 450 percent (Nielsenwire, 2008), and continued to increase through 2010 (Pew Internet, 2010).

For many, especially young people, the mobile phone has become indispensable. In comparison to other age groups, American adolescents (i.e., 13–17 years of age) sent and received the most text messages: 3339 text messages in a month (Nielsenwire, 2010). In 2010, American teens sent on average between 50 (Pew Internet, 2010) and 110 (Nielsenwire, 2010) text messages per day. Many people now feel dependent on their mobiles. Turkle (2008: 121) describes people as ‘tethered’ to their phones: ‘newly free in some ways, newly yoked in others.’ A study of Mexican youth found that 38 percent said they could not spend a day without their mobile (Mariscal and Bonina, 2008). Similarly, a survey of Indian mobile users found that 42 percent said they could not live without their mobile and 60 percent reported never leaving home without it (Rao and Desai, 2008).

Relational communication is a pervasive use of mobile phones (see e.g., Katz and Aakhus, 2002; Katz, 2008; Ling, 2004). People rely on mobiles to plan, share, include and validate (Ling and Yttri, 2002). Although this provides one of the technology’s core appeals, the phone is also a source of tension (Baron, 2008; Ling and Yttri, 2002). While being able to contact others is one of the most liked qualities of the mobile, being continuously available for others’ contact is also one of its most disliked qualities (Baron, 2008; Baron and Ling, 2007). As a portable always-on device, the mobile phone encourages relational partners to be in perpetual contact (Katz and Aakhus, 2002). This may lead to *hyper-coordination* (Ling, 2004; Ling and Yttri, 2002), which is the experience of enhanced, anxiety-provoking relational dependence and engagement through the use of mobile technologies. Although greatly enjoyed, the expectations of friends to inform, share, and maintain relationships via text messaging and cell phone calls can also lead to feelings of imprisonment and entrapment (Baym, 2010).

This tension between remaining closer through technology and feeling entrapped by technology has been identified in diverse contexts, from American college students (Baron and Ling, 2007) to poor urban Philippine spouses (Portus, 2008) and middle-class Indian families (Donner et al., 2008). As this article will return to below, this tension has often been seen through the lens of perpetual contact (Katz and Aakhus, 2002) rather than through relational dialectics theory (Baxter and Simon, 1993). One purpose of this article is to demonstrate the utility of dialectical theory to understanding the relational implications of mobile phones by integrating it with more media-centric approaches. This article offers a focused, quantitative test of the dialectal tensions resulting from the perpetual contact afforded by mobile phones in the context of close friendship. From the perspective of dialectical theory (Baxter and Simon, 1993), we argue that greater use of cell phones to call and text close

friends leads to higher expectations that friends will use mobiles for relational maintenance, which results in the experience of dependence, increasing relational satisfaction. Simultaneously, we expect that greater expectations of mobile maintenance result in overdependence and entrapment, which are expected to result in decreased friendship satisfaction. The model we propose and test in this article complements the rich qualitative work on these tensions (see e.g., Arnold, 2003; Licoppe, 2004) by concretely operationalizing variables in ways that can be measured quantitatively and by teasing out the relative impact of converging forces. By testing this model quantitatively, flows of influence among the variables may be disentangled and quantified, providing further evidence for the contradictory consequences of mobile technology in personal relationships.

### *Dialectical theory*

Dialectical theory characterizes relationships as ongoing collaborative and individual processes of finding balances within holistic tensions. Although this article will focus on the dependence–independence dialectic, expression–nonexpression and stability–change are two other commonly identified tensions (Baxter and Braithwaite, 2007). Communication is at the center of the dialectical tensions in interpersonal relationships. Dialectical tensions are unified in that each component of the contradiction depends on the other. For example, relational dependence can only be understood in contrast to independence, and without dependence, independence has no meaning. The dependence–independence dialectic, which has also been described as integration–separation (Werner and Baxter, 1994) and freedom to be dependent and freedom to be independent (Rawlins, 2009), is at the core of relationship maintenance (Baxter and Simon, 1993).

