Are You With Me? The Impact of Losing a Conversation Partner’s Attention to a Mobile Device

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ARE YOU WITH ME? THE IMPACT OF LOSING A CONVERSATION PARTNER’S ATTENTION TO A MOBILE DEVICE

by

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A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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Zachary A. Geller

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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THE CITY UNIVERSITY OF NEW YORK
ABSTRACT

Are You With Me? The Impact of Losing a Conversation Partner’s Attention to a Mobile Device

by Zachary A. Geller

Advisor: Professor Paul L. Wachtel

This study examined the impact of a cell phone interruption on participants’ emotional experience during a conversation, using the Thematic Apperception Test (TAT) (Murray, 1943) as a measurement instrument. The study explored whether or not, after losing their conversation partner’s attention to a cell phone, subjects would: tell stories reflecting less adaptive representations of relationships with oneself and others, as measured using a social cognition and object relations rating, SCORS (Stein et al, 2011); tell stories containing more negative emotional words, as measured using a linguistic inquiry software, LIWC (Pennebaker, 2001); and tell stories containing fewer words total.

Methods: The study’s participants were 90 undergraduates enrolled at The City College of New York, between the ages 18-26 with an average age of 20.1 years. They were asked to tell three stories in response to three TAT picture cards, then exposed to one of three conditions, then asked to tell three more stories in response to TAT picture cards. During the period between the first three cards and the second three, subjects were asked what the experience of telling stories was like. One-third of subjects were uninterrupted (control condition), one-third were interrupted by the sound of the experimenter’s cell phone to which the experimenter attended (cell phone condition), and one-third were interrupted by a knock on the door to which the experimenter attended (door knock condition). After the experiment, subjects were debriefed to check for suspicion.
This study unified two experimental methods heretofore only used separately. It made use of an active cell phone interruption, which had previously only been used to look at the interruption’s impact on cognition (Smith et al, 2011; Thornton et al, 2014), and it made use of a conversation paradigm, which had previously only been the setting for examining the impact of the mere presence of a cell phone on trust and relationship satisfaction with a conversation partner (Przybylski & Weinstein, 2012).

Results: Surprisingly, subjects in the cell phone interruption condition, compared to those in the control condition, told stories after the manipulation which reflected higher self-esteem. Results also indicated that those in the control condition told stories in the second set of three stories that used words with more positive emotional tone than those in the cell phone interruption condition. Lastly, while not statistically significant, participants in the control condition told stories in the second set of three stories with on average 19% more words than their first three stories, while those in the phone interruption condition told stories that became modestly shorter subsequent to the interruption.

Discussion: The findings suggest that participants experienced some emotional impact as a result of losing their conversation partner’s attention to a cell phone. They told stories containing themes of higher self-esteem. Unlike those in the control condition who demonstrated an increased positive emotional tone after being asked about their experience, they did not experience a boost to the positive emotional tone of stories told after being interrupted during conversation. And while not statistically significant, unlike those in the control condition who told stories containing more words after being asked about their experience, those interrupted by a phone told stories that contained moderately modestly fewer words.
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The author wishes to dedicate this scholarly work to the memory of his mother, Marjorie Geller, who instilled in him the belief that he could accomplish whatever he set his mind to, and stimulated within him the desire to understand the world ever more deeply.

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Chapter 1: Introduction

Longed for here is the pleasure of full attention, coveted and rare. These teenagers grew up with parents who talked on their cell phones and scrolled through messages as they walked to the playground. Parents texted with one hand and pushed swings with the other. They glanced up at the jungle gym as they made calls. ... Previously, children had to deal with parents being off with work, friends, or each other. Today, children contend with parents who are physically close, tantalizingly so, but mentally elsewhere. (Turkle, 2011, p. 266)

Writing in her book *Alone Together*, psychologist and technology researcher Sherry Turkle poignantly captures an experience of children and adults alike in the information age: one cannot be sure whether or not she has another person’s complete attention. How might the persistent threat and experience of interruption affect one’s perception of relationships? Ultimately, what might the impact of this uncertainty be on individuals’ psychological well-being? These questions are the focus of the proposed dissertation study.

The rate of adoption of mobile phones and the prevalence of text messaging and other behaviors associated with the mobile phone demand our attention. As of October 2014, 90% of American adults owned a mobile phone and 94% of mobile phone owners ages 18-49 used text messaging (Smith, 2015a). 46% of smartphone owners say they “could not live” without their phone (Smith, 2015b).

Interestingly, despite the inexorable trend of mobile phone adoption and usage, individuals report growing ambivalence about their phone ownership and usage. While 70% of adults in a recent survey by Pew indicated that their smartphone “granted [them] freedom,” 30% of adults surveyed said the phone was “a leash” (Smith, 2015b). As individuals’ feelings about phones grow increasingly complex and even contradictory, their habits also change: a Pew study in 2011 found that 31% of phone owners now prefer text messaging to talking (Smith, 2011).
The way we relate to one another is changing, and compels us to ask, in the experience of owning one of these powerful devices, what may be gained and what might we be at risk of losing?

The idea that a new technology may bring us risks as well as rewards is not a new concern: every technological revolution in human history has come with its critics and those concerned that something -- even something perhaps intangible -- is being lost as we adopt new tools. Indeed Plato was even concerned about writing, saying, “this invention will produce forgetfulness in the minds of those who learn to use it,” and that pupils taught using the written word will evince “the appearance of wisdom, not true wisdom” (Hackforth, 1972). The arrival of Gutenberg’s printing press was decried by monks who feared “he who ceases from zeal for writing because of printing is no true lover of Scripture.” More modern innovations like the telephone and television were feared to “break up home life and the old practice of visiting friends.” (Feifer, 2014).

These examples are often cited as counterarguments to the concerns raised by those like Turkle who point to what may be lost vis a vis human connections in our era of constant communication. These counterarguments are employed to illustrate that nothing has been lost as new technology is ushered in and that these inventions have only pushed forward human progress. While that assertion itself deserves scrutiny (e.g., have we sacrificed nothing at all despite the gains from these inventions?), what also deserves scrutiny is the logic that simply because past innovations have been well-integrated into our culture, current innovations do not come with attendant risks.

This dissertation seeks to understand from a psychological point of view if and how the proliferation of today’s most pervasive technological innovation, the mobile phone, impinges
upon the quality of our interpersonal, in-person interactions. Specifically, what is the experience of an individual who, during a conversation, loses his conversation partner’s attention to the partner’s cell phone due to an incoming text message interruption?
Chapter 2: Literature Review

While the phenomenon of interest in the present study -- the impact on an individual of a cell phone interruption of an in-person conversation -- has yet to be studied in the fashion proposed here, the literature has investigated substantial topics just adjacent to this particular issue. Relevant to this work are investigations of how technology is already known to interact with psychological phenomena, as well as studies looking solely at live in-person social interactions. The literature review will look first at the study most directly related to this investigation, one looking at the impact of cell phone presence on in-person interaction, and then will consider observational and experimental studies of the impact of cell phone use on relationships; experimental work investigating the effects of cell phone use and presence on attention and cognition; experimental investigations of rejection sensitivity; and ideas in the literature about the importance of the reliable availability of others who we can depend upon in our social world.

Mere presence of the cell phone and trust and relationship satisfaction

In 2012 Andrew Przybylski and Netta Weinstein at the University of Essex in the UK undertook an experiment that could be considered the direct predecessor to this dissertation work. They sought to understand what the impact of the mere presence of a cell phone would be on the way subjects experience an interpersonal interaction.

The experimenters paired participants into conversational dyads and instructed each dyad to talk about one of two topics: a casual topic or a meaningful topic. Each dyad was placed into one of two environmental conditions: a room with a cell phone placed on a table next to them,
or a room with a notebook placed on that table. That is, the experiment had a 2 x 2 design: two levels of conversation topic condition and two levels of cell phone environment condition.

