The effects of technology on interpersonal fraud

by

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Fraud has expanded in frequency as e-commerce has become a dominant part of business strategy and found widespread use. Previous research in the Information Systems domain has focused on how the adoption of technology influences behavioral decisions, and previous research in the accounting domain has typically explored why people choose to commit fraud. However, a holistic model of how technology influences a person's decision to commit a criminal act, such as fraud, is underrepresented. This manuscript explores how the characteristics of the technologies being used to facilitate e-commerce transactions affect the complex cognitive and social processes that result in fraud. The fraud triangle is a useful and widely supported representation of the elements necessary for a perpetrator to engage in fraud: a perceived pressure that motivates action, a perceived opportunity to successfully deceive another individual, and the ability to rationalize an act of fraud. By combining extant research in the fields of accounting and information systems, this manuscript incorporates the fraud triangle into a behavioral model that can be used to measure how the capabilities of the technologies being used to facilitate online transactions influence a person's decision-making processes and, ultimately, their choices related to fraudulent behaviors.

CHAPTER 1. INTRODUCTION

Overview

In the past few decades, a large volume of business transactions has been shifted online to garner the many benefits of e-commerce. As a consequence, fraud has followed as perpetrators update old scams for a digital age and develop new ones. The Internet Crimes Complaint Center was established as a joint effort by the Federal Bureau of Investigation, the National White Collar Crime Center, and the Bureau of Justice Assistance to collect and analyze complaints about online fraud and other cybercrime. The annual reports compiled by the Internet Crimes Complaint Center have exposed the growth in Internet fraud, and documented almost 300,000 reported cases of fraud in 2012 with losses totaling about half a billion dollars (IC3, 2012). As a result, computer-mediated fraud has become a prominent matter for both research and practice.

Most previous research about fraud has used a forensic approach by studying fraudulent actions after they had occurred to determine systemic weaknesses and improve control mechanisms. This reactive approach is necessitated by the reticence of potential fraudsters to articulate their intentions and the risk associated with arrest or criminal prosecution, and difficulties in observing and predicting fraud behaviors (Morales et al., 2014). It is not uncommon for former fraudsters or financial hackers to start working for organizations they attacked after they have been formally prosecuted because their perceptions of risk changed once they had been formally prosecuted (Taylor et al., 2006; Young et al., 2007). In these cases, the beliefs, attitudes, and decision-making process are articulated after the crimes have been committed and further criminal liability has been reduced. Much of the previous research about fraud has ignored behavioral aspects of these crimes and instead focused on improving detection and prevention through the development of better accounting and control systems (Grazioli et al.,

2006; Harrison et al., 2012). Similarly, most research about the risks of e-commerce has focused on how a victim perceives risk and develops trust in an online environment (Gefen et al., 2003; Pavlou, 2003) or how potential victims can improve their ability to detect fraud to reduce their likelihood of being defrauded (Xiao and Benbasat, 2011). By focusing on systemic issues on the perpetrator's side of a transaction and behavioral issues on the potential victims' side of a transaction, a research gap exists in describing how the technologies being introduced to facilitate e-commerce affect potential perpetrators' cognitive processes as they choose to either commit fraud or refrain from acting.

Fraud is a type of deception with a relevant business impact, because for fraud to exist both an intentional misrepresentation and some type of non-trivial, usually financial, injury to the victim must occur (Firozabadi et al., 1999). Fraud is subsumed within deception and is the result of some misrepresentation that has been intentionally foisted upon the victim by another individual (Albrecht et al., 2009). In the context of a commercial exchange, this misrepresentation creates an unethical and typically illegal asymmetry of information between the two parties resulting in a lopsided and unfair trade (Xiao and Benbasat, 2011). As a result, fraud is affected by the manipulation of information and information systems, and information systems are the tools of fraud in the context of e-commerce. Consequently, it is critical to examine how the individual characteristics of a technological artifact being used to convey communication and process transactions may influence the likelihood that a person would consider and attempt fraudulent misrepresentation. The central focus of this study is about interpersonal fraud using information systems, which is fraud occurring in exchanges between two individuals in an e-commerce context. Other types of fraud, such as corporate fraud, financial statement fraud, and embezzlement, remain outside the scope of this paper.

Purpose of Study

This study is meant to address the following research question:

RQ: *How do the characteristics of e-commerce and communication technologies affect the decision-making processes of individuals engaging in fraudulent transactions?*

To address the question of how the capabilities of a technology may affect an individual's propensity to commit fraud, a variance model is developed and presented. This variance model builds on previous process models from accounting and IS domains, and can be used to empirically describe the necessary and sufficient antecedents of computer-mediated interpersonal fraud (Seddon, 1997). Thus, this type of model has important functional implications for describing how individuals may reduce their risk of becoming victims to fraudulent transactions and how systems can be strengthened to take a holistic behavioral approach to deterring fraud. An important feature of this methodological approach is that the relationships described within the model can be statistically tested using empirical data. Secondly, this model presents a theoretically stimulating point to start exploring how the technological characteristics of information systems can induce or deter deviant or criminal behaviors. Finally, the scale developed for use in this model may be useful for conducting future research about fraud, thus extending fraud research beyond the common reactive approach involving interviews of incarcerated fraudsters. Contained below is a review of the literature on fraud, a presentation of the proposed model, and a description of the relationship between this model and prior literature. In addition, a description of the proposed methodology for empirically testing the model is provided.

Definitions

Fraud

Fraud is a form of deception that includes the following specific elements: fraud is a misrepresentation about a material point that is false and intentionally or recklessly so and which is believed and acted upon by the victim to the victim's damage (Albrect et al., 2009, pp. 7). Thus, fraud is a special case germane to business where a deceptive act is deliberately used to foist some significant misconception on a potential victim that will ultimately result in that victim's loss, which is typically has some monetary value.

Deception

In this study, deception includes but is not limited to fraud. Deception is defined as "a message knowingly transmitted by a sender to foster a false belief or conclusion by the receiver" (Buller and Burgoon, 1996, pp.205). Deception is akin to lying and is the process by which an actor intentionally manipulates an environment to create a misleading representation (Johnson et al., 2003). Thus, deception is an intentional act designed to manipulate another person. The key difference between fraud and deception as it pertains to this manuscript is that deception encompasses acts throughout an entire range of effects from inconsequential white lies to deception causing significant financial loss. In contrast, fraud only refers to deception that includes a financial ramification.

Interpersonal Fraud

Interpersonal fraud refers to fraud that is occurring between two people. Interpersonal fraud includes actions where one individual intentionally deceives another individual to the

latter's disadvantage. This is in contrast to other types of fraud such as corporate fraud, employee embezzlement, and financial statement fraud where fraud is committed against a group of individuals or an organization. Interpersonal fraud is common in e-commerce where individuals buy, sell, and trade in online marketplaces.

Media Capabilities

Media capabilities refer to the specific features of a communication medium that influence its effectiveness in communicating a message. The focal media capabilities used in this study are derived from Media Synchronicity Theory and include feedback immediacy, symbol sets, parallelism, rehearsability, and reprocessability.

Media Forms

Media forms refer to common types of media that are utilized for communication. A media form contains of a common core of media characteristics that are shared across individual media within that group. In this study, the focal media forms include e-mail, video conferencing, voicemail, and social network posts.

CHAPTER 2. THEORETICAL FOUNDATION

Fraud

Not surprisingly, the popularity of e-commerce has amplified the proliferation of computer-mediated fraud as fraudsters have followed the assets they seek into online marketplaces. New forms of commerce provide a different venue where perpetrators may attempt new deceptions and variations of old scams (Albrecht et al., 2009) outside the scope of extant research. Historically, much of the research on perpetrators of fraud focused on creating detection and prevention mechanisms in a corporate context, with an emphasis on how organizational actors might defraud investors or organizations (Hogan et al., 2008). These behavioral models of corporate fraud provided the foundation for examining the characteristics of perpetrators in consumer fraud, where individuals are targeted instead of corporations. Thus, the focus of fraud research has typically been on the environmental and cognitive factors that inspire individuals to commit fraudulent acts.

The foremost model for examining fraud, the fraud triangle, emerged from the criminology and sociology domains (Albrecht et al., 1982; Cressey, 1953, Sutherland, 1949; Sutherland, 1983; Morales, 2014). The fraud triangle describes three elements necessary for fraud to occur, and most previous adaptations of the fraud triangle have assumed these elements are independent of one another. A perpetrator must be motivated by some financial or social pressure to act dishonestly, perceive an opportunity to exploit another individual for their own gain, and have the ability to rationalize, and, thus, justify in their own minds their immoral or criminal act. A fourth element representing the perceived capability of the perpetrator to commit a fraudulent misrepresentation has been advocated as an extension to the fraud triangle (Rittenberg et al., 2010; Wolfe and Hermanson, 2004).

Often the pressure to commit fraud is the result of greed, ego, perceived financial necessity, or poor judgment (Albrecht et al., 2009). Social normative influences are typically assumed to influence people to avoid immoral actions, but strong pressures to be perceived as successful, powerful, or affluent have also been motivating factors for individuals to commit fraud (Dilla et al., 2011). These factors may motivate individuals to act in an unscrupulous manner to attain their own financial or personal desires. For example, Bernie Madoff started his investment firm with money earned as a lifeguard and yard laborer and over the years, achieved a central role in his social community. In addition, he developed a reputation both as a prominent philanthropist and a financial stalwart built upon the investment services he had provided to his friends and neighbors. For these types of fraudulent actions to occur, the perpetrator must also perceive an opportunity to gain some unfair advantage by misleading other individuals. These opportunities are often manifest as weak controls and procedures that may mask or obscure the perpetrator's fraudulent actions (Cohen et al., 2010). The anonymity of individuals engaged in many transactions occurring on the Internet is one example of a weak control system (Zahra et al., 2005). Finally, an individual must be willing to rationalize their actions, despite their actions deviating from common social norms against lying, cheating, or stealing (Albrecht et al., 2009; Rittenberg et al., 2010). Ironically, this rationalization may also be the result of emphasizing a greater sense of social duty, such as providing for one's family or helping others through a period of crisis (Choo and Tan, 2007; Cohen et al., 2010).

The communication, technical, financial, or economic capabilities an individual possesses can also influence their ability to commit fraud. Charm, charisma, and the ability to communicate well with others are useful for committing fraud and masking cues to deception. For example, Charles Ponzi cited his own personal knowledge about finance as his means of

achieving extraordinary financial returns for clients. He also relied on his social skills and interesting stories to assuage suspicion. A fraudster must be capable of successfully deceiving the other party in an exchange (Wolfe and Hermanson, 2004); therefore he must possess a set of capabilities that fits the requirements needed to successfully defraud a victim. Fraudsters and social engineers use their abilities to influence others and develop a false sense of trust in others in order to gain some advantage (Ramamoorti, 2008).

Despite the fact that the authors did not offer a theoretical justification for linking the elements in the fraud triangle (Cressey, 1953; Albrecht et al., 1982), it has been successfully integrated with other structured behavioral models such as the Theory of Planned Behavior, and these models have been used to describe managerial and financial statement fraud (Buchan, 2005; Carpenter and Reimers, 2005; Cohen et al., 2010). The Theory of Planned Behavior is rooted in the notion that actions are reasoned and planned prior to enactment (Fishbein and Ajzen, 1975; Ajzen, 1991). Extant literature on corporate fraud suggests that combining a structured behavioral approach with the fraud triangle is a useful and appropriate extension; however, there is currently no widely used structured behavioral model for describing interpersonal fraud (Carpenter and Reimers, 2005; Cohen et al., 2010; Grazioli and Jarvenpaa, 2000; Rofiq and Mula, 2010).

Computer-Mediated Deception

Interpersonal Deception Theory (IDT) is the foundation of most research in computer-mediated deception and explores the complex relationship between individuals engaging in an exchange (Buller and Burgoon, 1996). In IDT, each person participating in an exchange pursues their own agenda by manipulating the information and information systems at their disposal with

the intent to have an advantagous position in any exchange due to the asymetrical knoweldge they possess. Extant research suggests that people are constantly engaging in self-serving deception, with roughly 20-33% of daily communication being deceptive for self-serving purposes (DePaulo et al., 1996; George and Robb, 2008). Because all of the parties in the exchange are simultaneously pursuing their own agendas, each deceptive exchange is littered with cues that can be used to evaluate the veracity of statements. A suspicious listener will evaluate cues offered by other participants in the exchange to asssess the truthfulness of any communiques (Ekman, 1992; Ekman and Friesen, 1969). However, people generally exhibit poor effectiveness in determining if another person is being deceptive, correctly detecting deception only about half the time (Bond and DePaulo, 2006).