The dependence–independence dialectic is particularly challenging in close friendships, the relationship type on which this article focuses, because they are relationships of choice and lack the social sanctions of family and married relationships (Rawlins, 2009). When friends seek support, company, advice, and inclusion from one another, friendships become more integrated, which serves the fundamental desire to be needed and to need others (Parks, 2007; Rawlins, 1983). However, increasing relational dependence on friends is in tension with a desire to remain free of obligation (Rawlins, 2009). When friends expect too much relational maintenance, it becomes increasingly difficult to fulfill those expectations, which can result in greater disappointment and dissatisfaction (Felmlee, 1999), especially when expectations are unmet (Elkins and Peterson, 1993). The mobile phone may contribute to the dialectical tension of dependence–independence as friends increasingly use the technology to text and call for the purpose of routine relational maintenance.

### *Perpetual contact*

Mobile phone researchers often describe the technology as encouraging a logic of *perpetual contact* that guides choices (Katz, 2008). The device's potential to enable continuous communication combined with collective sense making, or *apparategeist* (Katz and

Aakhus, 2002), steers people toward connection. Interpersonal relationships are ‘maintained through constant contact, the quantity of which is as important as the quality’ (Licoppe, 2008: 140). Young mobile phone users are particularly likely to engage in a mode of friendship that entails short, targeted calls rather than long, engaged conversations (Licoppe, 2004). In dialectic terms, the logic of perpetual contact favors dependence over autonomy (Katz, 2008). As dialectical theory suggests, these and other seemingly oppositional tensions occur simultaneously. Arnold (2003) describes such tensions as Janus faced, underscoring the paradoxical dialectic of interdependence, and encourages theorists to consider media effects in terms of *irony* rather than simple consequences. For example, mobile phones enhance autonomy yet also enhance family cohesion (Donner et al., 2008). They are ‘used to overcome barriers separating self from other and to accentuate those differences’ (Campbell, 2008: 160). They enable relational partners to transcend space and strive for *pure communication* (Peters, 1999), yet people remain bound to the material realities of the physical world (Katz, 2008).

Ling and Yttri (2002: 139) note that mobile phones allow for ‘nuanced instrumental coordination,’ especially for individuals in interdependent relationships attempting to plan and execute several goals at once. This behavior, called *micro-coordination*, helps in the domestic coordination of families, easing tensions caused by late arrivals or changes in plans (Ling, 2004). However, for young adults, micro-coordination can change into *hyper-coordination* when instrumental planning and management are amplified by continuous mediated access and interaction, which results in stress when cell phone access is restricted (Ling and Yttri, 2002).

The peril of too much access is a common theme in research on the dark side of mobile devices, including Blackberries (Middleton and Cukier, 2006) and mobile phones (Arnold, 2003; Baron, 2008). Research in organizational contexts has suggested that mobile devices invade personal sanctuaries from work and are an infringement on private space (Middleton and Cukier, 2006). Access is a double-edged sword: it is both the most commonly identified positive feature of mobile phones (mentioned by 59.4% of respondents) and the most commonly identified negative feature of mobile phones (40.9% of respondents) (Baron, 2011). Baron (2011) suggests that this dialectical tension between the positive and negative consequences of access can be identified as freedom-entrapment, which echoes without referencing the dialectical tensions of friendship identified by Rawlins (2009).

### *Friendship expectations*

As a consequence of developing and maintaining close friendships, individuals develop expectations about how friends ought to behave (Wiseman, 1986). There are many types of expectations in friendship. Best friends are expected to be loyal, supportive, and committed, to share and self-disclose to one another, and to seek out and include each other in shared activities (Hall, 2011). The expectation of inclusion and interaction with friends is one of the most important expectations in close friendships for both men and women (Hall, 2011). Expectations of inclusion are critical to friendship maintenance (Oswald et al., 2004), and are one of the first expectations to develop in childhood friendships

(La Gaipa, 1987). However, because friendships are non-obligatory social relationships, friendship expectations must be tested and augmented to determine what sorts of behaviors can be reasonably expected from particular friends (Hall, 2011). That is, people have varying expectations of inclusion and interaction in friendship, and those expectations must be negotiated in each unique relationship. When expectations of inclusion and interaction are met through relational maintenance, friends are more satisfied (Oswald et al., 2004). However, few research studies have explored how relational maintenance expectations are developed in the context of new media.