After the dyad had a ten-minute conversation, the participants completed a number of paper-and-pencil measures assessing relationship quality (e.g., “my partner and I could be friends”), partner closeness (with each partner represented as a circle, to what degree the participant feels that the circles overlap, representing closeness), partner trust (e.g., “I feel like I could really trust my conversation partner”), and partner empathy (e.g., “To what extent do you think your partner accurately understood your thoughts and feelings about the topic?”).

Across all of their outcome measures, the experimenters found both a main effect of cell phone condition and an interaction effect between the conversation condition (i.e., casual or meaningful) and the cell phone condition. The presence of the mobile phone appeared to inhibit the development of interpersonal closeness and trust and to reduce the extent to which individuals felt empathy and understanding from their partners. These effects were most pronounced if the individuals were discussing a personally meaningful topic.

A facet of this experimental design leaving room for further investigation by the present study is its ambiguity: the authors have no insight into to whom the participants thought the cell phone belonged. In this way, the phone is treated as a disembodied stimulus, decoupled from its owner. Since the authors do not discuss any debriefs or checks for suspicion, we cannot know what the participants’ conscious or unconscious beliefs about the phones were. Did they think they were recording the conversation? Did they think the phones would ring? Did they think someone left the phone behind? Would they have even reported that a phone had been present?

Despite these ambiguities, the authors found significant results. Given the ostensible innocuousness of the stimulus -- a phone placed on a table -- the consistency of the results is
remarkable. What could account for the disparity in participants’ experiences in different conditions?

The authors postulate two hypotheses. First, that the phone operates as stimulus that activates internal representations of one’s own social networks, priorities, and important personal connections. This activation in turn crowds out the present face-to-face conversation. This is an attractive hypothesis. The cell phone certainly represents the way that many people communicate with loved ones, and it most likely is much more than that: the phone holds photos, messages, and the access to so many aspects of a person’s psychological existence. When these primary sorts of relationships and aspects of one’s life are put up in competition against forming a relationship with a stranger, it is easy to see how -- likely out of one’s awareness -- one could begin to remove investment from the present conversation as one may start to dwell on other relationships, or come to realize that he has many rich interpersonal relationships and does not need to invest in a new one. What remains ambiguous about this hypothesis is related to the original ambiguity of the study: does the person, as a subject, begin to lower his own investment in his partner? Or, does he defensively, as a preemptive response, begin to lower his own investment as he imagines his partner is doing because of the phone? Or, does the subject perceive a decreased investment from his partner, whose energy is elsewhere, and therefore report lower satisfaction?

Przybylski and Weinstein’s second explanatory idea is that people form “individual and enduring implicit associations with phones,” and that such attitudes, behaviors, and cognitions interrupt here-and-now interactions. This seems to propose that the phone is more than a stimulus, the response to which has become powerfully and idiosyncratically durable for each person. Perhaps the phone is something to which one must respond, which one must check, or
which could even represent disaster. Perhaps if this stimulus is present, it takes a great amount of energy to *not* interact with it; one expends energy and attention not completing a well-conditioned response to the phone.

Regardless of the explanatory mechanism, the results of this experiment are exciting and leave plenty of room for further research, and the present dissertation study will seek to build upon this prior study’s initial work by removing some of the ambiguities in the design as well as using a different measurement methodology to try and understand not only what subjects *report* after an experience, but what may lie outside of their awareness.

Cell phones and relationships

In addition to looking at narrow study designs like the one above, another point of entry for understanding the impact of the cell phone on any live, in-person interaction may be what we know about how the cell phone affects established relationships. The research aimed at understanding the cell phone’s impact on both romantic and close friendship relationships is broader than the in-person interaction research noted above, and has yielded mixed results thus far. Experimental and even observational research has yet to provide consistent data supporting theoretical ideas proposed by Turkle (2011) and others.

In a group of studies that did not yield significant results, authors have variously attempted to manipulate the text messages sent between romantic partners in day-to-day life (Luo & Tuney, 2014), understand the impact of text message interruptions on relational satisfaction in the laboratory (Servies, 2012), and see what relationship may exist between text message frequency and relational satisfaction (Jin & Peña, 2010). Authors of these studies have speculated about their lack of significant findings and have cited possible reasons as: the
implausibility of scripted text messages being sent to real romantic partners (Luo & Tuney, 2014), the failure of the laboratory to resemble real-life situations (Servies, 2012), and the possibility that ultimately there may not be a relationship between the phenomena of interest (Jin & Peña, 2010).

This author maintains that one unifying limitation of the aforementioned studies, like the Przybylski and Weinstein study reviewed in the section above, is their use of dependent variable measurements that look at explicit, manifest phenomena. The participants were asked about their mood or their relational satisfaction during the study. These paper-and-pencil measures leave open the possibility that participants are demonstrating defensive behaviors that protect themselves and their relationships from the threats of negative appraisal. The present dissertation study will seek to remedy this issue by assessing for the feelings that may be held outside of conscious awareness using projective techniques described in the Methods section below.

There have been nonexperimental studies, however, that have shown the ways in which electronic devices impact dyadic relationships. Hall and colleagues (2014) found a surprising result when looking at the mobile phone usage patterns and relational satisfaction of romantic partners. While they hypothesized that romantic partners would want one another to adhere to what they perceived to be societally accepted norms regarding phone use in public and private (e.g., to not use a phone when out to dinner; to speak quietly in public; see Ling 2008 for extended discussion), they found that individuals did not care whether or not their partners adhered to societal norms, rather, they only cared that their partners’ internalized norms about phone use were similar to their own. This would seem to suggest that if one’s conversation partner attends to his phone in a way discrepant with one’s own phone usage patterns, one could feel particularly slighted.
Luo (2014) sought to understand what predicts young adults’ texting use in close relationships and whether texting is likely to facilitate or hinder relationship development. This bears on the proposed dissertation study, as understanding the live, in-person response to phone interruptions may be bolstered by enriching our understanding of people’s attitudes about phone use in relationships more broadly. Luo’s was the first study to control for two important variables which could be unseen influencers of texting behavior in romantic relationships: physical distance between the partners (i.e., physical distance would seem to disproportionately influence the amount of texting between partners) and the amount of texting with respect to the total amount of communication between the partners (i.e., Luo measured the share of communicating that was done over text, as opposed to measuring only absolute amount of text messages). Luo also investigated the influence of attachment on texting behavior in relationships, which, while not covered in the present paper is a worthy topic for investigation, as the avoidance and anxiety constructs of attachment lend themselves nicely to thinking about ways in which people may prefer to communicate (e.g., at arm’s-length via text or in person face-to-face).

When looking at texting and relationship satisfaction together, Luo found that the texting share of communication was negatively associated with relationship satisfaction: the greater the proportion of communicating with the partner done over text, the lower the relationship satisfaction is likely to be. Luo also found that the absolute amount of texts sent between the partners is not associated with changes in relationship satisfaction. This lends support to the idea that texting per se between partners may not be harmful; it may only be harmful when it crowds out other forms of communication. Two supporting results were found in other studies as well. In his study of 19 relationship dyads, Pettigrew (2009) found that texting may serve as a useful, supplemental communication tool that complements face-to-face interactions, particularly
when face-to-face is not available. And a larger survey of individuals by long-time technology researchers Donna and Fraser Reid in the UK (2010) showed that overreliance on texting may harm relationships because texting is less intimate, direct, and personal compared to face-to-face interactions. With that said, and despite that lack of causal relationship, there seems to be support for the idea that the communication and relating done over text message is inferior to face-to-face communication with respect to relationship quality. It is this inferior quality of communication that may be brought to mind any time technology interrupts face-to-face communication, as will happen in the dissertation study.