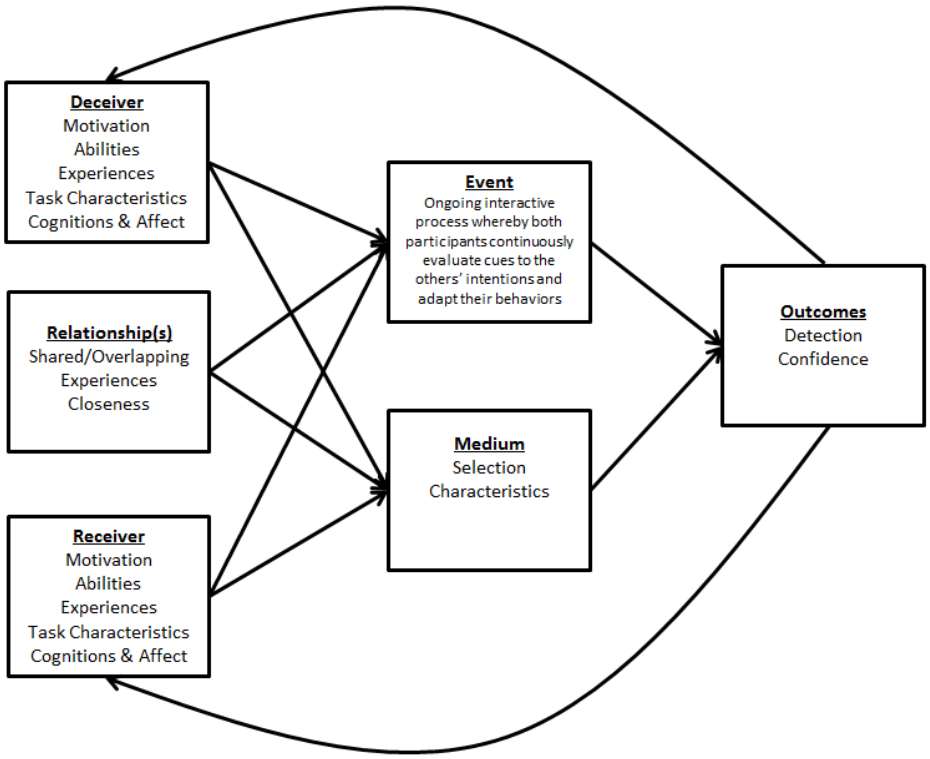

Figure 1. Deceptive Communication (adapted from Carlson et al., 2004)

Although IDT may be applied to larger groups, it has typically been supported by studies of dyadic pairs or small groups (Marett, 2004). IDT was expanded to develop a useful model of deception in computer-mediated communicaiton, shown in Figure 1, that describes the complex interaction between the sender, the receiver, the relationship between the sender and receiver, the communication medium, and the presentation of the deception by the deceiver (Carlson et al., 2004). Deception as a formulated cognitive act takes effort, and it is difficult for the deceiver to coordinate all the non-verbal forms of communication such as posture, expression, and tone when attempting to deceive others (Ekman and Friesen, 1969). When attempting to deceive another individual, cues to deception are unwittingly displayed or leaked to an audience (Buller and Burgoon, 1996; Eckman, 1992). These non-verbal cues to deception are usually the most consistent methods for determining if deception is occurring and are expressed even in a computer-mediated environment (DePaulo et al., 2003, Marret, 2004; Rao and Lim, 2000). Deceivers may actively attempt to mask the cues of deceptive behavior and when given a choice will choose a medium perceived as being less likely to reveal their deception (George and Carlson, 1999). Nevertheless, in the case of e-commerce fraud, potential perpetrators often have less volition in choosing which media they will use to convey their messages. This is because potential victims tend to congregate at a few very large commercial websites (e.g., EBay, Amazon, or CraigsList) or use specific types of communication tools (e.g., e-mail or text messages).

Some media, such as text-based e-commerce, can mask or distort the cues available for detecting potential deception. This may seem particularly problematic because communication media to one degree or another masks the most consistent predictors of deception which are uncontrollable biometric responses (e.g., heart rate, pupil dilation, or sweating) as shown in

Table 1. Because there are fewer cues available in these contexts, potential victims may have a greater sense of skepticism or assign greater importance to irregularities in the cues of deception that they do have available to them (Burgoon et al., 2003). Extant research has supported the principal argument that cues of deceit also exist in computer-mediated communications (George and Robb, 2008; Carlson et al., 2004). Consequently, it is important to understand how the capabilities of each medium may affect the existence or usefulness of these cues to deceptive behavior and how combinations of these cues may influence decision-making in each context. For example, the inclusion of pictures, along with descriptions of items listed for sale in an online auction site, potentially reduces concerns about the condition of the object. However, concern about deception only decreases when the message is believed by a potential buyer to accurately represent the condition of the object.

Table 1. Cues of Deception Detectable Through Written Communication (DePaulo et al., 2003; Lewis, 2009)

Not Detectable	Detectable
Less talking time More pressed lips Less verbal and vocal involvement Less verbal and vocal immediacy (impressions) More verbal and vocal uncertainty (impressions) More chin raises More word and phrase repetitions Less cooperative More negative statements and complaints Less facial pleasantness More nervous and tense (overall) More vocal tension Higher frequency, pitch More pupil dilation More fidgeting Fewer spontaneous corrections	Fewer details Less plausibility Less logical structure More discrepancies and ambivalence Fewer illustrators Less verbal immediacy (all categories) Less admitted lack of memory More related external associations

Fraud contains deception with the intention of reaping some type of advantage in an exchange, so it is useful to apply lessons learned about how media selection influences behavior in IDT and computer-mediated deception research. In conjunction with other insights about the behavioral elements necessary for fraud and the behavioral antecedents that precede participation in e-commerce, IDT and computer-mediated deception research can provide an understanding of the interactive processes that occur during a fraudulent exchange. The strong convergence between these research domains on the importance of an individual's motivation and capabilities, the existence of opportunities or environmental factors, the distorted rationale perpetrators possess, and the influence of media characteristics seem to suggest that there is a common theme that ties these constructs together.

E-Commerce

Several of the important cognitive processes describing how and why people adopt technology have been articulated in the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) (Ajzen, 1991; Davis, 1986, Fishbein and Ajzen, 1975). TAM is an applied extension of TPB that was originally formulated to describe the adoption of computers in an office environment. Nevertheless, TAM has proven to be useful and parsimonious in describing other technology adoption phenomena, notably decisions to engage in e-commerce. Both TPB and TAM take a similar approach in addressing an individual's choice to utilize technology and propose models where the expected benefits of using the technology outweigh the expected effort of using it, with the key proposition that behavior is a result of rational choice.

As shown in Figure 2, these behavioral theories have been extended to describe e-

commerce adoption decisions and the important influences of perceptions of risk (Featherman et al., 2006; Jarvenpaa and Todd, 1996; Lee, 2009; Pavlou, 2003) and trust (Gefen et al., 2003; McKnight et al., 2002; Suh and Han, 2003; George, 2004) in online commerce. The generally supported perspective that emerged from studying e-commerce adoption phenomena posits that potential consumers weigh the convenience of engaging in an exchange with their perceptions of risk for that transaction before deciding whether to engage in the transaction (Bhatnagar et al., 2000). The same logic can be applied to an individual's decision to initiate a fraudulent exchange where they may evaluate the convenience of using a technology to commit the fraudulent act and compare this with the risk involved in being found out or arrested. Though they do not intentionally address the scenario, these models also highlight the attitudes that fraudsters attempt to influence through their contrivances; that is, to commit fraud it behooves the perpetrator to foster a false sense of trust and reduce the perception of risk associated with a transaction.

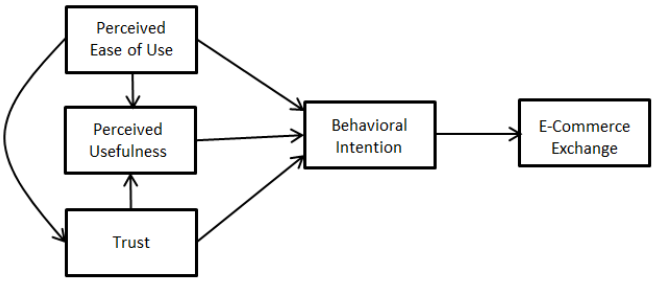

Figure 2. Model of E-Commerce Behavior (adapted from Gefen at al., 2003)

The level of trust that an individual has for others in an exchange plays a significant role in determining the level of risk that a participant perceives (McKnight et al., 2002). Trust and risk are both multidimensional and complex constructs (Bhatnagar et al., 2000, Johnstone and

Bedard, 2003; Lee, 2009; McKnight et al., 2002) and have been incorporated into numerous behavioral models of e-commerce (Gefen et al., 2003; Lee, 2009; Pavlou, 2003; Rofiq and Mula, 2010; Shin, 2008; Suh and Han, 2003). For the purposes of this paper's exploration of fraudulent exchanges, trust consists of assessments of competencies, benevolence, and integrity, which are dimensions that are evaluated separately by partners in the exchange (McKnight et al., 2002). Trust contributes to the formation of expectations about future actions for each individual in the exchange and manifests the social obligations each individual has to each other (Blau, 1964; Gefen et al., 2003; Kellerman, 1984). Therefore, even when formulating a plan to act in a deceptive manner, the deceiver trusts that potential victims will respond according to their expectations, albeit with the knowledge that actual responses may vary. Thus, a degree of risk is associated with an assessment of outcomes such as security, privacy, financial gain, social status, convenience, and performance (Lee, 2009).

In a fraudulent transaction, the perpetrator manipulates the exchange by anticipating the motivations of their potential victims and framing their influence in a manner in which they can obscure the true risk of the transaction and utilize discrepant and advantageous information (Johnson et al., 1993). Expectations of reciprocity in the exchange are intentionally broken through misrepresentation (Albrecht et al., 1982). Consequently, perceptions of trust matter little to a perpetrator because they already are aware that they will not be fulfilling any contractual or social agreement, but the perpetrator's assessment of their potential victims' level of trust influences their perception that an opportunity exists to utilize their manipulation to reap some personal benefit.

Victims of fraud are often engaging in a transaction with the purpose of reaping an economic advantage of their own, though they may drastically overestimate their prospective

benefit of participation due to a large dissymmetry of information caused by misrepresentation. As such, perpetrators will implement strategies to manipulate the information content and communication systems used in the exchange to project a greater financial, utilitarian, or hedonic value to their prospective victims while downplaying the risk involved with the transaction and any systemically risky flaws in the exchange. Thus, a keen fraudster will often use trusted websites or marketplaces as a way to mislead victims by taking advantage of the victim's trusting intentions and institutional trust in the system to offset their suspicions about a prospective transaction.

Fraud is more likely when knowledge asymmetry between the actors in an exchange is high and when assessments of risk are incorrect. Consequently, other important features of technologies that can be used by fraudsters to deceive victims are related to the type of information they make available to potential victims and these features influence which cues of deception are detectable during communication. For example, websites often provide information about the credibility and trustworthiness of individuals using their marketplaces in the form of consistent symbols such as user ratings, review systems, and certification systems. These different symbol sets are meant to provide alternate means to gauge the trustworthiness of both the market and the other party in the transaction. Potential consumers use these multiple symbols to gauge messages for consistency, because inconsistency is an important cue of deception, and they use these symbol sets as a means to determine the credibility of a website (Fogg et al., 2003). Thus, combinations of the capabilities of the technologies being used to facilitate the communication and the attitudes and beliefs of the individuals influence whether both parties agree to complete any prospective transaction.

Characteristics of Communications Technologies

Media Synchronicity Theory is useful in describing the various characteristics of the technologies being used to facilitate the e-commerce transactions. Media Synchronicity Theory evolved from Media Richness Theory (Daft and Lengel, 1986) which posited that media could be described by their ability in transmitting rich messages. The capabilities that media possessed that influenced the relative richness of communication included immediate response and feedback, personal focus, varied language, and multiple social cues. Media Richness Theory was criticized for its inability to account for important contextual elements such as the recipients' preferences (Markus, 1994). Media Synchronicity Theory expands on this perspective and addresses previous issues by explaining that the context or purpose of a message must be aligned with its relative capabilities, and that a rich form of media such as video may not be the preferred choice during certain types of communication where only basic information is being conveyed and deeper contextual cues are not required for developing a convergent understanding (Dennis and Valacich, 1999).

Media Synchronicity Theory posits that each form of media has different capabilities for communication as a result of varying transmission velocity, feedback, parallelism, symbol sets, rehearsability, and reprocessability (Dennis et al., 2008). Media synchronicity represents the extent to which the features of a medium allow users to work together at the same time towards a common goal (Dennis et al., 2008). Thus, while media synchronicity is the principal goal in cooperative actions, it is better to examine the individual characteristics of technologies when the goal of one or both actors is not convergent meaning, as is the case in fraudulent exchanges. Because 20-33% of daily communication is deceptive and self-serving (DePaulo et al., 1996), it is useful to evaluate how the characteristics and capabilities of media affect non-cooperative

communications, as well. For example, some media characteristics that influence the anonymity of the parties engaged in conversation may be valued in creating convergent meaning because of its democratic properties; alternatively, anonymity might also be coveted in fraudulent exchanges for its ability to obscure information. Other traits such as rapid feedback would only be desirable in a context where shared understanding is valued, whereas a fraudster would be wary of granting additional opportunities to leak cues of deception.

Transmission velocity refers to the rate at which the message can be sent and processed. Because computer-mediated e-commerce tools have a nearly simultaneous velocity of transmission, transmission velocity is of minimal importance in the proposed model. Feedback represents the speed and rate at which return messages can be sent and processed, and is a useful tool for clarifying uncertainty. An example of feedback in an e-commerce exchange would be the ability to ask the seller of an automobile on an online auction site how the vehicle was used, repair history, or other deleterious characteristics. A rapid response is

Parallelism refers to the number of concurrent transmissions and multiple direction communications, and in an online exchange, can represent a string of potential buyers and sellers engaged in multiple simultaneous conversations. Some media require a higher degree of attention and involvement from participants, allowing only an individual conversation, while other media forms allow multiple simultaneous interactions. For example, it is very difficult to engage in two telephone conversations at the same time, while it is common to send an e-mail to an entire group. Conversations requiring higher levels of effort and participation may cause distraction and can mask cues to deception (Burgoon et al., 2006).