Traditional typologies of relational maintenance (e.g., Stafford and Canary, 1991) are not sensitive to differences in maintenance across media (see Ledbetter, 2010). Yet, the use of new media in maintaining friendships has become increasingly common (Ling and Yttri, 2002). Closer relationships tend to use more media to keep in contact, a phenomenon known as media multiplexity (Haythornthwaite, 2005). Each medium (e.g., face-to-face, voice calls, texts, instant messages, social networking sites) plays a unique role in relational maintenance (Baym and Ledbetter, 2009). Consequently, partners must negotiate distinct understandings for each medium and shared norms for their use. The intense reliance on mobile phones to coordinate, share, inform, and pass time with friends establishes strong obligations to be responsive (Baron, 2008). The short, targeted practice of constant communication between friends can become a 'ritual [which] is institutionalized and the call itself becomes an obligation' (Licoppe, 2004: 143). This sense of obligation can be understood as an expectation of relationship maintenance, in that friends expect one another to maintain their friendship by using the mobile phone to interact and include.

The use of a range of media for the purpose of relational maintenance has been called *mundane maintenance* (Tong and Walther, in press). When partners communicate using mobile phones, it serves as a form of relational maintenance by reminding partners of their connectedness through mundane exchange (Katz and Aakhus, 2002; Ling and Yttri, 2002). Past research suggests that most computer-mediated technologies, including social networking sites and Instant Messaging (Nardi, 2005), are used for the purpose of mundane maintenance (Tong and Walther, in press). Mundane maintenance includes reports of everyday behavior (e.g., What are you doing?) shared between relational partners and made possible by the perpetual contact of technology. This type of maintenance serves to establish connected presence between co-workers (Nardi, 2005) and friends (Licoppe, 2004).

*Mobile maintenance expectations* are expectations of relational maintenance made possible by mobile phone technology, including communication through text messages and voice calls. Although maintaining a mobile device is necessary to ensure its functioning (e.g., paying bills; solving technical problems), this article will focus on the expectations of conduct and access developed between friends who use mobile phones to communicate. The concept of mobile maintenance expectations represents the overlap between two prior aspects of relational maintenance: friendship expectations of inclusion and mundane maintenance via media. Mobile maintenance expectations represent a unification of expectations of inclusion with mundane maintenance because updates, narratives, and short messages sent through mobile media increase interaction and the inclusion felt between individuals who are not co-present. Mobile maintenance

expectations represent a way to operationalize the logic of perpetual contact in that individuals experience obligations to enact relational maintenance through their mobile phones. Mobile maintenance expectations quantify the degree to which the obligation to share and be responsive are expected from close friends. As dialectical theory would maintain, the consequences of interdependent relationships are experienced in contradictory ways. While constant mundane exchange may allow friends to feel included, it may also restrict privacy and freedom, which is experienced as overdependence (Rawlins, 2009). To meet high mobile maintenance expectations, a friend privileges connectedness over autonomy, which exacerbates the dialectical tension of interdependence.

### *Proposed model*

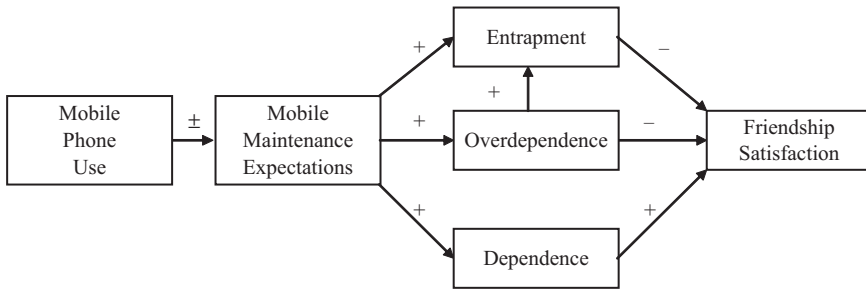
An emergent tradition of exploring the dual tensions of perpetual contact through qualitative analysis has identified several central concepts and the relationships among these concepts. However, qualitative researchers have called for quantitative analyses to operationalize concepts such as entrapment (Baron, 2010; Ling and Yttri, 2002). We will propose a model that uses dialectical theory to consolidate past research on the logic of perpetual contact and the risks of entrapment. This model will be established in a series of hypotheses, which will be tested using path analysis and structural equation modeling (SEM). This procedure will provide instrumentation for all of the key variables, will test the direction and strength of the relationships among variables, and will provide evidence for the value of dialectical theory in predicting relational satisfaction. This procedure will make prior claims of the irony of mobile phones quantifiable, and will provide a statistical test of the order and strength of these claims.