An increasingly prevalent and more nuanced way to conceive of the role of the cell phone in relationships has emerged in a set of papers which seeks to elaborate the ambivalent experience of the cell phone by individuals, as cited in the Introduction. These studies provide evidence for the sort of tension that Turkle tries to draw out in her books (e.g., 2011), describing individuals’ at times strong attachment to and at other times rejection of the presence of the phone. Just as texting may increase the feelings of safety and security in relationships and in the world at large (e.g., one feels safe because he can use the phone to reach loved ones at any time), it may simultaneously shackle individuals to their own devices and to others not in their presence (e.g., one may feel constrained because he can be reached by loved ones at any time). Turkle’s idea of the phone as “amulet of safety” and Ribak’s idea of the phone as umbilical cord (2009) suggest that the phone becomes a necessary and ever-present personal effect, even if it does have deleterious effects at other times.

This setting up of a potential dialectic -- things both gained and lost -- informed two recent investigations explicitly looking at the nature of the role of texting in dyadic relationships. A 2011 study by Hall and Baym sought to understand the dynamics of dependence and
overdependence that may be instantiated by texting in close friendships, while a study by Duran, Kelly, and Rotaru in the same year looked at the mobile phone in romantic relationships and the dialectic of autonomy versus connection.

Results of these studies indicated that using mobile phones to call and text friends increased expectations of relationship maintenance through mobile phones. These increased mobile maintenance expectations predicted both dependence (which increased satisfaction) and overdependence (which decreased satisfaction) on the relationships, bearing out the theoretical work of Turkle and others.

Attention, Cognition, Interruption, Interaction

As this study’s intention is to look at the impact of technology interruption on interpersonal interaction, one area worth reviewing is the work that has been done to understand the impact of technology interruption and presence on other psychological processes such as attention and cognition. For, while studies of these phenomena do not look at feeling-states per se, we can posit that the quality of attention and cognition that an individual displays when in the presence of another person will impact that person’s feelings about the interaction.

Distracted driving and other attentional studies

One of the earliest and most productive areas of research on technology interruption has been on phone use and driving: what happens to a research subject in a simulated or real-world driving situation who must attend to a phone while driving? In their seminal study on real-world data, Redelmeier and Tibshirani (1997) found that fully one-quarter of those involved in a sample of almost 700 car crashes in a fourteen month period had been using their mobile
phones within ten minutes prior to the crash, and that using a cell phone while driving was
associated with a fourfold increase in the likelihood of being involved in a crash. Because of the
impact of results like these, and mortality associated with this phenomenon, there has been ample
support for research in the area. In a series of experimental studies, Strayer and Johnston (2003)
demonstrated that participants engaged in cell phone conversations while in a simulator were
more likely to drive through traffic signals and to react to the signals they did see more slowly
than drivers who were not using phones; they also demonstrated that there was no difference in
performance between those using handheld and hands-free devices. Crucially, in contrast,
listening to the radio or to a book on tape did not impact driving performance. That is, it is not
just the cognitive activity of attending to and processing information that is distracting; there is
something unique about interacting with another person through a phone that creates its own
nature of distraction. The robustness of results like these suggests that we all have some
conception and experience with drivers whose attentional capacities are impaired by the use of a
phone, and that these conceptions we hold in mind must affect the way we perceive the attention
we receive from people who are distracted by phones.

Distracted driving studies have demonstrated that distracted drivers show decrements in their ability to react to stimuli and are less likely to remember novel stimuli that appeared during the driving simulation when shown them later. It is this capacity to remember novel stimuli that seems most relevant to interpersonal interactions; a conversation partner’s ability to remember what one has said would certainly be a criterion for evaluating whether or not one is a good enough conversation partner.

Ira Hyman at Western Washington (2010) sought to extend findings from driving simulators to walking to see to what degree cell phone users display this same inattentional
blindness while walking. In a naturalistic observational study, his team watched students walk across a main campus quad and categorized each subject as either on a phone, listening to music on a portable device, walking in a pair, or simply walking alone undistracted\(^1\). During the observational trial, the experimenters arranged for a particularly salient stimulus to be present in the environment: they had a unicycling clown ride around one side of the quad. When the observers stopped their participants after they had walked through the quad and asked if they had seen anything unusual, fewer than one in ten cell phone users said they saw the unicycling clown, while a third of the music listeners and individuals, and more than half of the people in pairs reported having seen it. When then told that there had been a unicycling clown, and asked if they had seen it, only one quarter of cell phone users said yes, while more than half of the music listeners, the individuals, and the people in pairs all reported having seen it.

In essence, cell phone usage made individuals significantly less likely to even notice an unusual stimulus, or to confirm that they had seen one that had been present.

While this sort of phenomenon is not necessarily at play all the time, the dissertation study seeks to *evoke* the experience of being a person in the world surrounded by others who are distracted and less likely to notice novel stimuli. If reminded of what it is like to be with someone who can only give this impoverished quality of attention, what sorts of emotions might people display?

\(^1\) An attractive part of the design, despite its inherent limitations of being an observational study, is the groups: the music controls for device usage in general, and the walking partner controls for the phenomenon of having a conversation. The group has tried to isolate the unique experience of having a conversation on a cell phone.

\(^2\) This author offers a critique of the Thornton study. Those in the experimental condition were *doubly* primed: they were told the study would be related to phones, and they had their phones
Active distraction and cognition

While the studies above are interested in attention during distraction, and whether or not distracted individuals notice stimuli, another group of studies looks at cognitive capacities in distracted individuals. The first group to substantively extend the study of phone-based distraction on cognition from solely in a driving paradigm to more of a cognitive paradigm was Smith et al (2011). This study utilized the DRM paradigm (Roediger & McDermott, 1995) of memory recall: words presented to participants all shared a semantically related “critical lure” in common. For example, the words “crib,” “rattle,” “blanket,” and “bottle” may have been presented while the word “baby” was not presented. In this case “baby” is the critical lure: it was not presented during the training period but because of its relation to the presented words, it may be erroneously recalled as having been presented. In this group’s experiment, distracted participants showed an error of particular import to the dissertation study: they were more likely to commit false positive errors during a later recognition phase of the experiment, incorrectly stating that they had seen words that had not previously been shown in the learning phase. Smith and colleagues hypothesize that those in the distracted condition encoded and recalled information with less precision and attention, making approximations of information which led to faulty recall.

This “false positive” recall effect during a cognitive study may very well be mirrored in interpersonal interaction outside of the laboratory. It is possible that the conversation partners of phone-distracted individuals end up on the losing end of a sort of “false positive” recall wherein distracted people think they have heard things that have not been said, giving their conversation partners only an approximation of being heard, resulting ultimately in less satisfying or even less helpful (Cohen, 2000) communication. This result in the cognitive realm demands extension
and exploration in the emotional realm, and the conditions in this dissertation study will seek to evoke feelings, possibly held outside of conscious awareness, of not being heard or listened to. While what is at issue in the dissertation experiment is not the veracity of data recall and its relationship to cell phone distraction, what the study may succeed in drawing upon is participants’ previous and repeated experience of interacting with distracted conversation partners.

Mere presence and cognition

A crucial innovation of Przybylski and Weinstein’s (2012) study discussed above is its use of the mere presence of the cell phone as a condition to be manipulated. This manipulation draws directly on preceding theoretical work from authors like Turkle (2011) and Carr (2011) who observe that the phone “provides a continual source of interruptions and distractions and potentially diminishes our ability to maintain attention and to concentrate and think deeply about things” (p. 479 in Thornton et al 2014). The use of the mere presence paradigm extends the phone from source of interruption to “conditioned stimulus, whereby its simple presence is capable of creating a distraction from the immediate task or situation at hand.” In this way the phone may act as a very powerful stimulus akin to those that distract individuals because they evoke thoughts unrelated to the task at hand, although in the case of the phone, it remains unknown what sorts of distracting thoughts are evoked: those of one’s own social networks, the potential to be interrupted, or something else entirely.