Symbol sets are the variety of ways that information can be encoded in the message. Web sites often use a series of redundant seals and certifications, as well as multiple descriptions of

objects being sold including verbal descriptions, standard descriptions, key characteristics of the item, and photos. For example, when selling a computer it would be standard to describe the size of the monitor, the size of the hard drive disk storage, the speed of the temporary random access memory, and the processor type. People then use these various descriptions along with photos and videos to develop their understanding of the condition of the computer. Thus, inconsistent or unusual combinations of these characteristics could cause uncertainty and suspicion.

Rehearsability provides the sender with an opportunity to fine tune their message, and messages that have been planned and rehearsed are often less confusing and more detailed (Mennecke et al., 2000). Rehearsability is associated with media processing capabilities, and in the context of a cooperative act of communication can be used to encode a message in a manner that is best suited to aid the receiver in more rapidly developing the intended interpretation (Dennis et al., 2008). However, rehearsed messages are also more likely to mask cues of deception (Carlson et al., 2004). A dishonest person may practice or edit their message to remove any inconsistencies or cues of deceit.

Finally, reprocessability is the extent to which a message may be reexamined by the receiver. Messages that are recorded or saved allow individuals to hear, read, or see the message again. Reading or listening to a message multiple times may provide additional information that was not noted during the first exposure to the message. This repeated exposure to the message can improve an individual's understanding of the intended message and their ability to notice contextual and non-verbal cues contained within the message.

As shown in Table 2, these different characteristics of media exist to varying extents within all media forms, making the combination of media choice and message have an important impact on the quality and usefulness of communication (Dennis et al., 2008). For example, video

conferencing causes a focused, unrehearsed, conversation with another individual but provides better opportunities for feedback and a wide range of non-verbal symbols. In contrast, e-mail communications allow highly rehearsed messages with varying degrees of symbol variety and distraction. These combinations of traits can make one type of media the preferred vehicle for a message for completing some specific task (Dennis and Valacich, 1999).

Table 2. Comparison of Media Capabilities (adapted from Dennis et al., 2008)

	Transmission Velocity	Parallelism	Symbol Sets	Rehearsability	Reprocessability	Information Transmission	Information Processing	Synchronicity
Face-to-face	High	Medium	Few-Many	Low	Low	Fast	Low	High
Video Conference	High	Medium	Few-Medium	Low	Low	Fast	Low	High
Telephone Conference	High	Low	Few	Low	Low	Fast	Low	Medium
Synchronous Instant Messaging	Medium-High	Low-Medium	Few-Medium	Medium	Medium-High	Medium	Low-Medium	Medium
Synchronous Electronic Conferencing	Medium-High	High	Few-Medium	Medium	High	Medium	Medium	Low-Medium
Asynchronous Electronic Conferencing	Low-Medium	High	Few-Medium	High	High	Slow	High	Low
Asynchronous E-mail	Low-Medium	High	Few-Medium	High	High	Slow	High	Low
Voice Mail	Low-Medium	Low	Few	Low-Medium	High	Slow	Medium	Low
Fax	Low-Medium	Low	Few-Medium	High	High	Slow	High	Low
Documents	Low	High	Few-Medium	High	High	Slow	High	Low

Although Media Synchronicity Theory is meant to address situations where computer-mediated groups attempt to come to a shared understanding (Miranda and Saunders, 2003), many of the same capabilities that are critical in developing convergent meaning in a virtual group setting are manipulated during e-commerce fraud. In e-commerce scenarios, parties often have less volition in selecting the traits of the technologies they use because many of the e-commerce tools are provided by a third-party vendor. Some of the most common examples are popular online auction or trading sites such as EBay or CraigsList, where users have a limited number of

manipulations they can perform when listing or viewing items. Thus, a paradox exists because communication media that have strong capabilities for sharing information often lack critical abilities for developing convergent meanings (Robert and Dennis, 2005). Because assets are fraudulently described in a computer-mediated setting using a tool that is designed to share basic information about the products being sold, the media are unlikely to have a strong focus on displaying the social and contextual cues that help consumers detect fraudulent offerings. Effectively, these e-commerce tools are typically developed to convey basic information and not to provide effective means to judge the veracity of claims or provide convergent understanding.

CHAPTER 3. RESEARCH MODEL

Conceptual Model

The proposed model, displayed in Figure 3, combines the convenience and parsimony of the fraud triangle with the descriptive power and insights of the structured behavioral models of technology adoption and computer-mediated deception. Thus, by combining models that explore how deception and trust are exploited during an exchange (Grazioli and Jarvenpaa, 2000; Pavlou, 2003; Rofiq and Mula, 2010) with models that describe the necessary antecedents of fraudulent behaviors (Buchan, 2005; Carpenter and Reimers, 2005; Chang, 1998; Cohen et al., 2010) and models that describe how technological capabilities influence deceitful exchanges (Albrecht et al, 2007; Carlson et al., 2004), a descriptive and useful convergent model emerges. This approach can be used to parse out how and why different types of media with distinct characteristics have unique influences on whether deceptive actions are recognized (Burgoon et al., 2003). The proposed model is similar to the Motivation-Opportunity-Ability (MOA) model, which is also an extension of TPB, and had been applied to e-commerce and marketing behaviors (MacInnis and Jaworski, 1989; Ramaswami et al., 1998; Hughes, 2007). The MOA model describes how a person's perceptions of ability and opportunity moderate the direct influence of motivation on behaviors in task-specific circumstances (MacInnis and Jaworski, 1989). The proposed model applies a similar interpretation to the task of fraud, and the fraud triangle constructs, which closely resemble constructs from MOA. An important contribution of the fraud model proposed in this manuscript is the combination of multiple independent, but convergent, research streams into a parsimonious behavioral model of technology-mediated fraud (Harrison et al., 2012). The primary argument for this type of structure is that opportunity and ability do not directly cause behavior; instead, motivation directly causes behaviors, but that direct

relationship between motivation and behavior is moderated by ability and opportunity (Hughes, 2007). The proposed model of computer-mediated interpersonal fraud extends this argument to introduce technology as a key driver of the perceptions of task-specific opportunities and capabilities.

Variations of the TPB have already been used to describe technology adoption (Johnstone and Bedard, 2003, Szajna, 1996) and e-commerce (George, 2004; Pavlou and Fygenson, 2006). In these models, the benefits of technology use are generally derived from improved work or personal performance and are weighed against the difficulty required to adopt the technology. MOA has applied a task-specific version of TPB to e-commerce, where financial profits are the key motivators, and knowledge of financial products and services constituted a measure of capability while access to a computer represented opportunity (Ramaswami et al., 1998). Fraud is similar to these purposes with the exception that in fraud there is no convergent decision-making, shared agreement, or cooperation exhibited by the perpetrator, who maintains a different set of attitudes, goals, and decisions.

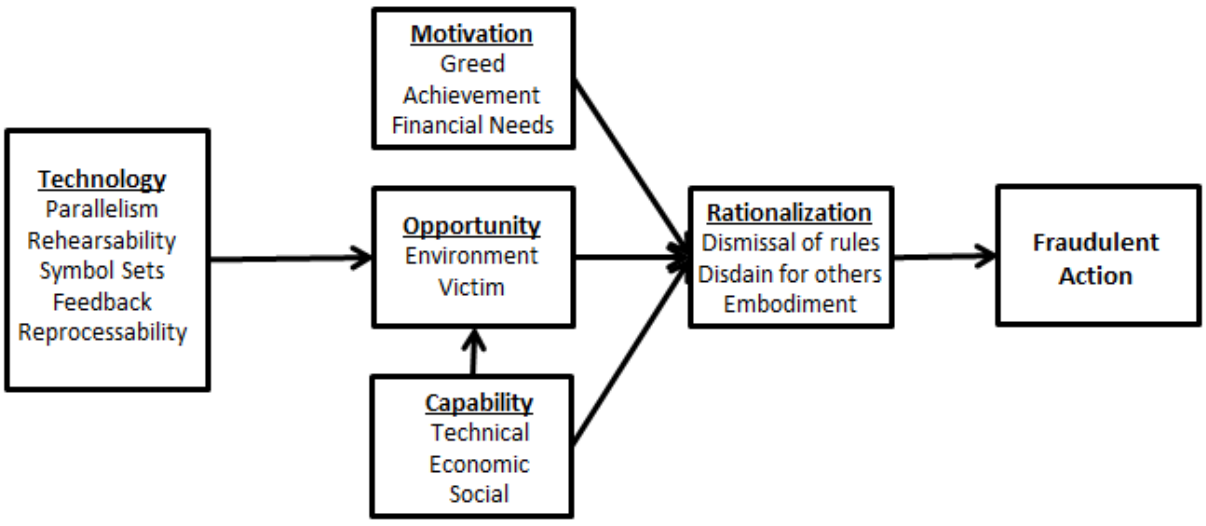

Figure 3. Conceptual Model of Perpetrator Behaviors

However, in a fraudulent exchange the supposed agreement is one-sided and only exists in the mind of the victim who suffers from a crucial lack of information brought on by the misrepresentation foisted upon them by the perpetrator. As a result, in a specific context, defined by the technological tools that create the electronic marketplace, a potential perpetrator's technical, social, and economic skills and abilities help the individual sense an opportunity to gain an advantage over another person. If the potential perpetrator is so motivated, by some combination of greed, ego, and desperation, it is likely that such a person could reasonably rationalize their inferred right to mislead the other party for their own advantage.

Variables

Technology

For any type of exchange to take place information must be transferred between individuals, and that information must be transmitted via some type of media. Media have varying capabilities that affect the message and information being transmitted and processed during the exchange (Daft and Lengel, 1986; Rice and Williams, 1984). The transmission velocity, feedback, parallelism, symbol sets, rehearsability, and reprocessability a technology affords can influence how messages are perceived in an exchange (Dennis et al., 2008) and ultimately influence the behaviors associated with engaging in the exchange. The characteristics a medium possesses influence the quality of communication and the outcomes resultant of the messages. Consequently, describing the influence of technology during communication is critical to understanding how various technologies may either deter or encourage fraudulent behaviors. Previous research describing how deceivers select media which aides in their effort to mask cues of their deception is useful in providing a foundation for understanding the influence of various

media types. However, in an e-commerce scenario, a deceiver often has less volition in choosing which technologies to use since a potential fraudster must use tools agreed upon by the victim, who also acts in their own self-interest. Instead, individuals who may intend to defraud others must use many of the same communications technologies that are used to facilitate ordinary transactions. In the same manner that a deceiver would have a preference for technologies that would mask cues of deception (Carlson et al., 2004; DePaulo et al, 2003; Robert and Dennis, 2005), any individuals seeking legitimate commerce would seek tools that display these cues and provide reassurances of credibility (Pavlou and Fygenson, 2006, Suh and Han, 2003). Thus, the mutual agreement of medium selection for e-commerce scenarios results in limited volition on the part of a fraudster.

Another key feature of e-commerce technologies is the shift towards communication types with less feedback between parties and a less personal form (Buller and Burgoon, 1996). The implication seems to be that as people become more familiar with computer-mediated communication and build a sense of efficacy, technologies that are designed to become more efficient and reduce the peripheral transaction costs are preferred. Paradoxically, this would seem to imply that more efficient e-commerce tools with less feedback and a focus on conveyance of information instead of the convergence of meaning could make deception more difficult to detect. This is because communicating a deceitful message becomes less taxing and deceivers are more capable of controlling or masking cues to deception when using efficient e-commerce tools (Buller and Burgoon, 1996; Eckman, 1992; Ekman and Friesen, 1969). For these reasons, the capabilities of the media used to facilitate e-commerce will influence the opportunities a fraudster perceives and an individual's perceptions of their capabilities to commit a fraudulent act.

Motivation

The most common motivation for committing fraud is the perception that a dishonest act could accrue some type of financial benefit (Cohen et al., 2010). The desire to accrue a financial benefit may be the result of some perceived financial need or pressure to acquire wealth necessary to maintain a social standing or reputation, it may be the result of a sense of greed, or it may originate from the need for achievement rooted in the generation of wealth (Albrecht et al., 2009; Beach and Mitchell, 1978; Choo and Tan, 2007). Historically, the construct of motivation had been rooted in the idea that an individual perceived that they had encountered some financial problem which they could not share with others or resolve via the help of others (Cressey, 1953; Morales et al., 2014). However, more recent perspectives describe fraud as a dishonest act perpetrated by an individual for their own personal benefit (Wells, 1997; Cohen et al., 2010; Dorminey et al., 2012). Nevertheless, behavioral motivations are psychological and do not necessarily reflect reality (Davis, 1989). In cases where fraud is meant to meet these financial goals, usually other means of legitimately achieving these goals that have been attempted by the perpetrator have been unsuccessful. Thus, the motivation to commit fraud is generally not for the pleasure of the act itself, but as a means-oriented goal (Dorminey et al., 2012). Motivation is similar to the perceived usefulness construct in TAM, describing the perceived benefits of action as a similar mean-oriented goal (Davis, 1989). Something is only useful if the user associates utility with the outcome, and usefulness lies within the concept of motivation. On occasion, the sense of power established through the successful execution of fraud provides the perpetrator feelings of dominance or mastery (Albrecht et al., 2007). Thus, the accumulation of wealth and ego are both key drivers motivating most fraudulent exchanges (Dorminey et al., 2012).

Opportunity

Potential perpetrators perceive an opportunity to commit fraud when they envision their dishonest actions leading to an unfair and advantageous position in exchanges. The perpetrator will typically exploit the potential victim's trust, often through the portrayal of some type of special knowledge, skill, or capability (Albrecht et al., 1982). Examples include extremely low prices, supernormal financial returns, or some rare artifact. While most individuals exhibit some degree of skepticism when the scenario seems too good to be true, it is common for individuals to exhibit a "truth bias," which is the expectation that others will be decent, pleasant, and worthy of positive regard (Buller and Burgoon, 1996; Kellerman, 1984).

