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The function of information immediacy and smartphone usage

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ABSTRACT

The current study used the delay discounting method to understand the need to respond to different communication mediums. In this method, participants were asked their preference between responding immediately for a smaller reward or after a delay for a larger reward. Experiment 1 asked participants their preference for responding to a text message, sticky note, and postcard. Participants indicated lower willingness in responding to the text message but did not have differing preferences between the other mediums. Experiment 2 sought to understand if the effect was related specifically to text messages or all instantaneous communication. Participants indicated their preference for responding to a text message, email, and voicemail while driving on a road trip. Participants indicated no differences in preference for responding to the message mediums. These results have implications for interpreting distracted driving research, specifically texting and driving, as the effect may apply to other communication mediums.

1. Introduction

The need for belonging and connection with others is not society-specific, but rather has been understood to be a fundamental human need (Baumeister & Leary, 1995; Lee & Robbins, 1995; Maslow, Frager, & Cox, 1970). Social capital is conceptualized as the total of resources that an individual will accrue due to a durable network of relationships of mutual acquaintance and recognition. These resources can either be actual or virtual (Bourdieu & Wacquant, 1992). Social capital has been associated with positive social outcomes at both group and personal levels. At the group level, a higher level of social capital is generally accompanied by an increased commitment to a community, better public health, lower crime rates, and more efficient financial markets (Adler & Kwon, 2002; Helliwell & Putnam, 2004). At a personal level, individuals with higher social capital have the option of drawing on the resources from those in their network (Paxton, 1999). Further, social capital has been related to self-esteem and life satisfaction, which are associated with psychological well-being (Bargh & McKenna, 2004; Helliwell & Putnam, 2004).

Since social currency is the product of connections there are two further implications: one, that people spend a significant amount of time maintaining these relationships, Ellison, Steinfield, and Lampe (2007); and two, the absence of connections should have negative consequences. When excluded in the classic virtual ball-tossing game paradigm, participants reported feeling ignored and excluded. This study was conducted using an fMRI and found increased anterior cingulate cortex (ACC) activity during social exclusion; however, right ventral prefrontal cortex (RVPFC) was more active during social inclusion and was negatively correlated with ACC activation during social exclusion. ACC activation has been associated with the

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experience of pain distress. On the other hand, the RVPFC has been associated with the regulation of pain distress and was associated with diminished distress after social exclusion in this study (Eisenberger, Lieberman, & Williams, 2003).

This overwhelming need for connection between individuals has not necessarily changed in nature but has changed mediums with the constant development of new technologies. The U.S. Postal Service reported that the average home only received a personal letter every seven weeks in 2010, which is significantly down from 1987 in which a letter was received every two weeks (Mazzone & Pickett, 2011). Furthermore, the amount of time spent talking on the phone decreased 25 percent between 2012 and 2015 (Gaskill, 2016). While these communication modes have declined, others have increased. The first text message was sent in 1992. Since this time, text messaging has exponentially increased in popularity. Worldwide, roughly 561 billion text messages were sent in June of 2014, or about 18.7 billion of text messages were sent per day (Burke, 2016). Texting has become "the preferred channel of basic communication between teens and their friends and cell calling is a close second" (Lenhart, Purcell, Smith, & Zickuhr, 2010; Subrahmanyam & Greenfield, 2008). It is "exploding" among teenagers, and the frequency of use of texting usage has now overtaken the frequency of every other common form of interaction with their friends such as cell phone conversation, social media networks, or face-to-face meetings (Lenhart, Ling, Campbell, & Purcell, 2010).