Thornton et al (2014) make use of Przybylski and Weinstein’s (2012) innovation of mere presence and import this manipulation into the cognitive realm. They sought to find out whether the mere presence of the participant’s cell phone would impair performance on cancellation
tasks of varying difficulties, as it impaired participants in Przybylski and Weinstein’s study in their capacity to develop trust toward their conversation partners.

Thornton et al established two conditions in their study for the students they asked to complete an exercise. For the experimental group in one classroom, they told students that they would complete an exercise related to cell phones and that the students should keep their phones on their desks during the exercise in case they needed to reference them. For the control group, students were given no special instructions and therefore kept their phones in their bags per usual class policy.²

On a timed cancellation task including simple addition, the experimenters found that participants whose phones were on their desks did significantly more poorly than those whose phones remained in their bags; they were more likely to make errors of basic cognition.

A crucial idea to hold in mind when considering the above studies is that they serve to show us that, whether or not we as individuals detect some detriment to people’s attentional capacities thanks to the cell phone, evidence suggests that indeed this is the case. This evidence contradicts the widely-held assumption that people may truly be able to successfully “multi-task,” and suggests that despite one’s confidence and potentially good intentions, cell phones may impinge on people’s ability to devote complete attention to the environment or one another, resulting in what may more aptly be thought of as “continuous partial attention” (Stone, 2012). The complement to this idea is that persons interacting with those who are distracted by cell

2 This author offers a critique of the Thornton study. Those in the experimental condition were doubly primed: they were told the study would be related to phones, and they had their phones out on their desks. Participants in the control condition were neither primed regarding phones being in the study, or by phones being out on desks. Therefore it would seem impossible to decisively attribute the effect of the study to either the expectation regarding phones or their presence.
phones -- the persons of interest in this study -- may be at least partially aware of the impoverished sort of attention they are receiving and feel incompletely seen and heard.

Rejection Sensitivity

The experience of rejection can be both a traitlike characteristic and a specific state induced by circumstances. Since the concern of the dissertation study is the experience of an individual who suffers an interruption, both the trait of proneness to feeling rejected and the transient state of feeling rejected are important to review.

The desire to achieve acceptance and to avoid rejection is widely acknowledged to be a central human motive (Downey, 1996). Geller et al (1974), investigating the state of an induced feeling of rejection, had confederate graduate students ignore subjects during a group conversation and found that not only did ignored subjects speak fewer words, they also subsequently evaluated themselves and their confederates less favorably than control subjects. While later work, led by Geraldine Downey, would focus on the trait of rejection sensitivity, Geller found a significant state effect of being ignored on words spoken by subjects. The present study will build on this earlier study in its aim to understand the impact of a technology interruption on an individual.

A central element of the formal rejection sensitivity (RS) work done in the past two decades is the Rejection Sensitivity Questionnaire (RSQ) developed by Downey and first reported with Scott Feldman (Downey & Feldman, 1996) to assess for the trait of one’s likelihood to feel rejected. The RSQ is a self-report measure with 18 items each consisting of a scenario (e.g., “You ask someone in class if you can borrow his/her notes”) followed by two questions: “How concerned or anxious would you be over whether or not (e.g., the person
would want to lend you his/her notes)?” and “I would expect that the person would (e.g., willingly give me his/her notes).” The two questions are answered on a six-point scale: the first from “very unconcerned” to “very concerned” and the second from “very unlikely” to “very likely.”

One feature of this measure is that it is self-reported (see, e.g., Hofmann & Gawronski, 2005). It necessarily turns upon the degree to which the participant is a reliable historian, but it also requires the participant to have a sufficiently sophisticated theory of mind (see, e.g., Dennett, 1981) to be able to imagine himself in a hypothetical situation. From a psychodynamic point of view, this measure also does not account for the idea of defenses, that is, to what degree the participant may disavow his likelihood to feel a certain way (Freud, 1946). While certainly Downey’s measure captures a fair portion of the variance about how rejection-sensitive an individual is, it misses those whose sensitivity is outside their conscious awareness.

Validation studies by Downey & Feldman (1996) have shown that those who scored higher on the measure reported significantly greater feelings of rejection after an experimental manipulation than did control subjects. Highly rejection sensitive (HRS) people were also more likely to ruminate over a rejection while those low in rejection sensitivity (LRS) were not concerned about an apparent rejection by a confederate. In fact, they were more likely to attribute an ambiguous rejection situation to circumstances rather than a confederate’s disposition.

Buckley et al (2004), in a study of both HRS and LRS participants who were extremely or moderately rejected by a confederate partner, found that emotional reactions did not differ in the extreme and moderate rejection conditions. Additionally, these authors did not find a significant interaction between the RS level of the individual and experimental condition: HRS
individuals reported more negative mood and less self-esteem regardless of their level of rejection-acceptance feedback. That is to say, regardless of the participant’s trait proneness to feelings of rejection, the participant would be equally likely to feel rejected after the manipulation in the study.

Contrasting Buckley’s results, Ayduk et al (2007) examined aggression following rejection using a hot sauce paradigm wherein rejected participants had the opportunity to create hot sauce snacks for the perpetrators of their rejection and found that participants across the rejection condition allocated more hot sauce to the rejection perpetrator than those in the control condition. However, RS moderated this effect such that rejection elicited aggression in high but not low RS people; LRS people did not behave aggressively when faced with rejection. This particular result, at odds with Buckley et al above, would indicate that RS should be a moderator of response to the sort of technology interruption being studied in the dissertation.

In line with Ayduk et al, Romero-Canyas et al (2013) showed participants videos of actors ostensibly responding to the participants’ online dating profiles with either positive, neutral, or negative faces. Their overall finding was that LRS individuals were less likely to perceive the videos as rejecting than were HRS individuals. This result reinforces the idea that LRS individuals are operating in the world with a more situational set of assumptions, interpreting ambiguously negative stimuli as not necessarily rejections, whereas HRS individuals are more likely to interpret potentially ambiguous stimuli as rejecting per se.

Feeling disliked, unappreciated, excluded, or devalued evokes negative emotions, lowers self-esteem, and may result in antisocial reactions such as aggression or withdrawal. In the papers reviewed above, no matter how acceptance and rejection were conveyed in these studies, participants who did not feel valued by others generally experienced negative emotions such as
hurt feelings, sadness, anxiety, loneliness, and shame (Buckley et al, 2004). The question at hand here is: to what degree will an electronic interruption be experienced by subjects as a rejection? To what extent will it be experienced as being ignored (Geller, 1974)?

Presently there appears to be limited evidence to support a connection between the state and trait of feeling rejected and while these two phenomena bear on understanding one’s experience of a technology interruption, there is not enough conclusive evidence to demand that RS be considered a moderator in the present study. Nonetheless work on the subject may inform the hypotheses, especially when considering the Geller (1974) ignoring study and the Ayduk (2003) hot sauce paradigm which showed main effects regardless of one’s level of RS.

Reliable Availability

One way to consider the potentially insidious and chronic impact of the cell phone on people’s security in their relationships is to call to mind Winnicott’s (1971) conception of what is provided to a child whose caregiver shows him that she is consistently available to him. Once the child comes to understand that the mother is available, he no longer needs to look back to check that she is there. This sort of reliability gives the child the knowledge that should he need his mother, she will be there for him; otherwise he is free to be alone, to explore, and to play.

The presence of the cell phone in life seems to turn this idea on its head. Whereas previously a child had some ability to perceive whether the caregiver is available or not available, the cell phone introduces the degree of not-knowing referenced by Turkle in the opening passage of this proposal: the mother who is “tantalizingly close, yet mentally elsewhere.” Whereas Winnicott’s child could learn over time whether his mother would be predictably available, the potential of the cell phone to always interrupt renders his predictive
capacity useless and leaves it to the whim of the phone which could ring at any time: the available mother is instantly made unavailable. For Winnicott, the child who is not able to rely on his mother’s availability suffers in myriad ways: he is impeded in the development of a capacity to be alone and to play, and is at risk for developing a “false self” (1960). While the developmental impact of the presence of cell phones is a subject too expansive for the present study, Winnicott’s ideas about the benefits of the confidence in knowing that the people in our midst are truly paying attention to us -- are “with us” -- are certainly among those to be investigated in the present study.