We argue that the use of mobile phones for the purpose of mobile maintenance results in three simultaneous but distinct experiences in friendship – all of which can influence relational satisfaction. We propose that higher levels of mobile phone use for the purpose of mobile maintenance is experienced as a duality, increasing both *dependence*, which positively influences satisfaction, and *overdependence*, which negatively influences satisfaction. *Entrapment* is an additional consequence of both higher mobile maintenance expectations and overdependence in friendships, and we propose that it will be a unique negative predictor of satisfaction. The complete hypothesized model can be seen in Figure 1.

In the first hypothesis ( $H_1$ ), we anticipate that friends who communicate more using mobile phones will have higher mobile maintenance expectations (Katz, 2008; Licoppe, 2004). Similar to approaches that have explored media multiplexity and relational maintenance (e.g., Ledbetter, 2010), this hypothesis predicts that greater use of the mobile phone to call and text increases the relational maintenance content of the medium. The amount of mobile phone use between close friends predicts their use of the device to keep each other informed about one another's actions and status throughout the day.

The second hypothesis predicts that greater mobile maintenance expectations will positively predict dependence ( $H_{2a}$ ), overdependence ( $H_{2b}$ ), and entrapment ( $H_{2c}$ ). The more close friends expect the mobile phone to be used for mobile relationship maintenance, the more likely they are to experience both dependence and overdependence (Baxter and Simon, 1993). Dialectical theory suggests that both sides of





**Figure 1.** Hypothesized path model for mobile maintenance and interdependence.

this interdependence continuum result from increasing integration (Baxter and Braithwaite, 2007). That is, dialectical tensions are paradoxical. In  $H_{2c}$ , we predict that the experience of entrapment will also result from increasing mobile maintenance expectations. In  $H_3$ , we predict that increasing overdependence will lead to the experience of entrapment (Ling, 2004). In other words, entrapment is caused by both increased expectations of mobile maintenance *and* by increased overdependence. The greater the mobile maintenance expectations, the more friends are pushed toward the overdependence side of the dialectic, which may result in feelings of imprisonment (Baym, 2010). Finally, this model predicts that relational satisfaction will be positively related to dependence ( $H_{4a}$ ), and negatively related to overdependence ( $H_{4b}$ ), and entrapment ( $H_{4c}$ ).

## Method

### Procedures

Respondents were recruited from introductory communication courses at a large Midwestern public university to complete an online survey in October of 2010. Partial course credit was offered in exchange for participation. The university's Institutional Review Board approved the procedures.

### Sample

Two hundred and forty-seven participants completed the online survey ( $N_{\text{female}} = 166$ ). The sample was 85 percent Caucasian, 6 percent Latino, 3 percent Asian-American, 2 percent African-American, and 4 percent mixed race. The mean age was 20 ( $SD = 3.12$ ,  $mdn = 19$ , range 18 to 54).

### Measures and procedure

*Mobile phone use.* Participants were asked to think of the friend with whom they communicated the most using their mobile phone. They were asked to write the first name of their friend in a text box to increase the salience of the friend and to remind respondents



to complete all survey items with this friend in mind. To assess usage, respondents were asked two questions: 'On a typical day, what is the combined number of 1) voice calls you made and received on your mobile phone, and 2) combined number of text messages you sent and received on your mobile phone (including voicemails) with your friend?' On average, participants indicated that they made/received 2.21 voice calls daily ( $SD = 2.87$ ,  $mode = 1$ ,  $mdn = 2$ ,  $range = 0-30$ ), and sent/received 38.39 text messages daily to their friend ( $SD = 64.05$ ,  $mode = 50$ ,  $mdn = 20$ ,  $range = 0-650$ ).

*Mobile maintenance expectations* were measured using four items derived from Ling and Yttri (2002) and six items created by study authors. Following the work of Baxter and Simon (1993) on routine relational maintenance, the items assess interaction and inclusion expectations (Hall, 2011) and mundane relational maintenance (Tong and Walther, in press). Items were based upon routine, daily, and mundane activities (e.g., My friend expects me to call/text throughout the day to keep them posted on how my day is going). Items measured text messaging and voice calls separately on a five-point scale indicating the frequency of expectations (Never = 1, Always = 5). The ten items measuring voice call maintenance expectations were reliable ( $\alpha = .92$ ), and items were combined ( $M = 2.24$ ,  $SD = .84$ ). The ten items measuring text message maintenance expectations were reliable ( $\alpha = .93$ ), and items were combined ( $M = 3.29$ ,  $SD = .96$ ). See Appendix A for all items.