The capabilities of the technology being used to facilitate the exchange also play a role, as potential fraudsters are more likely to perceive opportunities to defraud others when a medium exhibits certain traits. Volition, behavioral control, and locus of control all represent various aspects of opportunities and have been suggested as affecting behaviors in previous IS research (Hughes, 2007). A task-specific perception of opportunity to commit fraud exists when a control weakness is recognized and the likelihood of being caught seems remote (Dorminey et al., 2012; Ramamoorti, 2008). Thus, research has shown that deceivers typically prefer synchronous media when performing more important forms of deception and recognize the value of less synchronous media for less important forms of deception (Carlson and George, 2004). This may be because deceivers believe they can craft a less obvious deception with synchronous media, or alternatively, because they believe they can create more compelling deceptions to convince individuals with higher sensitivities to risk. In both cases, some capabilities of synchronous technology such as speed, rehearsability, and parallelism are useful and coveted by fraudsters while other traits such as reprocessability and a wide range of symbol sets are less useful or

counterproductive. This is because the goal of communication for a fraudster is not synchronicity as in many other forms of communication, but misrepresentation (Dennis et al., 2008). A fraudster does not want the other party in an exchange to develop the exact same understanding, but instead wants the other party to develop a disadvantageous understanding foisted upon them though misrepresentation. Consequently, the characteristics of the technology being used to facilitate the exchange that lead to the most advantageous misconception for the perpetrator will be the most valued and will afford the most opportunity to defraud others.

Capability

Individuals have varying capacities for committing fraudulent acts because of their unique skill sets. For example, information systems developers may have dangerous skills in the context of embezzlement or e-commerce fraud but do not necessarily possess the strong financial skills that would be needed to commit investment fraud. Capabilities represent the perception of an individual's ability to commit fraud in a specific context (Wolfe and Hermanson, 2004). The perception of capabilities to meet a specific purpose is similar to the concept of perceived behavioral control, which is a reflection of attitudes and beliefs based on past experiences (Ajzen, 1991). Thus, when an individual has relevant experiences and task-related skills, they will need to exert less effort to successfully complete the task (Beach and Mitchell, 1978). Prior research has suggested that capabilities derived from prior experience moderate the influence of motivational factors (Venkatesh and Bala, 2008).

In the context of fraud, communication skills, charisma, technical skills, and financial ability all offer advantages in manipulating exchanges through deceit. Communication skill and charisma are useful in masking cues to deception and crafting messages in a manner that makes

deceit difficult to detect. Technical skills and expertise provide a greater understanding of the mechanisms and controls designed to reveal cues of deception. Perpetrators often possess a high degree of knowledge about the procedures and control mechanisms in the systems they manipulate. Improved understanding of financial and economic activity can also be used to manipulate contractual terms when engaging in exchange with another individual with less expertise, and understanding any auditing procedures that may reveal irregularities (Ramos, 2003). Thus, the effects of capabilities of a perpetrator are rooted in how they increase various forms of power and influence exchanges (French and Raven, 1959; Albrecht et al., 2007). A combination of social, technical, or economic capabilities by a perpetrator or a lack of cleverness shown by victims can lead to unfair and fraudulent transactions (Albrecht et al., 1982).

Rationalization

Individuals may rationalize the fraudulent acts they commit by dismissing rules or laws or showing a general disdain for others. Thus, individuals rationalizing fraud still hold the same general attitude toward the behavior, but excuse their actions as they pertain to specific situations (Murphy and Dacin, 2011). Fraudsters rationalize their actions in a variety of ways that may include: blaming others, understating their own actions, complaining that they were forced by factors outside of their own control, underplaying the seriousness or impact of their actions, questioning the mores that forbid the act, or referencing others who have already committed such an act (Rossouw et al., 2000). Often there is a perception among perpetrators that they are entitled to some type of financial benefit or achievement, perhaps to compensate for some perceived past injustice. For example, an individual may rationalize their behavior by indicating that they only targeted privileged or wealthy individuals who did not actually need the money

that was stolen from them as much as the fraudster. Similarly, perpetrators will often explain after they are caught that they had never planned to defraud anyone and were just borrowing money they planned to repay later, or that they only embezzled because they deserved a little extra for the extraordinary effort they have put into their firm (Albrecht et al., 1982).

Individuals may also be able to rationalize dishonest acts by distorting personal boundaries. For example, an executive may appropriate business assets for personal use or a fraudster may be more willing to defraud strangers because they are not perceived as being individuals. Fraudsters may also deflect blame to the victim who was unwitting or gullible enough to fall for their deceit, and often exhibit a lack of empathy for their victims (Ramamoorti, 2008; Murphy and Dacin, 2011). Strong pressures to defraud also exist in situations where financial success is valued over all else (Choo and Tan, 2007). As a rational actor, the fraudster weighs their options before action and rationalizes the acts they are willing to commit. Thus, rationalization is the reconciliation of dishonest intentions with a personal code of ethics, which enables one to act dishonestly or immorally in certain contexts (Ramos, 2003). Offenders who acknowledge their fraudulent activities may refuse to accept a criminal identity and instead provide reasons that rationalize their acts (Dellaportas, 2013).

Fraudsters may not outwardly display their questionable moral propensity due to a hesitation to be exposed as breaking social norms or legal statutes. The ability to rationalize an action is similar to developing a behavioral intention and also represents the degree to which one favors or disfavors an action (Fishbein and Ajzen, 1975). Thus, in a socially undesirable action like fraud, the ability to rationalize the act is a manifestation of behavioral intention. Perpetrators who envision greater benefits, or less effort and risk, are more likely to be able to rationalize their decision to act dishonestly.

Fraudulent Intention

The Theory of Planned Behavior states that an individual will develop a cognitive intention to act prior to actually engaging in an action (Azjen, 1991). Similarly, extant research on fraud has portrayed fraud as an act based on a cognitive decision (Cressey, 1953; Murphy and Dacin, 2011). Cognitive decisions must be rationalized by the individual about to engage in the action; therefore, for fraud to occur an intention to act in a fraudulent or deceptive manner must also be formulated prior to engagement in action. Intention to act represents the purposeful anticipation that an individual will behave in a certain manner. Extant research has repeatedly shown strong correlations between behavioral intentions and actual behaviors for a variety of technology-related behaviors (Sheppard et al., 1988; Venkatesh and Davis, 2000, McKnight et al., 2002). As described in this study, fraudulent intention represents the behavioral intention to commit an act of fraud.

Research Design

This study is meant to address the question of how the characteristics of e-commerce and communication technologies affect the decision-making processes of individuals engaging in fraudulent transaction. The conceptual model, shown in Figure 3 is the basis of this research. This model describes how the characteristics being used to facilitate the communication and sale of items affect the decision-making process of a potential fraudster. To empirically address the question of how the capabilities of a technology may affect an individual's propensity to commit fraud, two variance models derived from the conceptual model in Figure 3 are developed and presented. The first model describes how media characteristics affect an individual's perceptions of the opportunity they perceive for that act to take place and how their perceptions of their individual capabilities are also mediated through their perception of opportunity. The second

variance model introduces causal relationships between the constructs in the fraud triangle. These variance models build on previous process models from accounting and IS domains and can be used to empirically describe the necessary and sufficient antecedents of computer-mediated interpersonal fraud. Thus, these models have important functional implications for describing how individuals may reduce their risk of becoming victims to fraudulent transactions and how systems can be strengthened to take a holistic behavioral approach to deterring fraud. Secondly, these models present a theoretically stimulating point to start exploring how the technological characteristics of information systems can induce or deter deviant or criminal behaviors.

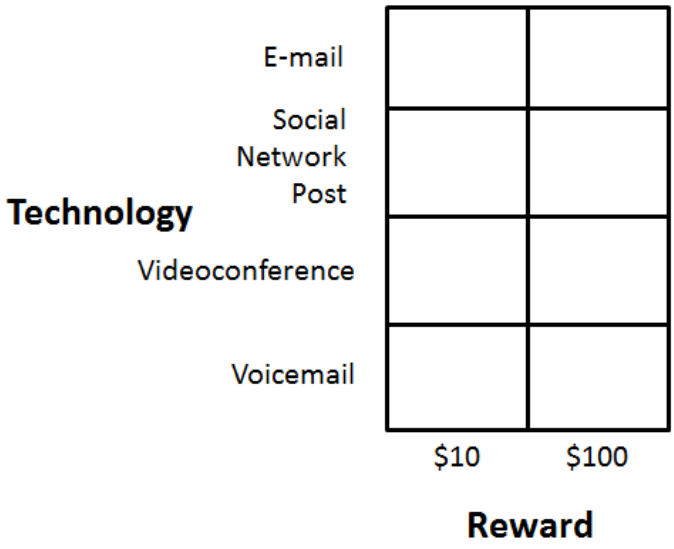

Figure 4. Research Design

A survey was used to collect data and analyze the models through a statistical analysis of responses. The research pool was divided into eight groups, representing the various conditions shown in Figure 4. A unique version of the survey presenting a different scenario (i.e., different potential rewards and different media types) was presented to each of the eight groups. The eight

scenarios represent conditions that theoretically would induce variance into the decision-making processes used by the participants. Each individual respondent belongs to only one research group in a between-subjects research design. To have a sufficiently large sample to perform the statistical procedures necessary for structural equation modeling (SEM) at least 400 total respondents were required with roughly 50 in each of the eight groups.

In the survey, respondents first answered a series of questions about a specific medium of communication (e.g., e-mail, video conferencing, voicemail, and social network posts) that detail the individual's perceptions of that particular technology's characteristics. The respondents were then presented with a scenario in which they would be asked to play a role. Specifically, they were asked to imagine that they are selling a tablet computer and could reap a greater financial reward by knowingly misrepresenting the condition of the tablet computer. Subjects were randomly assigned to one of four media forms and were told that they are to assume they would use the medium to facilitate the selling of a tablet computer. In these scenarios, they were also told that they would receive a financial reward if they knowingly misrepresent the condition of the tablet computer with the amount of this reward varying across groups, as either $10 or $100.

After being presented the scenario, respondents were asked a series of questions designed to gauge their motivation, perceived opportunity, perceived capability, and their ability to rationalize their actions with respect to the scenario they had been presented. Finally, respondents were asked if they would knowingly misrepresent the condition of the tablet computer based on the scenario they were presented.

As shown in Table 3, the study used four distinct e-commerce technologies that should be perceived as having differing levels of feedback, symbol sets, parallelism, rehearsability, and reprocessability (Dennis et al., 2008; DeLuca and Valacich, 2006). Based on extant research,

user ratings describing the capabilities of these technologies should vary and result in different perceptions of opportunity for creating a successful fraudulent listing. Previous research has already supported the notion that the characteristics a communication technology possesses do influence the behaviors of individuals (George et al., 2013; Froehle and Roth, 2004). Technologies with a large number of symbol sets, ample and timely feedback, and high reprocessability should be perceived as limiting opportunities for fraud for any potential fraudsters. In contrast, technologies with high parallelism and high rehearsability should increase perceptions of opportunities to commit fraud. The media technologies used in this study, e-mail, video conferencing, voicemail, and social network posting were selected because they have distinct combinations of media characteristics as defined by Dennis and colleagues (2008).

Extant research about media synchronicity has explored how the four technologies used in this study are perceived to be different in regards to their relative capabilities. E-mail is considered to have high rehearsability whereby users can plan and edit their messages in advance, high reprocessability because e-mails are typically stored on a server for re-use, and high parallelism because a person can have many distinct simultaneous conversations occurring while using e-mail. In addition, responses to e-mail may be delayed resulting in low feedback immediacy and e-mail is primarily text-based resulting in low symbol variety.

Table 3. Comparison of Media Forms

	Feedback Immediacy	**Parallelism**	**Symbol Variety**	**Rehearsability**	**Reprocessability**
E-Mail	Low-Medium	High	Low-Medium	High	High
Public Social Network Post	Medium-High	Medium-High	Low-Medium	Medium-High	High
Video Conferencing	High	Low	Med-High	Low	Low
Voicemail	Low-Medium	Low	Low	Low-Medium	High

In contrast, video conferencing is considered to be distinct from e-mail in each of the media characteristics. Video conferencing allows vivid visual displays and a broad selection of symbols, and as a synchronous media type feedback is nearly immediate. Additionally, the synchronous nature of a video conference does not allow well-planned responses resulting in low rehearsability, and typically video conference calls are not recorded or easily replayed, which results in low reprocessability. Additionally, because of the synchronous nature of a video conference exchange, it is difficult to have many simultaneous video conference conversations resulting in low parallelism. This results in e-mail and video conferencing having the potential to be perceived as very different in terms of the Media Synchronicity Theory characteristics.

Voicemail is similar to video conferencing in that the message also contains an audio component which is considered to be highly synchronous and has low parallelism and symbol variety. However, voicemail has high reprocessability and can be recorded and played back repeatedly. So, while voicemail is considered a synchronous medium from the perspective of the senders; to the receiver it is perceived as an asynchronous medium because messages can be replayed at the receiver's leisure. Thus, voicemail should be perceived as having similar media transmission characteristics, albeit with less symbol sets, to video conferencing while also having similar media processing capabilities to e-mail.