Another lens through which to conceive of the importance of reliable availability is more explicitly the perception of availability as related to social support. The health literature on the relationship between social support and health outcomes is well-established: studies and reviews have demonstrated the positive impact of social support on health (see Cohen, Gottlieb, & Underwood, 2000, for an overview), and it may be the belief in its availability that drives the efficacy of social support (Cohen et al., 2000, p. 7). If in fact this intrusion of mobile phones about which Turkle speaks above -- and about which research heretofore has only explored with relation to attention and cognition -- reduces one’s perception of intimacy, one may also lose out on the benefits provisioned by effective social support.

What both Winnicott’s and Cohen’s ideas about the impact of the loss of perception of availability leave still to be explored is: what it is like in the moment to lose someone’s attention to technology? And while both Winnicott’s and Cohen’s worlds were full of the sort of physically apparent reasons for interruption -- mother attending to a knock on the door, a boiling pot, another person in the room -- this study seeks to understand what may be evoked that is different because of a technology interruption.
Chapter 3: Methods

The present study proposes to respond to the questions posed above using an experimental design in which subjects will be exposed to a technology interruption, and asked to tell stories in response to Thematic Apperception Test (TAT) cards. The TAT is one of the most prominent methods for assessing representations of social and personal relationships (Murray, 1943, Westen, 2002). Differences in relationship themes in stories told before and after the interruption will be compared between three conditions: a technology interruption (experimenter answering a text message during conversation), non-technology interruption (experimenter answering a knock on the door during conversation), as well as a no-interruption condition. It is hypothesized that stories told after the technology interruption (but not after the doorknock interruption) will reflect diminished themes of trust and relatedness and increased themes of abandonment and aggression. It is also hypothesized that stories told after the technology interruption will contain fewer words than stories in the other conditions.

Participants

The study will recruit 90 undergraduate psychology students at The City College of New York through CCNY’s study participant volunteer portal. Sample size was calculated based on principles outlined by Cohen (1977). Eligibility criteria include: 1) ages 18-28; 2) ability to speak English.

Data Collection

The proposed research will collect data during an experimental study. Participants will be recruited through the Psychology research subject pool at The City College of New York
where students may be required to participate in or receive extra credit for participation in studies; others may volunteer for their own interest.

Data collected will be stories told in response to pictures on Thematic Apperception Test (TAT) (Murray, 1943) cards following the prompts, “Tell me a story about this picture. What is happening now; what happened before; what will happen next; what are the people in the picture thinking; how are the people in the picture feeling?”

During the first phase of the experiment (“pre-manipulation”), participants will tell three stories in response to three TAT cards. During the second phase of the experiment (“manipulation”), during a conversation with the experimenter, participants will experience one of three interruption conditions: the experimenter will receive and respond to a text message (technology interruption), the confederate will respond to a knock on the door (door knock interruption), or there will be no interruption. During the third phase of the experiment (“post-manipulation”), participants will tell three more stories in response to three more TAT cards. It should be noted that for the sake of the study, the two sets of three stories are pre- and post-manipulation, but the participant will experience these as simply six TAT stories being told; as they will have been told at the outset that they are participating in a story-telling study. The manipulation between the two sets of three stories should feel incidental to them, and not as separating two different phases.

Stories will be recorded using digital recording and subsequently transcribed. Stories will be labeled using a coding system that notes the participant, order of stories, and manipulation conditions but does not reveal this information to the readers who will subsequently score the stories. Readers will receive a random sample of stories from different subjects rather than
reading all six stories of a single subject. The particular TAT cards used during each phase of the experiment will be counterbalanced across subjects.

Measures

The Thematic Apperception Test is a source of data for assessing the ways in which individuals view relationships between self and other. As subjects are asked to draw on their internal representations of relationships in order to construct characters and interactions in response to a picture of an ambiguous interpersonal situation, the TAT evokes a number of responses from the participants’ repertoire of interpersonal schemas, expectancies, and affects. (Westen, 2002).

Data

Social Cognition and Object Relations Scale. The SCORS (Stein et al, 2011; Westen, 2002) provides scoring criteria assessing the perception of interpersonal relationships. The subscales of the SCORS to be used in the dissertation study include: complexity of representations of people, affective quality of representations, emotional investment in relationships, experience and management of aggressive impulses, and self-esteem. A score 1-7 is given for each of the five SCORS subscales which will be treated as five outcome variables of interest. Transcripts of stories will be read and scored by two clinical psychology doctoral students who will have achieved reliability (Cronbach, 1951) on scoring the TAT for dimensions specified by SCORS.

Linguistic Inquiry and Word Count, LIWC (pronounced “Luke”). LIWC (Pennebaker et al, 2001) is used to gather data from and make inferences about word usage in stories told by
participants in myriad experimental conditions. LIWC codes for psychological processes such as anger, sadness, inhibition, inclusion, and exclusion, and produces counts of social words, positive emotion words, and negative emotion words drawing on software dictionaries. LIWC will also be used to make total word counts for each story.

Analysis

The ultimate comparison of interest in this study is of mean differences on each subscale between pre- and post-manipulation scores in the stories told among the three conditions: text message interruption, door knock interruption, and no interruption. For each scale of interest (and for the simple word count), the three mean difference scores between pre- and post-manipulation will be compared with a one-way ANOVA to detect the presence of difference between means, followed by post-hoc t-tests to determine which means differ.

LIWC (Pennebaker et al, 2001) will also be able to provide a richer analysis beyond a simple comparison of mean scores for each subscale. While the human scoring will give a single score per subscale for each story, LIWC will carry out word counts for particular psychological process dictionaries, and will reflect specific processes at play for the conditions if present (e.g., words related to anger being more present in the post-manipulation stories of those in the text message interruption condition).

Aims and Hypotheses of the current study

1. To examine the relationship between adaptive representations of relationships with oneself and others, e.g., self-esteem and emotional investment in relationships, (as
measured by SCORS), and the exposure to a text-message or door-knock interruption during a story-telling task.

a. It is hypothesized that those exposed to a text-message interruption will show a decrease in adaptive representations of relationships with oneself and others, compared to those in a door-knock condition and to those in a control condition.

2. To examine the relationship between the emotional valence of words used in narratives (as measured by LIWC), and the exposure to a text-message or door-knock interruption during a story-telling task.

a. It is hypothesized that those exposed to a text-message interruption will show a decrease in positive valence, and increase in negative valence, in their narratives, compared to those in a door-knock condition and to those in a control condition.

3. To examine the relationship between the total words spoken while telling a story, and the exposure to a text-message or door-knock interruption.

a. It is hypothesized that those exposed to a text-message interruption will show a decrease in words spoken compared to those in a door-knock condition and to those in a control condition.
Chapter 4: Results

Demographics

Ninety subjects participated in the experiment. 70% were women (n = 63). Participant ages ranged from 18 to 26 years with an average age of 20.1 years. 35.6% identified their ethnicity as “Other” (n = 32), 34.4% of participants identified as Asian (n = 31), 10% identified as Black or African-American (n = 10), 10% identified as White or Caucasian (n = 10) and 1% identified as Native American (n = 1). 8.9% of participants declined to identify an ethnicity (n = 8).