*Dependence* was measured using Parks and Floyd's (1997) instrument. Five items measured dependence using a five-point Likert-type scale (e.g., The two of us depend on each other; This person and I have a great deal of effect on each other; The two of us have little influence on each other's thoughts (reverse coded)). The measure was reliable ( $\alpha = .70$ ), and items were combined ( $M = 3.57$ ,  $SD = .63$ ).

*Overdependence* was measured using a modified version of Baxter and Simon's (1993) scale for romantic relationships. Items were measured using a five-point Likert-type scale. Items were changed to reflect overdependence in friendship (e.g., The friendship is detracting from things we need or want to do as separate individuals). The four original items were reliable ( $\alpha = .80$ ), and items were combined ( $M = 2.23$ ,  $SD = .63$ ).

*Entrapment* was measured by adapting seven items from the qualitative analyses of Baron (2010) and Ling and Yttri (2002). Items were measured using a five-point Likert-type scale. Items captured the degree to which participants felt stressed and pressured as a consequence of mobile communication with their friend (e.g., I feel stressed by the amount of contact with my friend through my mobile phone). The seven items were reliable ( $\alpha = .86$ ), and items were combined ( $M = 2.33$ ,  $SD = .76$ ). See Appendix A for all items.

*Relational satisfaction* was measured using Hendrick's (1988) relational satisfaction scale (e.g., I feel satisfied with our friendship). The five-item scale was reliable ( $\alpha = .84$ ), and items were combined ( $M = 3.97$ ,  $SD = .65$ ). Table 1 offers a correlation matrix of study variables.

## Results

The measurement model was tested using confirmatory factor analysis (CFA) procedures in MPLUS 5.0 (Muthen and Muthen, 2007). This technique ensures that individual items significantly loaded on their respective constructs and that cross-loadings were not significant. For mobile phone use, both ratio-scaled use and log-transformed

**Table 1.** Correlations between variables.

	Mobile phone use	Maintenance expectations	Dependence	Overdependence	Entrapment
Maintenance Expectations	.60***				
Dependence	.16*	.27***			
Overdependence	.22*	.37***	.10		
Entrapment	.14*	.23*	.06	.60***	
Satisfaction	.01	.02	.68***	-.40***	-.38***

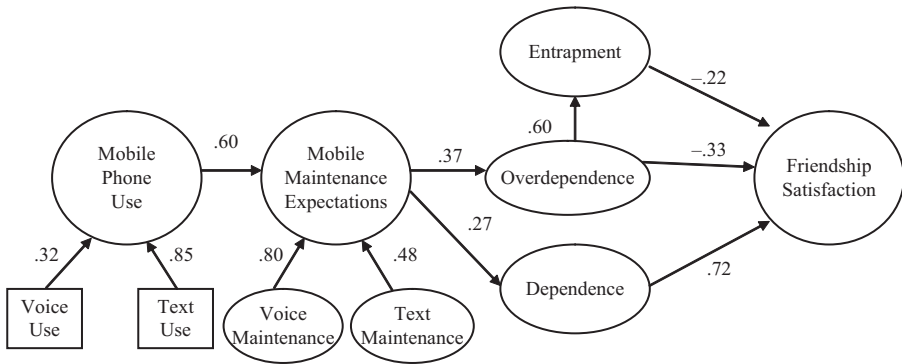
Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

use were tested for fit. Ratio-scaled data demonstrated a better model fit and were used in subsequent analyses.

Taken together, the hypotheses create a path model (see Figure 1), which was tested using SEM. The measurement model and the path analysis were tested in the same model. Although testing of a hybrid model is the recommended use of SEM, the increased parameters of latent variables in a hybrid model increases the chance of model misfit (Holbert and Stephenson, 2008). The goodness-of-fit statistics should be interpreted in light of following this recommendation. When testing SEM, it is important to explore the significance of individual paths as well as the overall global fit of the model (Byrne, 1998). Results demonstrated that the path coefficient between mobile maintenance expectations and entrapment ( $H_{2c}$ ) approximated zero ( $\beta = .01$ ,  $SE = .08$ ,  $p = ns$ ), so this path was removed and the model was retested. The measures of global fitness used in SEM indicate the degree to which the predicted model fit the data collected for this study. These data provided an adequate fit to the revised model (see Figure 2) (RMSEA = .065, 95% confidence interval  $.059 \leq RMSEA \leq .071$ ). The revised model had a 2.05  $\chi^2$  to degrees of freedom ratio (870.92/424), which is well below the recommended ratio of five (Byrne, 1998). Other fit indices indicated a nearly acceptable fit to the data (CFI = .88) (Byrne, 1998).