Social network posting is text-based like e-mail, but more synchronous, which makes it share characteristics with both synchronous technologies like video conferencing and text-based technologies like e-mail. In a similar fashion to e-mail, it is possible also to post messages with pictures of videos embedded within them on social networking sites. Using social networking posts, individuals are often expected to reply to one another, and messages being transmitted are generally much shorter than e-mails. Another trait of social network posts is that they are

intended to be broadcast to a larger audience, as opposed to a single individual. As a result of this mixture of synchronous and asynchronous characteristics, social network posts are considered to have moderate levels of parallelism, feedback immediacy, symbol variety, and rehearsability.

Consequently, these four media choices should produce varied perceptions of the characteristics belonging to each communication medium among participants. For example, people assigned to the e-mail condition should have lower perceptions of the immediacy of feedback than people assigned to social network posting, who in turn would have lower ratings of the immediacy of feedback than people assigned to the video conferencing condition. This variance in the perceptions associated with the characteristics of the technologies was meant to induce variance into the perceptions of opportunity individuals perceive to commit an act of fraud. In the example described above, people have a different perception of an opportunity to commit fraud when presented with a technology. For example, e-mail, masks certain cues to deception and does not allow immediate feedback, while video conferencing masks different cues of deceptive behavior and allows immediate feedback. Therefore, the different characteristics of the technologies the respondents are presented with in the scenarios are expected to produce variance in the perceptions of opportunity to commit an act of fraud.

In addition to the four types of media, two levels of financial incentive were presented to participants through the various scenarios. The personal utility, or financial benefit, that a person accrues through an action should affect their motivation to perform that action. Therefore, participants were presented with either a scenario where they would gain little through their actions, or a scenario where their actions would result in a more sizable financial benefit. While individuals do have varying levels of personal utility they assign to financial motivations, the differences between high and low financial incentives should create variance in the perceptions

of motivation for individuals to act. Therefore, variance in the exogenous variable motivation is expected to be a result of the financial benefits one could accrue in each scenario.

Finally, within each of these scenarios, individual assessments of capabilities are expected to vary by person. Because individuals were randomly assigned to one of the eight scenarios, each scenario contains individuals with a range of personal capabilities for committing an act of fraud. Some people may perceive that they have strong communication or technical skills that may allow them to better manipulate the transaction. Other individuals may perceive difficulties in persuading others, and deem that they are less capable of successfully misrepresenting the condition of the tablet computer.

Fraud Triangle Research Model

The following analysis contains two main sections. Each section describes the models that were used to quantitatively analyze hypotheses derived from the research question. Each analysis presents and describes a research model that focuses on a different part of the conceptual model. The first research model describes the casual structures of the relationships between the constructs in the fraud triangle, and builds and validates a model of interpersonal fraud. The second section of the analysis focuses on the effect of media capabilities. That section describes how communication technologies and perceptions of personal capabilities affect perceptions of the opportunity that exists to commit a fraudulent act.

As described above, the first part of the analysis focused on testing a structured version of the fraud triangle. It was necessary to develop and validate a model of interpersonal fraud before the effects of media capabilities on fraud can be precisely tested. Thus, although in a causal structure the effects of media capabilities precede the effects of fraud triangle constructs upon

one another, in the analysis the structure of the fraud triangle must be validated before the effects of media capabilities can be effectively evaluated. In extant research, the factors making up the fraud triangle have generally not been assigned any specific causal structure or order of precedence (Albrecht et al., 1982). However, similar models based on the Theory of Planned Behavior have been applied to the domains of Information Systems and Marketing research. First, any causal relationships between the fraud triangle constructs can be evaluated using a similar structural equation modeling approach as described for testing the media capabilities in the previous section.

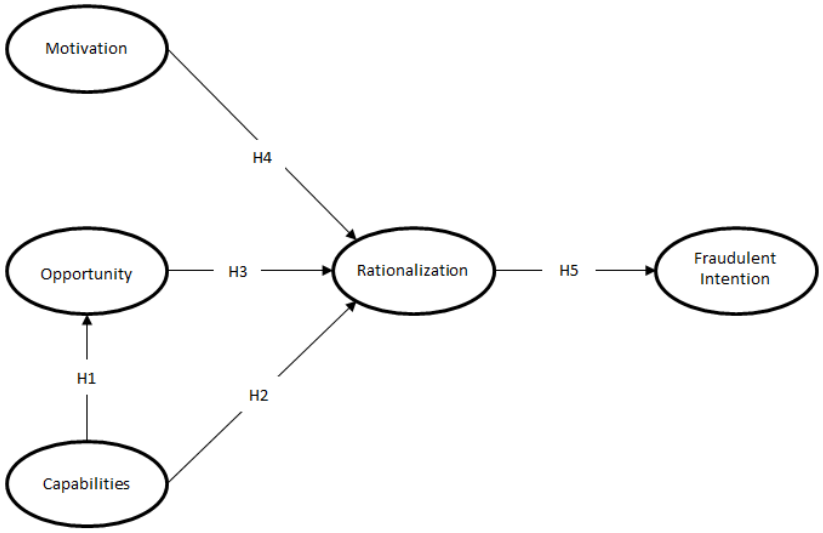

Figure 5. Fraud Triangle Model

In addition, an analysis using cross-group equality constraints for each of the media types provides valuable insights in testing this part of the model. A cross-group constraints approach to testing the group models provides information about whether technology type affects the values and relationships of the cognitive constructs (i.e., motivation, opportunity, capabilities, rationalization, and fraudulent intention). Cross-group equality constraints can be used to test

causal hypotheses across groups with the technological artifact as the key differentiating condition between the groups. In a cross-group constrained model, the means of the variables or the estimates of parameters are sequentially constrained to be equal to one another and then the fit and structure of the model is tested for differences as each subsequent constraint is added (Byrne, 2004). Significant differences in the various groups' model fit indices indicate differences between the groups. However, a cross-group constrained model is not as useful in describing the individual effects of the characteristics of technology (i.e., feedback immediacy, parallelism, symbol variety, rehearsability, and reprocessability) as the original model where the parameter estimates of the beta coefficients represent these effects. Thus, while the cross-group constrained models are useful for examining the impacts of various media forms on fraud, they are not as descriptive about the effects of individual media characteristics. Instead, the cross-group constraints model that describes the technologies as categorical entities (i.e., e-mail, social network post, and video conferencing) tests the argument that different media forms cause varied effects in the perceptions and cognitive processes that precede fraudulent actions. However, each media form contains a suite of characteristics; thus, when the technologies are used as categorical variables it would is difficult, or impossible, to ascertain the relative importance of these media characteristics or their independent effects.

The benefit of a cross-group constraints approach is that it provides information about whether the decision-making process for fraud is similar irrespective of media selection. Significant differences in the models for various media forms indicate that media type is a key driver in the decision-making processes of fraudsters. In contrast, a non-significant finding indicates that media type may play a moderating role in the relationships proposed in the model or have no discernable effect at all on behavior. Thus, this analysis determines whether

technology has a direct influence or plays a moderating role on behaviors.

Finally, evidence of cross-group invariance provides support for developing a general structured version of the fraud triangle more akin to TAM, MOA, and other such models. Thus, if the same causal relationships retain their significance irrespective of media type, the evidence suggests that a general model of the causal relationships between constructs in the fraud triangle exists. Because the non-deviational behavioral model of fraud was identified in the subsequent analysis, estimates of the regression parameters from this model were also useful in describing the constructs and relationships between them. For example, the beta coefficients described the change that endogenous variables such as perceived opportunity and perceived capabilities had on other endogenous variables such as the rationalization to commit an act of fraud. Thus, the significance tests associated with these parameters provided statistical testing of the causal hypotheses proposed for the model.

Similarly, the lambda matrix contains values describing the change that a latent factor causes in an observed indicator, giving a statistical interpretation of the factor loadings associated with each of the latent constructs and allows the evaluation of construct validity. Finally, model-wide measures of fit such as the chi-squared (χ^2) tests of model fit, the root mean square error of approximation (RMSEA), and goodness-of-fit index provide a means of describing the usefulness of the model. These heuristics all represent measures of model fit and are used as evidence of the validity of the specification of the proposed model. Overall, the variety and usefulness of the tests provided by this combination of model specification and research method provides substantial opportunities to address research questions about how media influences the behavioral processes that result in fraud. This approach also provides evidence of the value, generalizability, and robustness of the fraud triangle model.

Fraud Triangle Hypotheses

As described previously, it is likely that people who believe they are exceptionally talented when using communication, financial systems, or information systems would perceive a greater opportunity to commit fraud in the context of e-commerce. In addition, the effects of capabilities on rationalization would be partially mediated through the perception of an opportunity to act. Individuals who perceived their own social, economic, or technical capabilities to be superior to others could exploit these capabilities to create an opportunity to defraud another.

H1: A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased perception of an opportunity to commit the fraudulent act.

People who possess greater capabilities to commit fraud would anticipate that it would take less effort to successfully act (Beach and Mitchell, 1978). As a result, when weighing the motivating benefits against the costs and risks associated with the opportunity, individuals with greater task-specific capabilities would perceive a better exchange compared to those with less relevant skills. More highly skilled individuals will envision a better payout in terms of effort versus reward and are more likely to rationalize their actions due to this more optimistic assessment of consequences. Individuals who perceived themselves as having greater social, economic, or technical skills would perceive it to be easier to successfully commit an act of fraud, and would consequently find those actions easier to rationalize. In these situations, feelings of superiority derived from these perceptions of personal capabilities may lead fraudsters to rationalize their actions through their disdain for others or their disregard of rules.

H2: A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased likelihood that person will rationalize the fraudulent act.

Opportunity is a reflection of an individual's recognition of an improved chance or reduced effort needed to perform a fraudulent action. Perceptions of opportunity are based on environmental and contextual factors that leave other individuals open to manipulation and deceit (Albrecht et al., 1982). When an act is perceived as easier to perform, it increases the likelihood that a person considering that act would choose to perform it (Beach and Mitchell, 1978). Both the availability of opportunities presented to individuals and the personal characteristics of those individuals affect behavioral intentions in ethical situations (Banerjee et al., 1998). Consequently, some potential perpetrators may find it easier to rationalize committing an act of fraud when an exceptional opportunity is presented through a weakly controlled environment or especially susceptible victim (Murphy and Dacin, 2011). In these instances, it may be easier to believe that the act was justified or that the victim deserved to be defrauded.

H3: A greater perceived opportunity to commit a fraudulent act will result in an increased likelihood to rationalize a fraudulent action.

Motivation is driven by greed, perceived need, or ego (Albrecht et al., 2009; Beach and Mitchell, 1978; Choo and Tan, 2007; Dorminey et al., 2012). These psychological factors describe the state of mind of individuals and exist independently of the technology, or even the context of a single transaction. People highly motivated to commit fraud, whether through greed, need, or ego are more likely to be able to rationalize their actions based on their perceived necessity. Greater motivation and pressure to act dishonestly to achieve a perceived need or

personal achievement and greater perceived rewards for deceptive acts should increase the likelihood that an actor is willing to rationalize the act of fraud.

H4: A greater motivation to commit a fraudulent act will result in an increased likelihood to rationalize a fraudulent action.

Often fraud is rationalized or legitimized within a personal code of ethics by ignoring rules, arguing general rules are not valid in specific circumstances, or espousing disdain for others (Albrecht et al., 2007). For example, Jim Bakker rationalized defrauding his church followers because even money he spent on himself was indirectly helping others because his mission was to live as a servant to others. A person's morals and personal judgments consistently affect their behavioral intention to engage in unethical acts (Leonard, 2004). However, when rationalizing fraud, an individual can maintain their general disdain for the activity while justifying their intentions as an appropriate action given their specific circumstances (Murphy and Dacin, 2011). Thus, given the circumstances fraudsters may rationalize that normal rules do not apply. When a person is capable of rationalizing such an act with their own ethical framework, they are more likely to perform a fraudulent action.

H5: A greater likelihood that a person will rationalize a fraudulent act will result in an increased likelihood of that fraudulent act occurring.

Media Capabilities Research Model

The second part of the analysis explores how the characteristics of communication media affect perceptions of ability and opportunity to commit fraud and uses factor analysis to describe patterns in the media capabilities. Thus, this second section of the analysis builds upon the model

of interpersonal fraud presented in the previous section and answers the research question of this study by addressing how media capabilities affect interpersonal fraud.

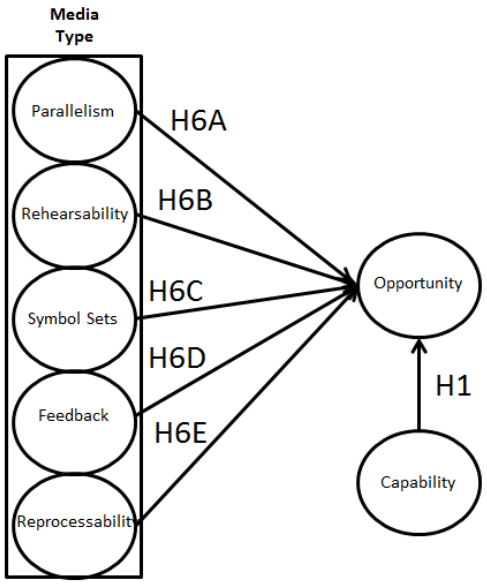

Figure 6. Media Capabilities Model of Effects

There is theoretical justification for determining if media capabilities, as described by Media Synchronicity Theory, represent statistically distinct phenomena. For example, there is reason to suspect that feedback immediacy and rehearsability are both related and are primarily a result of the transmission velocity of a communication medium. Similarly media with fewer symbol sets, such as e-mail, are typically easier to record and reprocess than media with a large variety of symbolic indicators, such as video conferencing. It is these interrelationships that DeLuca and Valacich, (2006) posited are responsible for the fallacy of interpreting media as having a single dimension, media richness, and recommend to instead examine the entire combination of the media characteristics. Consequently, the factor analysis provides valuable information on how the characteristics of the media are related to one another. In addition to the factor analysis, the path model, shown in Figure 6, describing the effects of the media

characteristics and capabilities on perceived opportunity, will be interpreted for each media form. This model of the effects of media capabilities describes how the various media characteristics are relevant and related to task-specific perceptions of the opportunity to commit an act of interpersonal fraud.