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>63</td>
<td>70%</td>
</tr>
<tr>
<td>Male</td>
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<td>30%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
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<td>18 years</td>
<td>20</td>
<td>22.2%</td>
</tr>
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<td>19 years</td>
<td>23</td>
<td>25.6%</td>
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<tr>
<td>20 years</td>
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<td>21.1%</td>
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<td>10%</td>
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<td>22 years</td>
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<td>6.7%</td>
</tr>
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<td>24 years</td>
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</tr>
<tr>
<td>26 years</td>
<td>2</td>
<td>2.2%</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
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<tr>
<td>Other</td>
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<td>35.6%</td>
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<tr>
<td>Asian</td>
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<td>34.4%</td>
</tr>
<tr>
<td>Black or African American</td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td>White or Caucasian</td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td>Decline</td>
<td>8</td>
<td>8.9%</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>1.1%</td>
</tr>
</tbody>
</table>
Main Variables

There were three sets of outcome variables for the present study. The basic outcome data point was calculated as a difference between the average score of the three stories told initially (i.e., the baseline), and the average score of the three stories told after the manipulation (control, phone interruption, or door interruption). The average score of stories told before manipulation was subtracted from the average score of those told after manipulation; positive values in the data sets indicate that scores increased and negative values indicate that scores decreased. Each set of outcome variables was created using this basic model of finding an average difference score between stories told before and after the manipulation.

The first set of outcome data was obtained from scores given by human raters using the SCORS manual. The five dimensions were scored on a scale of 1-7. An inter-rater reliability check was run for the two scorers, who both scored all 540 individual stories. For the five dimensions of SCORS, their reliability coefficients were: complexity of representations of people (.812), affective quality of representations (.795), emotional investment in relationships (.681), experience and management of aggressive impulses (.810), and self-esteem (.635).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation</th>
<th>Lower bound</th>
<th>Upper bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity of representation of people</td>
<td>.812</td>
<td>.777</td>
<td>.841</td>
</tr>
<tr>
<td>Affective quality of representations</td>
<td>.795</td>
<td>.758</td>
<td>.827</td>
</tr>
<tr>
<td>Emotional investment in relationships</td>
<td>.681</td>
<td>.623</td>
<td>.731</td>
</tr>
<tr>
<td>Experience, management of aggression</td>
<td>.810</td>
<td>.775</td>
<td>.839</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>.635</td>
<td>.568</td>
<td>.692</td>
</tr>
</tbody>
</table>

Table 2. Inter-rater reliability for two human scorers of TAT stories with SCORS, using intraclass correlations, average measures, with 95% confidence interval noted

The second set of outcome data was obtained using the software program LIWC. LIWC can produce more than fifty outcome variables for any given sample of text. Of these possible
variables, twenty were selected ahead of time for analysis after data collection. With the exception of two of the variables -- Clout and Emotional tone -- these variables are all scored as the number of times a word from a specified word dictionary appears in the story. For Clout and Emotional tone, scores are from 1-100 and are based on algorithms taking into account multiple word dictionaries (Tausczik & Pennebaker 2010).

In addition to an inter-rater reliability check for SCORS, a check of the SCORS and LIWC data collected across the conditions before the manipulation was also performed to ensure that the groups were all equivalent at baseline. This check showed that indeed there were no differences between groups before the interruption.

The third set of outcome variables is made up of word count as completed by the LIWC software.

Table 3. Descriptive characteristics of SCORS data: differences between average scores given to stories before and after manipulation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition (n)</th>
<th>Mean change</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity of representation of people</td>
<td>Phone (30)</td>
<td>-.050</td>
<td>.372</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>-.078</td>
<td>.481</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>.089</td>
<td>.347</td>
</tr>
<tr>
<td>Affective quality of representations</td>
<td>Phone (30)</td>
<td>.089</td>
<td>.462</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>-.050</td>
<td>.345</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>.044</td>
<td>.715</td>
</tr>
<tr>
<td>Emotional investment in relationships</td>
<td>Phone (30)</td>
<td>-.100</td>
<td>.494</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>-.011</td>
<td>.499</td>
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<tr>
<td></td>
<td>Control (30)</td>
<td>-.117</td>
<td>.464</td>
</tr>
<tr>
<td>Experience and management of aggression</td>
<td>Phone (30)</td>
<td>.028</td>
<td>.348</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>.056</td>
<td>.281</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>-.089</td>
<td>.299</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>Phone (30)</td>
<td>.083</td>
<td>.174</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>.039</td>
<td>.189</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>-.033</td>
<td>.193</td>
</tr>
</tbody>
</table>
Table 4. Descriptive characteristics of word count data: differences between average word count in stories told before and after manipulation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition (n)</th>
<th>Mean change (words)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word count</td>
<td>Phone (30)</td>
<td>0.111</td>
<td>23.10</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>3.233</td>
<td>36.05</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>17.800</td>
<td>32.09</td>
</tr>
</tbody>
</table>

Relationships between variables

A one-way analysis of variance (ANOVA) was used to determine if there were significant differences between the three conditions (phone, door, control) for any of the outcome variables. Post-hoc t-tests were conducted to see if any significant differences existed between any pairs of conditions for any of the outcome variables.

Aim 1: The relationship between representations of relationships with oneself and others, (measured by SCORS), and the exposure to a text-message interruption

The representation of the relationship with oneself and with others was measured using SCORS, an instrument used to assess quality of social cognition and object relations (Stein et al, 2011). Aim 1 sought to understand whether or not this representation of relationships would be impacted when subjects were exposed to a cell phone interruption.

Compared to the control group, those for whom the experimenter got interrupted by a text-message during a conversation showed a statistically significant increase in the self-esteem dimension of SCORS on stories told after the interruption. Those in the door-knock condition did not show a significant increase compared to the control group.

No other statistically significant results were reflected in the SCORS data.
Table 5. Significant result for self-esteem, as measured by SCORS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition (n)</th>
<th>Mean change</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem</td>
<td>Phone (30)</td>
<td>.083</td>
<td>.174</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>.039</td>
<td>.189</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>-.033</td>
<td>.193</td>
</tr>
</tbody>
</table>

*difference = -.117, p = .017

Aim 2: The relationship between emotional valence of words used in narratives and the exposure to a text-message interruption

The emotional valence of words was assessed using LIWC, a software program containing word dictionaries that correspond to psychological processes and feelings, e.g., “love, nice, sweet” for the positive emotion dictionary, and “hurt, ugly, nasty” for the negative emotion dictionary (Tausczik & Pennebaker, 2010). LIWC also has a few scores that are computed using algorithms drawing on multiple word dictionaries, e.g., the “clout” measure, reflecting the social status, confidence, and leadership displayed in a story, and the “emotional tone” measure, reflecting both positive and negative emotion words in a single summary variable built such that higher numbers reflect more positive tone (Pennebaker et al 2015).

It was demonstrated that those in the control condition showed a large increase in the positive emotional tone of their narratives, while those interrupted by a text message during their response showed a small decrease in the positive emotional tone of their stories. The difference between these two groups on the emotional tone measure was statistically significant ($p = .030$) while the door-interruption group did not differ significantly from the control group.

No other significant results were found using the LIWC analysis.
Table 6. Significant result for emotional tone, as measured by LIWC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition (n)</th>
<th>Mean change</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional tone</td>
<td>Phone (30)</td>
<td>-3.64b</td>
<td>23.85</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>-0.36</td>
<td>24.57</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>14.18b</td>
<td>29.72</td>
</tr>
</tbody>
</table>

\[ \text{difference} = 17.82, p = .030 \]

Aim 3: The relationship between number of words spoken while telling a story and exposure to a text-message interruption

The word count for each story was computed by LIWC. It was hypothesized that those in the phone interruption condition would show a decrease in words spoken compared to those in the control condition.

No statistically significant result was demonstrated on this outcome variable. The mean word count per story increased substantially for those in the control condition (from an average word count of 93.69 words per story for the first three stories, to an average word count of 111.49 for the last three) while the mean word count for those in the phone interruption condition stayed practically flat (from 92.12 words per story to 92.23 words per story).