Consistent with  $H_1$ , mobile phone use positively predicted mobile maintenance expectations ( $\beta = .60$ ,  $SE = .16$ ,  $p < .001$ ). As mobile phone communication with a close friend increased, the expectations of mundane relational maintenance using the mobile phone increased. Consistent with  $H_{2a}$  and  $H_{2b}$ , mobile maintenance expectations positively predicted both dependence ( $\beta = .27$ ,  $SE = .09$ ,  $p < .01$ ) and overdependence ( $\beta = .37$ ,  $SE = .01$ ,  $p < .001$ ).  $H_3$  predicted that overdependence would lead to the experience of entrapment, and this hypothesis was supported ( $\beta = .60$ ,  $SE = .06$ ,  $p < .001$ ). Finally, hypotheses 4a–c were supported in that dependence ( $\beta = .72$ ,  $SE = .05$ ,  $p < .001$ ), overdependence ( $\beta = -.33$ ,  $SE = .08$ ,  $p < .001$ ), and entrapment ( $\beta = -.22$ ,  $SE = .08$ ,  $p < .01$ ) independently and significantly predicted friendship satisfaction.

The indirect effects of overdependence on satisfaction were tested using bootstrapping, which offers a better alternative for determining mediated effects than other mediation analyses (Preacher and Hayes, 2008). The direct effects reported above demonstrated that overdependence was a unique predictor of friendship satisfaction. The indirect effect of overdependence via entrapment suggested that additional variance in satisfaction is



**Figure 2.** Final path model for mobile maintenance and interdependence.

explained by this indirect relationship ( $\beta = -.13, p < .001$ ). That is, in addition to negatively predicting satisfaction independently, the effect of overdependence through the experience of entrapment further reduces satisfaction in friendship.

### Alternative models

Two alternative paths models were tested. The first alternative model explored whether the dialectical tensions of the friendship (i.e., dependence, overdependence) would create mobile maintenance expectations, leading to more cell phone use, finally resulting in entrapment and decreased satisfaction. This alternative model suggests that dialectic tensions are the motivating impetus for mobile maintenance expectations and mobile use, which then results in entrapment and reduced satisfaction. Examination of the path estimates indicated that dependence failed to predict mobile maintenance expectations. Furthermore, the global fit of the model was a worse fit to the data than the revised path model (RMSEA = .078, CFI = .82).

The second alternative model explored whether maintenance expectations increases mobile phone use, which results in dependence, overdependence, and entrapment, finally resulting in satisfaction. This model is similar to the hypothesized model, but tests whether mobile maintenance expectations drive mobile use, which in turn explains dialectical tensions and entrapment. Examination of the path estimates indicated that mobile maintenance expectations failed to predict mobile use and mobile phone use failed to predict dependence. This model also demonstrated a worse global fit to the data than the revised path model (RMSEA = .070, CFI = .84). This suggests that it is more likely that the use of the mobile phone results in maintenance expectations, rather than greater expectations resulting in greater phone use. This provides some evidence that the mere use of mobile phone technology in friendships creates obligations to be available and responsive.

### Discussion

The present investigation explored the effects of mobile phone use on the dialectic of interdependence in close friendship. The results demonstrated support for all but one

hypothesis, and suggest that increased use of mobile phones for the purpose of relational maintenance can be simultaneously a boon and detriment to friendships. The results of the present investigation are explored in greater detail below.

First, we demonstrated that mobile maintenance expectations are related to, but not the same as, mobile phone use. As the number of calls and texts to a close friend increased, the expectations of mobile maintenance increased, confirming the first hypothesis and providing construct validity for the concept of mobile maintenance expectations. This supports past research indicating that relational maintenance is one of the most important functions of mobile phone contact between friends (Katz, 2008; Ling and Yttri, 2002). The mode of friendship that ritualizes constant contact produces an obligation to be responsive, be available, and be connected (Licoppe, 2004). Our model demonstrated that this obligation affects relational satisfaction through the dialectical tensions of interdependence.