An important feature of this analysis is that the various parameter estimates represent the relationships from the media characteristics to opportunity and can be interpreted as the relative importance of each media characteristic for the purpose of committing fraud. This provides an important insight because it demonstrates that for specific tasks the relative importance of a specific capability of a medium is more or less desirable than other characteristics. In contrast, most previous studies of the influence of media on behavior have focused solely on using various media as an exogenous variable instead of examining the individual traits of the media. In the context of computer-mediated interpersonal fraud, Interpersonal Deception Theory implies that traits such as rehearsability and reprocessability may be more germane than having a wide range of symbol sets due to their relative salience in masking cues to deception.

In addition, the effects of personal assessment of capabilities on perceptions of opportunity are also analyzed in this model. An analysis of this model describes the extent to which an individual's assessment of their own capabilities to commit an act of interpersonal fraud leads to their perception that an opportunity to commit a specific act of interpersonal fraud exists. Similarly, the lack of significant relationships between media capabilities and other fraud triangle constructs, like capabilities and motivation, indicates that the effects of media characteristics are mediated through perceptions of opportunity, but do not influence an individual's personal assessment of their own capabilities to commit fraud or their perceptions of the benefits they may accrue through a fraudulent action.

Media Capabilities Hypotheses

Extant research about deceptive communication suggests that various media forms may be better at masking or elucidating cues to deceptive behavior (George et al., 2013). Thus, certain characteristics that lead to high-synchronicity will be useful when used to deceive others, while other characteristics may be counter-productive to those efforts. Because an act of fraud requires a deliberate attempt to deceive another, media characteristics would similarly influence the perception of an opportunity to commit an act of fraud. Consequently, the individual characteristics possessed by the information technologies that support e-commerce may influence the interpretation of the messages being exchanged and the behavioral responses of the individuals participating in the exchange. In addition to the characteristics of technologies being used to facilitate communication, the personal capabilities an individual possesses will also alter their interpretation of the opportunity to commit an act of fraud. As described in the previous sections, the capabilities an individual believes themselves to possess can affect their interpretation of the difficultly of performing an act. Individuals that have developed certain talents consider acts that rely on those talents to be easier to perform (Beach and Mitchell, 1978). Increased knowledge of computer systems, financial exchange systems, and knowledge of how to mask cues of deception in communication are critical capabilities for creating misconceptions during an e-commerce exchange. Opportunity is a perception that there is an improved chance for action and perceived capabilities represent the presumed efficacy of an individual with task-relevant skills. Therefore, it is likely that people who believe they are exceptionally talented at manipulating communication, financial systems, or information systems would perceive a greater opportunity to commit fraud in the context of e-commerce. Thus, the effects of having greater social, economic, or technical capabilities to commit fraud would be partially mediated through

the increased opportunities one would perceived as a result and these effects would need to be included in the model of media effects.

H1: A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased perception of an opportunity to commit the fraudulent act.

Media that possess high feedback immediacy, many symbol sets, low parallelism, high rehearsability, and high reprocessability have been shown to affect behavior and decisions about communication in previous research about cooperative tasks (Dennis et al., 2008). Media that possess the ability to provide rapid feedback, provide alternative symbol sets, reduce simultaneous tangential conversations, allow messages to be rehearsed, and save messages so they can be reprocessed again later are more capable of creating shared understanding when communicating ideas (Dennis and Valacich, 1999). While media have been categorized as having high-synchronicity or low-synchronicity during collaborative group exercises, measures of synchronicity should be deconstructed into its component capabilities for non-collaborative exercises (Carlson and George, 2004). This is because the goal of a fraudulent exchange is not convergent understanding, but is, rather, the conveyance of misrepresentation. Thus, traits like anonymity that may be valuable in collaborative groups for egalitarian purposes may be useful in a different manner when used for deceptive purposes (Nunamaker et al., 1999). As a result, in this study the effects of media forms and individual media characteristics on interpersonal fraud are both examined. This assessment is necessary to explore how media as a suite of characteristics may affect behaviors, but also which individual characteristics within that suite induce the most significant changes in behaviors.

The logic of Interpersonal Deception Theory suggests that media that obscure cues to

deception will be preferred for deceptive acts, such as fraud. Rehearsability allows a potential perpetrator of fraud time to craft their message in a manner that hides as many of the cues indicating deceit as possible. Consequently, media that have a high degree of rehearsability will allow individuals time to more deliberately and comprehensively mask cues of their deceit.

H6A: A communication medium with a greater amount of parallelism will result in an increased perception of an opportunity to commit fraud.

Additionally, a high volume of interfering conversations and the ability to send misleading messages to large audiences would be coveted by fraudsters. Cues to deception may be overlooked by distracted or busy recipients. Consequently, media with high parallelism would obscure cues to deceit by overloading recipients with more information than they could effectively assess in a timely manner. Finally, having the ability to contact a great number of people is useful because while some message recipients will notice leaked cues of deception and stop the exchange, the fraudster may have luck in locating a few recipients gullible or desperate enough to be deceived by the ruse.

H6B: A communication medium with a greater amount of rehearsability will result in an increased perception of an opportunity to commit fraud.

In contrast, some capabilities may expose cues and illuminate deception. Individuals will look for consistency as a sign of honesty because lying, as a cognitive task, is difficult, and often uncontrolled cues to deceit will slip into conversations (Ekman and Friesen, 1969). Thus, having a variety of symbol sets to control may prove to be more difficult for a fraudster and additional cues of deceit may be leaked into the communications. Consequently, the more symbol sets

offered by a communication medium, the more cues of deception would leak into conversations resulting in increased skepticism and probability of detection. This increased skepticism and distrust during the exchange would be manifested in a reduced perception of an opportunity to commit an act of fraud.

H6C: A communication medium with a greater number of symbol sets will result in a decreased perception of an opportunity to commit fraud.

Similarly, a potential victim's ability to ask for feedback and receive additional context provides more parts of the deceptive message for the fraudster to cognitively manage. Interpersonal Deception Theory describes how during the communication event messages are constantly evaluated by the participants and that these assessments affect subsequent levels of trust or skepticism (Carlson et al., 2004). Thus, the rapid feedback may provide more opportunities for deceptive behaviors to be discovered and can result in an iterative process of building skepticism. Consequently, media forms with high feedback immediacy provide additional chances for cues of deception to be unwittingly conveyed and uncovered. Thus media that would provide immediate feedback would be perceived as reducing opportunities for fraud because they would be more rapidly displaying cues of deception.

H6D: A communication medium with a greater amount of feedback immediacy will result in a decreased perception of an opportunity to commit fraud.

The ability for a message to be reprocessed by a potential victim will also provide more opportunities for that potential victim to discover cues to deceit. When the recipient has the opportunity to repeatedly assess a message and scour it for indications of deception, it is more

likely that any inconsistencies or unintentional cues of deception would be uncovered. Thus media that offer high reprocessability will be perceived as reducing opportunities to commit fraud because they will more effectively elucidate these inconsistencies and cues to deception. In addition, the risk of social or legal ramifications for defrauding others are greater for messages that are recorded and stored, making greater reprocessability of a message unwelcome to potential perpetrators.

H6E: A communication medium with a greater amount of reprocessability will result in a decreased perception of an opportunity to commit fraud.

Finally, media capabilities would not significantly affect either motivation or individual capabilities to commit fraud. While it is possible that due to individual perceptions of efficacy with a communication technology, individuals may believe they have greater capabilities for performing fraud when using specific information systems, the concept of capabilities as described in extant fraud literature points to a general set of beliefs about one's personal aptitude. As such, the construct capabilities represents individual perceptions about the social, technical, and financial abilities that one possesses that would be useful in successfully accomplishing an act of fraud. Consequently, perceptions of personal inherent capabilities will be made independent of media type or characteristics, and situation-specific perceptions of one's capabilities will be manifested within the opportunity one perceives to commit the action. Similarly to perceptions of personal capabilities, motivation exists independently of media, since it is mainly driven by psychological factors such as greed, ego, or need. Thus, neither motivation nor capabilities should be influenced by media forms or media characteristics.

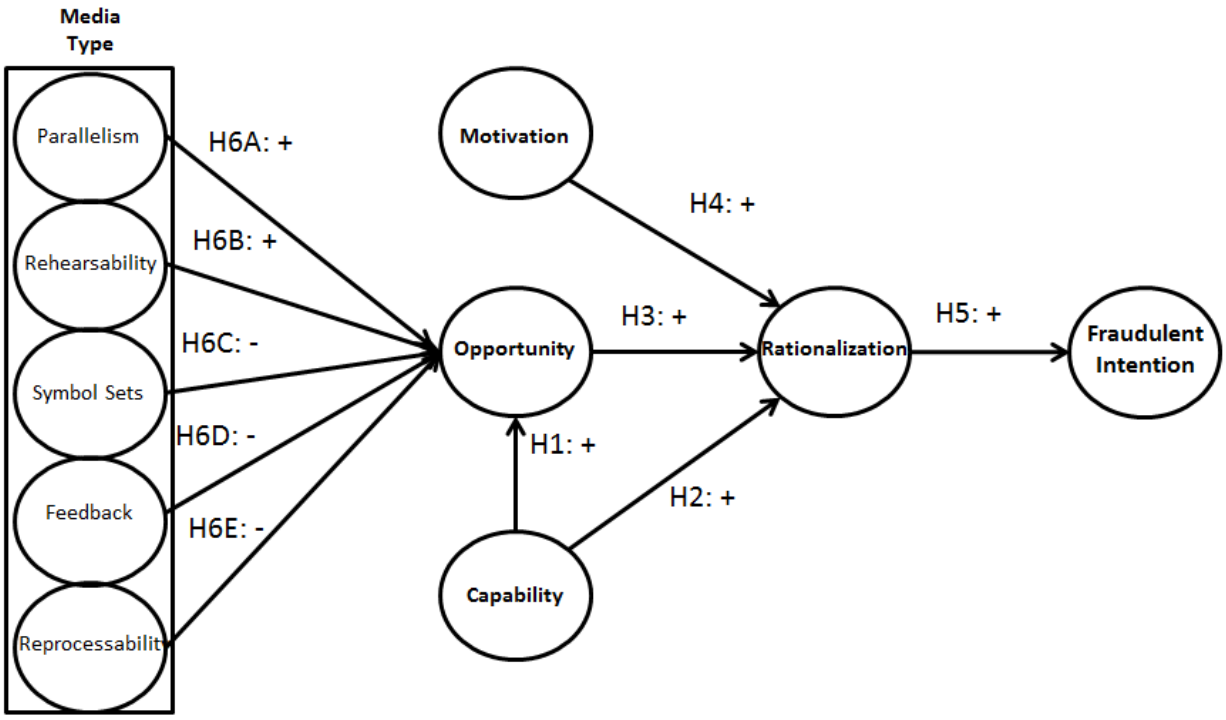

Figure 7. Full Research Model with Hypotheses

Therefore, this model predicts that individual media characteristics drive individuals' perceptions of their opportunity to commit fraud. This model also specifies that perceptions of motivation and personal capabilities are not influenced by the technology that is facilitating communication. Thus, the full research model combines the hypotheses that describe the effects of media characteristics as supported by Interpersonal Deception Theory and computer-mediated deception research with the causal hypotheses that add structure to the Fraud Triangle based on the Theory of Planned Behavior. Consequently, the combined research model, displayed in Figure 7, summarizes the entire collection of directional casual relationships hypothesized within this study. However, the subsequent analyses are performed on the abbreviated models with the major sections of the analyses focusing on the fraud triangle and media capabilities, respectively.

CHAPTER 4. METHODOLOGY

Scale Development

Evaluating the Initial Scales

Measurement scales do not already exist for evaluating the media capabilities or the fraud triangle constructs described in the proposed model so measurement scales for these constructs were developed prior to the quantitative analyses. Collecting data for measuring media characteristics and fraud via a survey represents an alternative method than had been used in previous research. Most research about media capabilities has relied on expert assessment to describe how various media are different from one another. Most previous research about the fraud triangle had been articulated in the context of corporate fraud and had often used interviews or other qualitative methodologies for describing corporate cultures and the influence of those cultures on motivation, opportunity, capabilities, and rationalization. In this study, the scales developed for measuring both media characteristics and fraud triangle constructs showed evidence of reliability and validity. Thus, the scales proposed, developed, and validated in this study represent useful new alternative methods for measuring and studying media effects and fraud behaviors.

The scale development process followed the recommendations of MacKenzie et al. (2011), who recommend developing valid survey items by using a systematic and iterative data collection process. A similar process had already been employed for developing scales to measure behaviors in computer-mediated communication in other contexts (Froehle and Roth, 2004). First, the scale items are conceptualized and defined based on extant theory. Extant research describing the concepts, listed in Appendix A and Appendix B, were used to define the scope and conceptual core for each of the constructs. The phrases and wording of the

measurement items mimicked or rephrased the descriptions of these concepts. Consequently, the measurement items created prior to refinement are meant to represent the entire conceptual domain of the construct.