Table 7. Result for word count

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition (n)</th>
<th>Mean change (words)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word count</td>
<td>Phone (30)</td>
<td>0.111c</td>
<td>23.10</td>
</tr>
<tr>
<td></td>
<td>Door (30)</td>
<td>3.233</td>
<td>36.05</td>
</tr>
<tr>
<td></td>
<td>Control (30)</td>
<td>17.800c</td>
<td>32.09</td>
</tr>
</tbody>
</table>

\[ \text{difference} = 17.69, p = .074 \]
Chapter 5: Discussion

This study was undertaken with the aim of using an experiment to better understand a person’s experience of losing her conversation partner’s attention to the partner’s cell phone. Based on both the literature currently available and on observations of the role of cell phones and texts and their effect on sustained attention to the people one is with, it was anticipated that a cell phone interruption would have a negative impact upon the psychological state of the subject, and that this effect would be greater than the effect caused by an interruption via a knock on the door.

Prior research focused on the impact of an interruption by one’s own cell phone has established evidence that one displays a decrement in the ability to attend to novel stimuli (Hyman et al, 2010), successfully complete cognitive tasks (Thornton et al, 2014), sustain attention (Strayer & Johnson, 2001), and remember what words one has or has not seen (Smith et al, 2010). These phenomena and others combine to make up the experience of the individual who is distracted by his cell phone and is in a state of continuous partial attention (Stone, 2012). This study differed in that it aimed to examine the impact of someone else being distracted by their cell phone.

The one prior study looking at this impact, and on which the present study sought to expand, demonstrated that the mere presence of a cell phone during a conversation appeared to cause individuals to have less trust in their conversation partner and report less satisfaction with their conversations (Przybylski & Weinstein, 2012).

This study sought to extend Przybylski and Weinstein’s work by taking the merely present cell phone from their study and putting it squarely and actively in the hands of one of the subject’s conversation partners -- the experimenter. It was hypothesized that being interrupted by the experimenter’s cell phone might evoke for subjects an increasingly common experience in
contemporary life -- being listened to with impoverished attention -- and this would result in a less positive internal state that would be reflected in subsequent TAT stories. It was further hypothesized that the impact of the cell phone interruption would be different from the kind of interruption represented by a knock on the door. The TAT was employed as a measure because the effect was anticipated to be out of awareness and hence not accessible to questionnaire or self-report data.

The study sought to understand the impact of the cell phone interruption on the internal state of the subject by examining in three ways the stories they told after the interruption. First, it was hypothesized that subjects would tell stories in which relationships between people were not as psychologically adaptive (Aim 1). Second, it was hypothesized that the stories would contain words with a more negative emotional valence (Aim 2). Third, it was hypothesized that the stories would become shorter (Aim 3).

Impact of interruption on representations of relationships with oneself and others (Aim 1)

It was hypothesized that the representations of relationships with oneself and others as told in the stories would become poorer for those interrupted by a phone. While the majority of the findings using SCORS did not show evidence of the impact of the interruption, there was one significant result showing an impact of the interruption that ran counter to the anticipated results. Those interrupted by the phone during the study showed a modest increase in the self-esteem displayed in their stories, as scored by human raters using the SCORS manual, compared to those in the control condition ($p = .017$). These subjects displayed a small increase -- .083 points on a 7-point scale -- while those in the control condition displayed a small decrease of .033 points.
(It is notable that the inter-rater reliability for this dimension of SCORS was the poorest of the five dimensions, at .635. While it is plausible that this result is the product of “noise” in the data collected, and does not in fact represent a significant result, there are a few ideas worth considering that could account for this result if it turns out to be replicable.)

One way in which the self-esteem of a person interrupted by their partner’s cell phone might be heightened would be if the person’s perception of their partner -- in this case, the experimenter -- was elevated by the partner receiving a text message. If a person associates the receipt of a text message with being “important,” and is spending time with this now-elevated partner, perhaps internal feelings of self-esteem become elevated, and in the case of this study, would become detectable in TAT stories.

Another way that self-esteem experienced by an individual could become elevated after her partner is interrupted by a text message would be if this interruption was experienced as a sort of injury or insult, and subsequently her internal feelings of self-esteem were defensively boosted in response to this injury. In the case of the study, these changes would be detectable in the TAT stories as the subject made efforts to defensively boost self-esteem.

This modest finding and its inherent ambiguity suggests that something is at play vis a vis self esteem when an individual loses her partner’s attention to the partner’s cell phone. Whether that person’s response is to identify with the partner’s new perceived elevated status, to respond defensively with a boost to her own sense of self, or some other internal process, it may be that this kind of interruption impacts one’s self-appraisal.
Impact of interruption on emotional valence of words used in stories (Aim 2)

It was hypothesized that those who were interrupted by a cell phone during the study would subsequently tell stories using words with more negative emotional valence, as computed by LIWC, after the interruption. This hypothesis too stemmed from Przybylski & Weinstein’s (2012) study wherein subjects in the presence of a cell phone experienced decreased trust and satisfaction with their conversation partner when in the presence of a cell phone.

Data from LIWC predominantly showed no impact of the interruption, showing mostly no significant change in the words used by subjects after an interruption with respect to those in the control condition.

There was however one result which supported the study’s hypothesis although in an unexpected way. Subjects in the control condition showed an increase in the positive emotional tone of their word choice (by 14.18 points on a 100-point scale) compared to those in the phone condition whose scores decreased modestly (by 3.63 points on a 100-point scale, \( p = .03 \)).

This result reflects two phenomena: the boost of positive emotional tone due to the experiences of those in the control condition, and the blunting of that boost by the phone interruption.

After the first three TAT stories, all participants were asked casually, “what’s this like for you, to sit here and make these stories up, and share them with me?” Participants in the control condition were allowed to answer completely, with no feedback or follow-up questions. After they finished speaking, the experimenter said, “let’s continue,” and showed the fourth TAT card.

It seems likely in this scenario that those in the control condition subsequently displayed more positive emotional tone in their stories as a result of experiencing the apparent interest of the experimenter. The simple single question asking participants to elaborate on their internal
experience may have buoyed them temporarily, contributing to a more sanguine attitude as expressed through the TAT stories.

The second phenomenon reflected here is that those in the interruption conditions did not show this boosted emotional tone after the manipulation. These subjects were also asked what the experience was like for them, but were interrupted by the experimenter’s phone, or a knock on the door, after they started speaking. The experimenter said, “excuse me,” attended to the phone or door, then returned and said, “you were saying.” Once the participants finished answering, the experimenter said, “let’s continue,” and showed the fourth TAT card. Subjects’ stories in the phone interruption condition reflected a modest decrease in the positive tone of their stories (by 3.63 points on a 100-point scale) \((p = .03)\), and stories from subjects in the door condition were practically unchanged (a decrease of .365 points on a 100-point scale) \((p = .102)\). While there were small decreases for these two groups, it seems more notable that these subjects did not experience the boost experienced by those in the control condition.

It seems from these findings that whatever boost may be experienced from a simple question about one’s internal experience can be eliminated if the person asking the question is quickly interrupted, whether by a cell phone or a knock on the door. While the question seems to reflect interest and care, the interruption and loss of attention may be just as likely to be experienced as a lack of interest and care. Interestingly this result only partially comports with the anticipated results: while subjects who were interrupted by a cell phone showed less positive emotional tone in subsequent stories compared to the control subjects, those subjects’ tone remained flat flat. This finding may introduce a new way to conceptualize cell phone interruptions, in that while they may not do harm per se, they may remove the positive impact of well-intentioned attempts at closeness between people. This would suggest that for the sake of
their relationships, individuals ought to be mindful of the impact of attending to the interruptions of their phones, especially if their intention is to express their interest in those in their presence.

Impact upon number of words spoken while telling the story (Aim 3)

It was hypothesized that subjects interrupted by a cell phone would tell subsequent stories using fewer words than those in a control condition. This hypothesis was informed by Geller (1974), who instantiated a rejection paradigm by paying less attention to conversation participants, who then subsequently spoke less during conversation. This aim of the present study sought to see if participants in these interruption conditions would display a similar result.