Importantly, we found that simply using the mobile phone with close friends affects how people perceive their obligations to maintain those relationships. The results of the alternative path model show that the data are better explained by considering mobile phone use as a predictor of expectations than the alternative explanation (i.e., that increased expectations result in greater use). Consistent with the concept of *apparatusgeist* (Katz and Aakhus, 2002), this suggests that mobile phones have a logic such that when they are used in closed friendships, people are steered toward increased expectations of connectedness and availability.

Third, our study supports the idea of media multiplexity (Baym and Ledbetter, 2009; Haythornthwaite, 2005) by showing that both texting and voice calls affected mobile maintenance expectations. The rapid increase in text messaging by young adults (e.g., Nielsenwire, 2010; Pew Internet, 2010) is reflected in the present sample, wherein the mode number of text messages sent to *one* close friend in a single day was 50 and the mean was 38. Although participants made considerably fewer voice calls to their close friend ( $M = 2.2$ ), our results show that voice calls contributed significantly to both mobile use and mobile maintenance expectations. By exploring the effects of text messaging and voice calls on mobile maintenance expectations independently yet simultaneously, it is clear that both uniquely contribute to increasing friendship expectations. That is, the use of each component of the technology increases friends' likelihood of experiencing an obligation to be responsive to one another. Although preferences in the use of technology use may change, each channel of communication has its own impact on personal relationships (Ledbetter, 2010).

Our findings also offer continued support for the theory of relational dialectics and demonstrate the theory's utility for understanding the interpersonal consequences of communication media. As others have demonstrated in qualitative investigations of mobile phone use (Arnold, 2003) and Instant Messaging (Nardi, 2005), the results of the present investigation quantitatively demonstrate that this obligation both establishes solidarity and brings about entrapment (Baym, 2010). The results of the path analysis demonstrate the duality of interdependence as predicted by dialectical theory (Baxter and Simon, 1993; Rawlins, 2009), and offer evidence that this tension may be inherent to the increased access afforded by mobile phone technology (Arnold, 2003; Baron, 2008). This tension could well result in difficulties when negotiating mobile maintenance

expectations in close friendships (Baym, 2010). In contrast to more deterministic accounts of the positive *or* negative consequences of mobile connectivity, these findings demonstrate that connection between friends is ironic (Arnold, 2003). On one hand, greater expectations increased dependence in friendships, which, in turn, increased relational satisfaction. However, greater maintenance expectations also increased overdependence, which reduced satisfaction. Between the two dialectical constructs, nearly 43 percent of the variance in friendship satisfaction was explained. This offers clear evidence that dialectical tensions in friendship can result in a strongly ambivalent relational experience and that mobile phones play a significant role in these processes.

Finally, we have clarified the concept of entrapment, building on the work of Baron (2010), Katz and Aakhus (2002) and Ling and Yttri (2002). The items created for this study provided a valid and reliable measure of an experience that is distinct from overdependence. Rather than a unique outcome of increased friendship maintenance expectations, the results of the path analysis demonstrated that entrapment is experienced as a consequence of overdependence. As a friendship becomes increasingly overdependent, the pressure mounts to respond to text messages and voice calls, and guilt increases when responses are delayed. This experience of entrapment, empirically operationalized for the first time in this manuscript, uniquely predicted dissatisfaction in friendship. Entrapment decreased friendship relational satisfaction beyond what would be expected by the positive experience of dependence and the negative experience of overdependence. Furthermore, analysis of the indirect effects offers another important finding: the experience of overdependence is channeled through the feeling of entrapment, resulting in an additional significant detriment to satisfaction in close friendships. Although overdependence significantly reduced satisfaction on its own, satisfaction was further decreased through greater guilt and pressure to respond to text messages and cell phone calls. Thus, mobile media can lead to more connectedness, but, as a consequence of favoring constant contact over autonomy, it can also lead to feelings of overdependence and entrapment.

### *Limitations and directions for future research*

The dialectical tensions inherent to mobile phone use are a worldwide phenomenon (e.g., Mariscal and Bonina, 2008; Rao and Desai, 2008), but the present study's participants were young, American college students. This investigation offered new measurement instruments that can be used to operationalize entrapment and mobile maintenance expectations (Appendix A) and a path model to test those relationships. However, the statistical relationships found here must be established in samples from different nations and age groups, as well as different types of relationships (e.g., romantic partnerships), to broaden the generalizability of the model.