Different from other communication mediums, text messaging provides more immediate gratification and reward. However, this gratification and reward tend to operate on a variable reinforcement schedule (Weinschenk, 2012). The result of this schedule is that the anticipation of receiving a text message has been associated with a more intense release of dopamine. This release of chemicals supplements the preexisting dopamine reward pathways that are created and have been understood to rival those associated with highly addictive other behaviors, such as sex (Weinschenk, 2012). Though the DSM-V did not explicitly include any form of technology addiction, it did include behavioral addictions, to include the previously described characteristics. Although neither technology nor phone addictions have been specified, habitual orientation, or automaticity, occurs when people instinctively and immediately attend to their phone when they are alerted of a notification. Responding to a phone may not only give the recipient an informational reward but responding to a phone may also be done habitually and without conscious thought. Furthermore, automaticity has been understood to predict text messaging while driving even when controlling for past texting frequency (Bayer & Campbell, 2012).

Generally, the rewards of constant communication have little to no consequences. However, when communication is attempted in a risky situation, it becomes problematic. Specifically, when drivers choose to text and drive, they are choosing that the value of the message and the associated rewards are worth more than the risks of driving while distracted. When talking on the phone while driving, the risk of getting into a collision increases by approximately four times (McEvoy et al., 2005; Reidelmeier & Tibshirani, 1997; Strayer & Johnston, 2001; Strayer, Drews, & Crouch, 2006; Strayer, Drews, & Johnston, 2003). Texting and driving is suggested to be even worse. It may be as much as five to six times more dangerous than drunk driving and increase the risk of collision (Alvarez, Alnizami, Dunbar, Jackson, & Gilbert, 2015; Drews, Yazdani, Godfrey, Cooper, & Strayer, 2009; He et al., 2014; Hosking, Young, & Regan, 2009; Klauer, Dingus, Neale, Sudweeks, & Ramsey, 2006; Rumschlag, et al., 2015; Thapa, Codjoe, Ishak, & McCarter, 2015; Virginia Tech Transportation Institute, 2009). Aggregated findings have confirmed these trends. About 81 percent of measurements of driving performance while participants were talking on a phone showed performance to be degraded performance. For texting and driving, the figure was about 93 percent (Atchley, Tran, & Salehinejad, 2017).

In a survey of university students, 90 percent of respondents admitted to talking on the phone while driving (Hill et al., 2015). Of the same sample, 90 percent also admitted to texting while driving. Similar studies have found prevalence to be as high as 98 percent of drivers who text while driving despite the entire sample reporting that they were aware of the dangers of texting and driving (Atchley, Atwood, & Boulton, 2011). The prevalence of communicating while driving despite the known danger illustrates the compelling nature of these activities. However, it is unknown if this behavior is related to the social connection broadly or more related to the immediacy associated with the communication mediums which influences the decision to drive distracted.

One way to understand the choice to drive distracted and subject oneself to the associated risk is from a decision-making standpoint. The "decision-making model" proposed by Janis and Mann (1977) is a model that is extensively used for studying impulsivity-related behavior such as drinking (Migneault, Pallonen, & Belicer, 1997), smoking (Velicer, DiClemente, Prochaska, & Brandenburg, 1985), and other problematic behaviors (Prochaska et al., 1994). According to this model people weigh and evaluate their behavior based on "decisional balance." Decisional balance is a construct that involves cognitive and motivational aspects of human decision-making behavior (Velicer et al., 1985). This construct consists of the subjective balance in importance of a set of positive (pros) and negative (cons) aspects of engaging in a behavior (Migneault, et al., 1997). From the "decisional balance" point of view one can evaluate positive and negative aspects of risky texting behavior and then decide whether to engage in such behavior or not.

Decisional balance models cognitive and motivational aspects of decision-making behavior, but measuring decision-making requires a different methodological approach. The "delay discounting" method is one approach based on the decision-making paradigm that helps us understand how people value their decisions (Green, Fry, & Myerson, 1994; Myerson & Green, 1995). Delay discounting is a behavioral method that measures value of behaviors based on the consequences of the decisions. This method assesses the rate at which the value of a behavior decreases relative to other choices by presenting participants with choices between smaller/sooner rewards and larger/later rewards (Myerson & Green, 1995). The delay discounting method has been shown to be useful for studying humans' decision-making process (Doya, 2008),