While analysis of word count by LIWC did not reveal statistically significant differences, a notable result, which resembles the difference in emotional tone discussed above, was observed.

Much like the boost seen in emotional tone, subjects in the control condition showed an average 19% increase in words per story, from an average of 94 to 112 words used. Those in the phone condition saw practically no change with an increase of .12% ($p = .074$) and those in the door condition saw a small increase of 3.2% ($p = .167$).

While these word count results did not achieve statistical significance, they reflect a similar phenomenon to the results found for emotional tone by LIWC: those asked about their experience used approximately 19% more words in subsequent stories while those in interruption condition told stories of practically the same length.

This result supports findings by Geller (1974) who observed that ignored participants use fewer words in subsequent conversations. That would suggest that the manipulation here was
experienced in a way similar to a rejection or ignoring, although not to a statistically significant degree.

Interestingly, the most striking result here shows that individuals who are asked about their experience “open up” and speak at greater length. This seems like a natural response indicating that when people are asked about their experience, they feel cared for and attended to, and they will feel more free to take the risk of speaking and expressing themselves, riding the belief that their conversation partner cares about them.

The partner’s interruption by the cell phone has a powerful impact on the subject’s response, and seems to negate the buoying impact of being asked about inner experience. This idea would seem to have the most broad and important implications for understanding one’s experience of losing a conversation partner’s attention to the partner’s cell phone: despite his apparent intentions and interest, attending to his cell phone has the power to negate his interest.

Taken as a whole, the results of the study seem to indicate that while a cell phone interruption may not be experienced as an overt insult, it may have some impact on self-esteem that manifests in unexpected ways, and has the power to negate the positive effects of a bid for a more intimate connection. Just as was shown in the study, those experiencing an expression of interest from another person may become more expressive or positive. However, if that other person is interrupted by a cell phone, they may just remain “flat.” Given how pervasive phones and their interruptions are today, it would seem that many opportunities for closeness and depth of relationship will be increasingly missed if individuals fail to be mindful of the power of their phones to take them out of interpersonal moments with those in their presence.
Study Limitations

One important limitation of the study is the vulnerability introduced by the investigator being the person administering the TAT stories. Once he was interrupted by the phone or door, he was no longer blind to the subject’s condition, and therefore could have introduced expectation effects to the subject’s responses that were out of his awareness. Much as the study sought to understand impacts of interruptions held outside subjects’ awareness, confounds to the study could have remained out of the experimenter’s awareness. Despite this vulnerability, it does not appear that experimenter behavior impacted the data, as the hypotheses proposed by the experimenter mostly did not bear out. Furthermore, the results that did turn out to be significant were significant not in the way expected: rather than subjects from interruption conditions displaying a decrease in scores or word count, it was those in the control condition who showed an increase while those in interruption conditions remained flat.

One way to remedy this potential vulnerability in future studies would be to borrow an idea from Przybylski and Weinstein (2012) who had interactions take place between two participants, as opposed to one participant and one experimenter. Future studies could be designed in such a way that one participant is the “facilitator” administering the TAT, and also has to potentially attend to a phone that is controlled by experimenters, while the other participant is the “subject” who tells the TAT stories. In a design like this, the “facilitator” would remain naive to the hypotheses and even to the focus on interruptions, eliminating concerns about experimenter effects. While this design would sacrifice the clinical skills of the experimenter in the present study, it would introduce the advantage of eliminating any expectation effects by the experimenter.
A second potential vulnerability of the study was the potential for suspicion by subjects. Subjects’ comments during debriefing were reassuring in this regard, as during debriefs, only 2 of the 30 subjects in the phone condition expressed mild suspicion, stating they thought “maybe” the interruption was related to the study, while the rest of the subjects expressed surprise that the interruption was intentional. This vulnerability too could be remedied by making use of a new paradigm wherein participants acting as the facilitators who show the TAT cards and get interrupted would not have to “act” in response to the interruption, as they too would be naive to the focus on interruptions.

Future Directions

Future work might pursue whether the failure to find the anticipated phenomena was an artifact of the particular procedures or methods used, or a reflection of the incorrectness of the guiding understanding and hypotheses informing the study.

One future direction for study would be to eliminate one potential way that subjects may have warded off the impact of the interruption, which could have been to think of the experimenter as “important” and therefore as having the power to decide to whom he will give his attention at any time. This ability to view the experimenter as “important,” and therefore create an implicit self-narrative where getting interrupted cast reflected glory on the subject, is one way that the study’s hypotheses may have been predominantly thwarted. Future investigators could create experimental situations wherein the subject’s conversation partner is a peer as opposed to someone in an apparent position of relative power -- in this case the investigator. An experimental paradigm with a peer conversation partner -- instead of an authority figure -- could further parse out the possible reasons for the observed outcomes, ruling out results that may
have been due to the perceived power of the investigator in this case, and further ascribing power to the receipt of the text message itself.

The predominantly null findings in this study may also be attributed to the fact that the participant did not become very invested in the interaction with the experimenter, and so the interruption did not have much impact. Opportunity for more give and take by both conversation partners may stimulate greater investment in the conversation, and therefore greater impact of the interruption. This again would borrow from Przybylski & Weinstein, 2012, who asked conversation partners to talk about more or less personal topics, whereas the present study asked participants to tell stories about pictures on cards. It would be useful to create experimental situations wherein participants have more of an opportunity to build rapport with their conversation partners.

Another future direction would be to use a different instrument than the TAT to assess out of awareness impact of the interruption. While the TAT has been shown to be sensitive to experimentally-generated emotionally meaningful implicit cues (Wachtel & Schimek, 1970), and indeed was moderately sensitive to such manipulations in this study, it may be more influenced by persistent traits that are not as sensitive moment-to-moment changes. Additionally, while instruments such as SCORS and LIWC introduce the ability to quantify the qualitative data in TAT stories, other instruments inviting participants to respond to questions or participate in tasks -- not explicitly about their conversation partner or interruptions, so as to still assess feelings out of awareness -- may be more sensitive to state changes, and better tap into the impact of interruptions. Paradigms such as those used in rejection sensitivity research, such as having participants choose how much of something to give to another participant or confederate
following an rejection (e.g., Ayduk et al, 2007) may tap into state-based behaviors and be more reliable to quantify.

Finally, it would be productive to reproduce the study with older participants. The average age of the participant in the present study was 20.1. These participants learned to socialize with cell phones as an integral part of relating to others. A study like this with stratified age categories could shed light on different experiences of phone interruptions for people of different ages.

Conclusion

The present study sought to better understand the psychological experience of being interrupted by a conversation partner’s cell phone by uniting two heretofore separate experimental methodologies. It made use of the active interruption paradigm utilized by experiments that had previously only looked at impact on attention and cognition (Smith et al, 2011; Thornton et al, 2014), and it made use of a conversation paradigm that had previously only made use of the mere presence of the phone (Przybylski & Weinstein, 2012). It introduced a new use of the TAT to better tap into the unconscious emotional processes that may be impacted by a cell phone interruption.

The study revealed two statistically significant findings. Those in the phone condition showed an increase in the self-esteem reflected in their TAT stories, as measured by SCORS, compared to the control group ($p = .017$). Those in the control condition showed an increase in the positive emotional tone of their stories, as measured by LIWC, compared to those in the phone interruption condition ($p = .030$).
The study revealed one finding which, while not statistically significant, reflected a notable result. Those in the control condition showed an increase in the amount of words used in their stories compared to the phone interruption group ($p = .074$).

These findings suggest that it is likely that some emotional process takes place, out of awareness, in those who lose their conversation partner’s attention to a cell phone. These findings also suggest future directions for study making use of interruption paradigms and storytelling tasks.

While the majority of findings of the study supported the null hypothesis, the modest findings supporting alternative hypotheses support further exploration in this area. As cell phones become increasingly ever-present parts of our lives, it will continue to be the job of psychologists to understand their impact on the human experience.
References


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