Next in the scale development and validation process, the measurement items were refined by assessing the face validity and redundancy of items. To develop these scales, experts on fraud, deception, and e-commerce were asked to help develop questions designed to measure each of these constructs on a seven-point Likert scale. The anchors on the scales ranged from Strongly Disagree (1) to Strongly Agree (7). Following this, experts and a second group of non-experts evaluated these items to come to a consensus about which measurement items best represented the core concepts associated with motivation, opportunity, capabilities, and rationalization.

The following step in the scale development process consists of evaluating the scales through a number of statistical analyses designed to provide statistical evidence of reliability and construct validity. Thus, the measurement items were presented in a survey to a larger audience for data collection. The participants in the survey were screened for familiarity with various media forms and e-commerce. In the survey responses, only one respondent (0.4%) had indicated that he had not participated in e-commerce prior to the survey and his response was removed from the data used in the analysis. The surveys were administered using Qualtrics, an online program for collecting survey data. Of the 263 surveys that were started; 252 (95.8%) had all the information filled out and were used for the analysis. Incomplete surveys were deleted in a listwise fashion; partial survey responses were not used. For the scale refinement survey, respondents were randomly assigned to answer questions about either e-mail or video conferencing, but not both media.

The first part of the statistical analysis included an exploratory factor analysis to develop a more precise and parsimonious version of the scales with between 3-5 measurement variables per construct. The statistical analysis consisted of performing an exploratory factor analysis on the measurement items and a confirmatory factor analysis on the measurement model. The exploratory analysis provided information about the underlying relationships between the items and the latent factors, and provided evidence of convergent and discriminant validity. The confirmatory analysis provided additional evidence of construct validity, and validated the findings of the exploratory analyses.

The exploratory factor analysis was performed using PASW software and utilized principal components analysis as the factor extraction method. Because there is theoretical justification to believe that the constructs would be correlated due to the theoretical relationships posited between them, the covarimin oblique rotation method was used to arrange the factor solution. Oblique rotation methods, such as covarimin, are preferred when the latent constructs are correlated (Hair, 2010). Rotation does not improve the explanatory power of the factors but trades the relative complexity of the variable and factor interpretations to find a clearer factor solution. Covarimin rotates the factors to find a solution with the lowest correlations between factors. Exploratory factor analysis is used to uncover the underlying structure of the variables based on heuristics such as the Kaiser-Guttman rule using Eigenvalues, parallel analysis, and scree plots. Thus, the statistical relationships between items were used to determine the optimal factor solution, where the fewest number of factors describe the most structure in the correlations between variables. The resulting refined scales are listed in Appendix D and Appendix E.

Following the exploratory analysis, the measurement model was tested using a covariance-based structural equation model. This method is regarded as a rigorous means of

evaluating construct validity (Chin, 1998; Wetzels et al., 2010). The software used to evaluate the measurement model was AMOS, a graphical software program for evaluating structural equation models using covariance estimation techniques. Maximum-likelihood estimation was the technique used to reproduce the observed covariance matrix. Consequently, the scales had been conceptualized from extant research, assessed for statistical reliability, evaluated for face validity through pilot studies, and validated for convergent and discriminant validity through appraisal of the measurement model.

Validating the Scales for Hypothesis Testing

After the scales had been statistically validated through EFA and CFA techniques as described in the recommendations for scale development (MacKenzie et al., 2011), another set of data was re-collected for the purposes of further validation and theory-testing. This method of scale development was consistent with the manner in which previous scales for measuring behaviors in computer-mediated communications were proposed and validated (Froehle and Roth, 2004). Because, the initial scales were deemed to show strong evidence of reliability and validity, a new set of data was collected for testing hypotheses using the recently validated scales. To test the nomological validity of the constructs and the relationships proposed for our research model, the data collection for the second set of data was expanded to four media types. These media types were e-mail, video-conferencing, voicemail, and social network posts.

Of the 673 total surveys that were initiated during the second round of data collection, 647 (96.1%) were completed and were used for the analysis. Respondents were randomly assigned to answer questions about their behaviors and perceptions for their respective media types. Of the respondents, 163 were in the e-mail group (25.2%), 160 were in the video

conferencing group (24.7%), 198 were in the voicemail group (30.6%), and 126 were in the social network posts group (19.5%). Thus, the scales were used in a larger second round of scale validation meant to confirm the reliability and construct validity evidenced in the first analysis and provide additional evidence of nomological validity for the relationships posited in the proposed research model. The scales maintained the same evidence of reliability and validity during the analysis of the second set of data. Therefore, recommendations for scale development indicate that subsequent analyses can be used to evaluate casual relationships between the factors (MacKenzie et al., 2011). The model was evaluated using partial least squares (PLS) in SmartPLS (Ringle et al., 2005). PLS can be considered more appropriate than a covariance-based structural equation model for evaluating causal models and formative structures because this estimation technique maximizes the amount of variance described in endogenous variables by the exogenous variables (Wetzels et al., 2010). Following recommendations for utilizing PLS to perform significance tests on the proposed relationships, a bootstrapping algorithm with 1,000 samples was performed for the 647 cases (Chin, 1998).

These structural equation modeling techniques require a large number of participants, and large sample sizes can influence the strength of factor loadings as well as the reliability of the measures (Field, 2000). The recommendations for sample sizes can vary and include 15 subjects per variable (Field, 2000), 5 times as many observations as variables (Gorsuch, 1983), and 10 cases per item (Nunnally, 1978). In these analyses, 252 cases and 647 cases remained in the first and second data sets, respectively, after list-wise removal of incomplete surveys. These sample sizes exceed each of the sample-size heuristic criteria. Another potential concern with using data collected via survey for factor analysis is that a key assumption in EFA is that all variance in measurement error is random. However, collecting data by survey can result in systematic

patterns within the data. EFA assumes that the variables were measured without any non-random error, and this assumption is difficult to adhere to with survey collection methods. However, there are statistical tests that can be performed to assess the impact of mono-method bias upon the results, and these tests were also conducted as part of the analysis.

Sampling

For this research, the population of interest included individuals engaged in e-commerce. The target sample of subjects for the survey was students who attended Iowa State University and had participated in e-commerce. The sample population was drawn from undergraduate students who had previously bought or sold something over the Internet. To obtain a representative sample, respondents were prescreened to determine if they had previously participated in e-commerce. The prescreening items appear in Appendix C. The prescreening questions on the survey asked respondents about their familiarity with e-commerce and with the communication medium they had been assigned to. Respondents who have never bought or sold anything over the Internet were not used during the analysis. Participants were also screened to ensure that they were familiar with the media to which they were assigned. The removal of subjects who did not meet prescreening requirements was listwise and no partial responses were used. As shown in Appendix F, during the pre-screening questions participants were also asked their sex and if they have ever been defrauded in the past and these responses were used as control variables in the subsequent analyses. Based on the prescreening items and their familiarity with both the media forms and e-commerce, students were deemed to constitute an appropriate and representative sample of people who frequently use e-commerce and buy and sell items like tablet computers.

Study Administration

The surveys were distributed via e-mail using the Qualtrics survey-development tool. Students were randomly presented with one of the eight versions of the survey, representing their membership in one of the eight groups in the research design. Upon agreeing to participate in the study, participants answered prescreening questions about their familiarity with e-commerce and with the communication medium they had been assigned to. Respondents who had never bought or sold anything over the Internet or had never used the media that was assigned to their group were not used during the analysis. Participants were also asked if they had been defrauded in the past, and this response was used as a control variable. Extant research suggests that the processes involved with the development of trust are different when one has been defrauded previously, so there is theoretical justification that the reasoning processes for these individuals may be different than for others who have not been previously defrauded. Then, respondents were asked to describe the characteristics of the communication medium to which they were assigned. The media characteristics were based on the descriptions of the media capabilities in Media Synchronicity Theory (Dennis and Valacich, 1999). Each media capability was represented with three survey questions, as listed in Appendix E. Participants were asked to describe the extent to which they agreed or disagreed with a series of statements that described the media capabilities in Media Synchronicity Theory.

Next, participants were presented with a specific scenario, as displayed in Table 4, and answered a series of questions describing their cognitive processes in relation to the scenario. The scenarios presented a case in which the respondent would knowingly misrepresent the condition of a tablet computer for financial gain. Misrepresentation of a material good is one of the most commonly reported forms of fraud in e-commerce (IC3, 2012). The questions presented

to respondents immediately following the descriptions of the scenarios were designed to gauge how the characteristics of the media and the circumstances described in the scenarios affected respondents' perceptions of motivation, opportunity, capabilities, and rationalization for engaging in a fraudulent action. The survey questions presented to participants about the fraud triangle constructs are listed in Appendix D. Participants were also asked whether, given the specific scenario, they believe they would perform a fraudulent action.

Table 4. E-commerce Scenarios

		Reward	
		$10	**$100**
Media Technology	**E-Mail**	You are selling a tablet computer online and intend to use e-mail to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $10 from the sale.	You are selling a tablet computer online and intend to use e-mail to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $100 from the sale.
	Public Social Network Post	You are selling a tablet computer online and intend to use posts on a social network to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $10 from the sale.	You are selling a tablet computer online and intend to use posts on a social network to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $100 from the sale.
	Video Conferencing	You are selling a tablet computer online and intend to use video-conferencing to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $10 from the sale.	You are selling a tablet computer online and intend to use video-conferencing to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $100 from the sale.
	Voice Mail	You are selling a tablet computer online and intend to use voice mail messages to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $10 from the sale.	You are selling a tablet computer online and intend to use voice mail messages to communicate with the potential buyers. If you state the condition of the tablet computer to make it appear better than it really is, you could gain an additional $100 from the sale.

Data Analysis

The data collected through the surveys were analyzed using a structural equation modeling approach specifying a model with latent variables. In the first analysis, the media types presented in the scenarios were deconstructed into the component characteristics of those technologies so that more meaningful interpretations could be drawn from the analysis. Thus, instead of looking at the effects of various technologies, the analysis focused on the effects of feedback immediacy, parallelism, symbol sets, rehearsability, and reprocessability. The focus of this approach was to examine how characteristics of media affect the behavioral processes resulting in fraud. A second analysis using cross-group constraints with the SEM model of fraud triangle constructs evaluated the effects of media types instead of individual media characteristics. The focus of this approach was to explore if the same cognitive processes result in fraud irrespective of the media being used to facilitate communication. Both approaches used SEM with latent variables to represent the constructs in the model.

SEM with latent variables combines the assumptions and interpretations for both measurement models describing the relationships of measurement items to the latent factors and structural models describing the relationships between those latent variables. In SEM, the measured values of the indicators for the exogenous variables do not need to be normally distributed, making it feasible to combine the eight scenarios into one data set (Muthen and Satorra, 1995). The proposed models were fully-recursive and non-deviational, because the model had clear causal relationships in only one direction and estimates of means and intercepts were used in comparing and testing the groups described in the research design. The non-deviational specification of the models affects the identification of the model, because means and intercepts are estimated parameters. Identification is critical in SEM, where it is necessary that

the number of parameters being estimated does not exceed the number of known observations, and consequently result in a lack of unique solutions for the model. In this model, in which each construct had 3-5 observed measurement items, the measurement part of the model was necessarily identified using the t-rule and sufficiently identified using the three-indicator rule. The structural part of the model was necessarily identified using the t-rule and sufficiently identified using the fully recursive rule.

Because the non-deviational model was identified, a solution to the series of equations could be converged upon. In addition, since the model fit well, the estimates of the regression parameters were useful in describing the constructs and relationships between them. Using a SEM approach in the first analysis, the model-wide measures of fit such as the χ^2 test of model fit, the RMSEA, and various goodness-of-fit indices indicated the usefulness of the overall model of fraud.

Additionally, the lambda matrix contained values describing the change that each latent factor caused in the observed indicators, giving a statistical interpretation of the factor loadings associated with each of the latent constructs. These factor loadings were used to provide evidence of construct validity. Convergent validity is supported when measurement items loaded very strongly on the factors they were associated with, and discriminant validity was evidenced when those same measurement items load very weakly with any other latent factors.

Finally, the gamma and beta coefficients described the effects that the latent variables had on each other. Thus, the hypothesis tests associated with these parameters provided statistical tests of the hypotheses (H1-H6) proposed for the model. Consequently, if the parameter estimates for the gamma and beta coefficients are significantly different from 0 at a high level of confidence (alpha = .05), there is strong evidence that the proposed relationship describes a real

effect of one latent variable on another. Furthermore, the amount of variance in the endogenous latent variable explained by the relationship can be measured with the coefficient of determination (R^2).

These same heuristics for determining construct validity, model fit, and relationship strength were utilized in the cross-group SEM analysis, as well. However, in the cross-group approach multiple SEM models (i.e., one for each group) are simultaneously estimated (Byrne, 2004). The parameter estimates in the cross-group models can be constrained to the same value for any parameter including factor loadings, factor weights, error terms, means, and intercepts. These constraints were added in a deliberate order, to evaluate evidence of structural invariance, factor invariance, and mean differences, respectively. Finally, when a high degree of measurement invariance was evidenced, pairwise comparisons of the means were performed across the groups. The cross-group constraints affect the overall fit of the model and change both the χ^2 value for the model and the degrees of freedom associated with it. Using these values, χ^2 difference tests were performed after adding each new constraint to determine how significantly the model had changed as a result of the newly added constraint. When the fit significantly weakened as the result of a cross-group equality constraint being added, measurement invariance and other differences between the models were demonstrated. These differences in model fit can be used to evaluate how measurement items are interpreted, how effects vary, and how latent constructs differ between groups. Thus, while not specifically addressing the hypotheses (H1-H6), these comparisons between media types were a useful extension to the analysis because they provided additional evidence of the similarities and differences in the cognitive processes resulting in fraud when using various media.