Our method measured one person's perception of a relationship at one point in time in attempts to disentangle the internal logic of media use and the distinct positive and negative consequences of interdependence on relational satisfaction. Future research may seek to understand how maintenance expectations are negotiated between friends. In fact, the agreed-upon expectations of mobile phone use and phone personalization may be reflections of that negotiation. As Licoppe (2004) points out, the decision to not respond to a message or to turn off one's mobile entirely can either be an act of rejection

or an act conforming to mutually established expectations. As Nardi's (2005) work on Instant Messaging demonstrates, technologies can stand in for lost nonverbal channels of communication. Similarly, the mobile phone itself can nonverbally reinforce the presence of a relational partner through personalized ring-tones, vibrations, and digital photos. These personalized options might function dialectically as well. On one hand, personalization of mobile contact from a particular partner can enhance co-presence, but may also be experienced as a leash, reminding each person that they are never alone or free (Arnold, 2003). Although this investigation offers quantitative evidence of the value of dialectical theory in understanding the tensions of mobile phone use, future ethnographic or interview-based methods could use dialectical theory to explore how expectations of use and availability are established throughout the history of a friendship and how expectations are negotiated between relational partners during the continuing domestication of mobile technologies.

Although this type of mobile connectedness appears to be the favored mode of friendship for many young adults (Ling and Yttri, 2002), other friendship practices deserve further attention. Friends may also favor long, engaged phone conversations made in private spaces, or may choose to write detailed email messages rather than text messages (Licoppe, 2004). Friends who privilege long phone conversations and email messages, rather than short calls and frequent text messages, may have chosen to do as a rejection of the mode of constant contact. Although they are a minority among their peers (in this sample, only 12% sent 10 or fewer text messages per day), this mode of friendship is also part of a larger dialectical tension in friendship. Perhaps those who value longer conversations and messages likely favor independence rather than dependence in their friendships. Nonetheless, this study would suggest that in performing one side of this broader dialectical tension, those who enjoy longer calls and more detailed written messages may gain independence at the cost of missing out on the benefits of inclusion and connectedness through constant contact.

The results of this investigation reinforce that in personal relationships the consequences of technologies are paradoxical and ultimately unpredictable. As Arnold (2003: 253) wrote, 'the framing of technologies such as the mobile phone in Janus faced terms, allows the complexity and ambiguity of our mediated social position to be maintained in the course of analysis, and invites an examination of ontological fundamentals.' As ironic as it may be, overdependence is only made possible by dependence, and according to the results of the present investigation, both contribute to the overall satisfaction in a relationship, albeit in opposing directions. Rather than a deterministic force – either toward the benefits of connectedness or toward the bane of entrapment – the use of mobile phones affects relational satisfaction in both positive and negative ways simultaneously. Which side the balance tips toward for which partner at which point in time is the product of several simultaneous influences – not all captured in the present investigation. We hope that future research will explore these unfolding tensions in more depth across diverse populations, relationships, and contexts.

### **Authors' note**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. A previous version of this article was presented as a paper at the 2011 National Communication Association Conference in New Orleans, LA.



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## Appendix A

Mobile Maintenance Expectations (Calling and texting measured separately)

(Never = 1, Always = 5)

My friend expects me to call/text to communicate about the things we are planning to do together

My friend expects me to call/text to check in

My friend expects me to call/text to keep them updated

My friend expects me to call/text to just say hello

My friend expects me to call/text to pass the time

My friend expects me to call/text to tell them where I am

My friend expects me to call/text to tell them where I am going

My friend expects me to call/text to tell them what I am doing next

My friend expects me to call/text to tell them what I am doing now

Entrapment

(Strongly Disagree = 1, Strongly Agree = 5)

Sometimes I don't want my friend to contact me

I feel pressured that I have to be available to my friend

I feel stressed by the amount of contact with my friend through my mobile phone

I am pressured to respond quickly to all calls or texts from my friend

If I don't respond quickly to my friend's phone messages, they are annoyed with me

I feel pressured to call or text to tell my friend what I am doing

I feel pressured to call or text to keep in touch with my friend

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