Manipulation Checks and Controls

Prescreening items, which are shown in Appendix C, ensured that only participants who indicated that they had used the media described in the scenario they were randomly assigned to were included in the analysis. All respondents had been screened to ensure that they had previous experience with the media form described in the scenarios to which they had been assigned. Only six respondents (0.9%) indicated that they had never participated in e-commerce before. Thus, the results were not significantly different when excluding individuals who had not participated in e-commerce.

At the end of each survey, respondents were asked to answer basic questions specific to their scenarios, such as the dollar amount and the media form that was used, to ensure that each respondent carefully read the scenarios. These manipulation checks are displayed in Appendix G. In the survey responses, 98.0% of people correctly identified the media described in their scenario, and 97.6% correctly identified the dollar amount described in the scenario to which they were assigned. Thus, the vast majority of respondents displayed that they had indeed read and remembered the details of the scenario to which they had been assigned.

Additionally, respondents were asked to describe whether the scenario they were presented more closely matched an act of convergence or an act of conveyance. Media Synchronicity Theory is clear that one can expect different task outcomes and media fit when engaging in acts of convergence or conveyance. As shown in Appendix H, in the first data set most of the individuals (54.3%) indicated that they considered the interpersonal act of fraud described in their scenario to be an act of convergence rather than conveyance (36.0%). The same results were evident in the second data set. In the second data set, 56.7% of respondents considered the scenario they were presented with to describe an act of convergence and only

35.2% considered the scenario to describe an act of conveyance. This was consistent with extant research, which indicates that in a deceptive scenario, individuals perceive the act of deceiving or convincing another individual of some falsehood to be an act of convergent communication (George et al., 2013).

Finally, because it is expected from extent theory that males would be more likely to rationalize and engage in acts of fraud (Albrecht et al., 2009), the sex of the respondent was collected to be used as a control in the analyses. Additionally, extant research has shown that people who have been defrauded before are more jaded about commerce and make their decisions about engaging in e-commerce differently (Dorminey et al., 2012). Thus, the survey included an item in the prescreening questions that asked if the respondent had ever been defrauded before. Finally, since the data were all collected via survey, measures of social desirability were collected to be used in the analysis of common methods bias.

CHAPTER 5. SCALE DEVELOPMENT

Assessments of Reliability and Face Validity

The scales describing media capabilities and the fraud triangle constructs were evaluated in the first data set which consisted of 252 responses and consisted of respondents who were presented with the e-mail and video conferencing scenarios. The items all exhibited high reliability, except for item PL1, which was altered in subsequent versions of the survey. Upon speaking to both respondents and individuals involved with the pilot testing of the scales, it was determined that the word "simultaneous," which was included in the original measurement item, was difficult to understand for some individuals and caused confusion about the meaning of the survey question. Although the word "simultaneous" was included in the original phrasing of the item, respondents preferred the phrase "at the same time." This change in phrasing for subsequent versions of the survey made the phrasing of item PL1 more consistent with the language used in items PL2 and PL3. This is a strong indication that item PL1, as it was originally phrased, was significantly influenced by methodological error. Thus, while item PL1 was a reliable measure, it did not exhibit sufficient validity and was removed from subsequent analyses for the first set of data. Removing item PL1 made only minor changes to the EFA model; all analyses and factoring heuristics remained the same before and after item PL1 was removed from the analyses. While using a factor with only two measurement items, the model for the first analysis was specified using the two-indicator rule instead of the three-indicator rule. Because the model remained fully recursive and contained no hypothesized correlations across factor error terms, the model was still identified when using the two-indicator rule. The updated measurement item PL1, which was rephrased to replace the word "simultaneous", was included in subsequent analyses of the second set of data.

Table 5. Reliability of Measurement Items

Media Capabilities Items			Fraud Triangle Items		
Construct	**Item-to-Total Correlation**	**Item**	**Construct**	**Item-to-Total Correlation**	**Item**
Feedback Immediacy (FB) α = 0.873	0.718	FB1	Motivation (MOT) α = 0.957	0.890	MOT1
	0.804	FB2		0.902	MOT2
	0.749	FB3		0.868	MOT3
Parallelism (PL) α = 0.846 (0.921 when PL1 is removed)	0.561	PL1*		0.888	MOT4
	0.814	PL2		0.859	MOT5
	0.781	PL3	Opportunity (OPP) α = 0.921	0.773	OPP1
Symbol Variety (SV) α = 0.848	0.718	SV1		0.854	OPP2
	0.701	SV2		0.827	OPP3
	0.731	SV3		0.797	OPP4
Rehearsability (RH) α = 0.876	0.791	RH1		0.725	OPP5
	0.825	RH2	Capabilities (CAP) α = 0.944	0.853	CAP1
	0.686	RH3		0.832	CAP2
Reprocessability (RP) α = 0.938	0.825	RP1		0.849	CAP3
	0.900	RP2		0.878	CAP4
	0.895	RP3		0.824	CAP5
			Rationalization (RAT) α = 0.938	0.773	RAT1
				0.814	RAT2
				0.875	RAT3
				0.885	RAT4
				0.831	RAT5

*This item PL1 was dropped from the scale development analyses and was replaced in subsequent analyses with "____ allows people to have many conversations occurring at the same time" (item-to-total correlation = 0.901)

Evaluation of Media Capabilities Scales

After assessing the reliability of the measurement items, an exploratory factor analysis was performed on the 252 records to evaluate the factor structure of the latent media capabilities constructs. To perform the exploratory analysis, the Principal Access Factoring (PAF) extraction method was used. PAF is a particularly useful extraction method for scale development because it extracts the minimum number of latent variables to explain as much covariance as possible in the observed data and is more robust to non-normal data than maximum likelihood (Fabrigar et

al., 1999). PAF models also include the measures' shared variance and exclude unique variance, making it ideal for scale refinement.

To determine if factor analysis would be useful with our data, the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy was performed. The KMO test describes the proportion of variance in the variables that might be caused by underlying factors; values above 0.5 indicate the analysis is useful (Kaiser, 1974). The KMO sampling statistic for this data set is 0.836, indicating that factor analysis would be appropriate. The Bartlett's test was highly significant (<.001) with a χ^2 value of 2,634.5 and 91 degrees of freedom, similarly implying that some relationships exist within the data. Consequently, the preponderance of evidence suggests that the data were factorable and that factor analysis was a suitable analytical technique for this purpose. EFA is considered to be one of the best alternatives for analyzing the underlying structure of the latent factors and is recommended as a primary step in scale development (Hair et al., 2010).

As part of the EFA, the reliability of the measures was assessed. Reliability is the internal consistency of items within a single factor and was measured with Cronbach's alpha. When interpreting Cronbach's alpha, typically values above 0.7 are considered acceptable (Field, 2000). As shown in Table 5, all factors had reliabilities greater than 0.8, and each factor was measured with three variables, after PL1 was rephrased. This part of the analysis suggests that the proposed measurement items were a reliable way to measure the media capabilities defined by Media Synchronicity Theory. Nevertheless, reliability is necessary but not sufficient for the development of valid measures of these constructs. Consequently, the validity of the measures was assessed through analyzing the factor structure and fit of the model.

Theory suggests a five-factor, higher-order, solution based on the constructs proposed in Media Synchronicity Theory (i.e., feedback immediacy, parallelism, symbol sets, rehearsability, and reprocessability). This is because feedback immediacy, parallelism, and symbol sets are media transmission characteristics, while in contrast, rehearsability and reprocessability are media processing characteristics. Extant theory supports the notion that there is a second-order factor structure with some media characteristics contributing to media transmission capabilities while other media characteristics contribute to media processing capabilities (Dennis et al., 2008). Theory posits that feedback immediacy and parallelism contribute to a medium's ability to transmit a message, whereas rehearsability and reprocessability contribute to a receiver's ability to process the message. Theory also suggests that symbol variety may play a role in both the transmission and processing of a message (Dennis et al., 2008).

In addition to making propositions about the effects of each media capability, theory also implies the constructs have a formative structure. In a formative model, each sub-construct contributes a critical component of the conceptual core to a higher-order construct. In contrast, in reflective higher-order constructs sub-constructs are interchangeable alternatives. Feedback immediacy, parallelism, and symbol sets each represent distinct theoretical concepts but are all defined as media transmission capabilities. Thus, these relationships strongly suggest that a formative model would be most appropriate. Similarly, rehearsability and reprocessability represent two distinct concepts but are both described as media processing capabilities, which also suggests a formative structure. As a result, a higher-order factor formative structure was expected based on extant research about Media Synchronicity Theory. Evidence of this higher-order factor structure was interpreted as additional evidence of construct validity for both synchronicity and the lower-order constructs measuring individual media capabilities.

In EFA, there are a number of heuristics that are used to determine the appropriate number of factors within a data set. First, a lower-order factor solution was attempted, and during that analysis evidence consistent with a higher-order factor structure emerged, suggesting that the higher-order formative structure existed within the data. Subsequently, a higher-order factor analysis was performed using the correlation data from the inter-factor correlation matrix from the initial PAF analysis. The analysis of the higher-order factor structure was consistent and the solution for various factoring heuristics all converged on the same solution proposed by Media Synchronicity Theory: two higher order factors, media processing capabilities and media transmission capabilities existed. Consistent with theory, feedback immediacy, parallelism, and symbol sets loaded onto the factor representing media transmission capabilities. In contrast, rehearsability and reprocessability loaded onto the factor representing media processing capabilities.

The Kaiser-Guttman criterion, the percent of cumulative variance explained, a scree plot, and parallel analysis have all been recommended as methods for determining the appropriate number of factors in an EFA. First, the Kaiser-Guttman criterion is a simple heuristic that suggests that only factors with an Eigen value greater than 1.0 should be retained in the model (Kaiser, 1960). For the lower-order factor model, the Kaiser-Guttman criterion indicated that a four-factor model would be most appropriate. In contrast, extant theory posits that there are five distinct media capabilities. As an alternative method for determining the appropriate number of factors, previous research has also suggested that a good stopping point for the number of latent factors in an EFA is when 70-80% of the total variance is explained by the factors (Field, 2000). When evaluating the lower-order factor structure, the first three factors accounted for 71.9% of total variance and the first four factors accounted for 79.6% of the total variance, suggesting that

a structure with either three or four latent factors was the most appropriate solution. These results from the lower-order EFA were not consistent with extant theory, which suggests that a five-factor model would emerge with each of the five media characteristics being distinctly represented by a factor. Inconsistencies among factoring heuristics such as these can be an indication of a higher-order factor solution (Hair, et al., 2010).

To analyze the higher-order factor structure proposed by theory, first the factor loadings were evaluated in an EFA model where the number of factors was constrained to five. Effectively, this constraint imposed five first-order factors onto the model, with each factor representing one of the five media capabilities proposed in MST. If these factor loadings were found to exhibit strong loadings onto the appropriate latent constructs along with weak cross-loadings onto other factors, then it would be appropriate to use the inter-factor correlation matrix to perform a higher-order EFA using the five second-order factors (Hair, et al., 2010). To evaluate and interpret the factor structure, the rotated factor loadings in the pattern matrix were examined (see Table 5). Typically, factor loadings over 0.4 are considered significant and values less than 0.4 are considered to not significantly load on a factor (Field, 2000). Significant loadings of related measurement items onto a single factor demonstrate convergent validity. Discriminant validity is evidenced by the lack of significant factor loadings to other latent factors. While all of the factor loadings adhere to the correct factors as specified by theory, a rotated factor loading greater than 1.0 for measurement item RP2 and factor 1 was irregular. This could indicate colinearity between two of the factors, presumably rehearsability and reprocessability, due to high inter-factor correlations. Nevertheless, even though rehearsability and reprocessability are highly correlated, results from the CFA show evidence of convergent and discriminant validity for each of the measures. In addition, there are strong theoretical

reasons to believe rehearsability and reprocessability represent distinct concepts. Because both rehearsability and reprocessability are weighted onto the same higher-order factor, it seemed most appropriate for both measurement items to independently remain in the analysis.

Table 6. Eigen Values of Media Capabilities

Eigenvalues			
Factor	Total	% of Variance	Cumulative %
1	2.393	47.866	47.866
2	1.350	26.993	74.859
3	0.543	10.864	85.722
4	0.518	10.367	96.089
5	0.196	3.911	100.000

Both convergent and discriminant validity were suggested in the five-factor model because the measurement items significantly load onto each of their five respective factors without any significant cross loadings. Thus, a five-factor solution was feasible for the lower-order constructs (i.e., feedback immediacy, parallelism, symbol variety, rehearsability, and reprocessability), and both the factor analysis and theory further suggest a higher-order factor solution. The theoretical justification to model a higher-order factor is based on the proposition that ultimately all five of the variables measure various aspects of synchronicity and therefore, they should ultimately reflect perceptions of a higher-order construct. A higher-order factor analysis was performed using oblimin rotation, and the correlation data consisted of the inter-factor correlation matrix from the initial PAF analysis.

As shown in Table 6 and Figure 8, the same criteria for evaluating the factor structure described in the lower-order EFA strongly supported a solution in which the five lower-order factors loaded onto two distinct higher-order latent factors. For example, the first two factors had

Eigen values greater than 1.0, and these two factors accounted for 74.9% of the variance in the data. Furthermore, the scree plot and parallel analysis both also indicated a two-factor solution. A scree plot is a graphical representation of the Eigenvalues, and sharp changes in these values produce "elbows" in the chart that can aid in interpretation (Cattell, 1966).

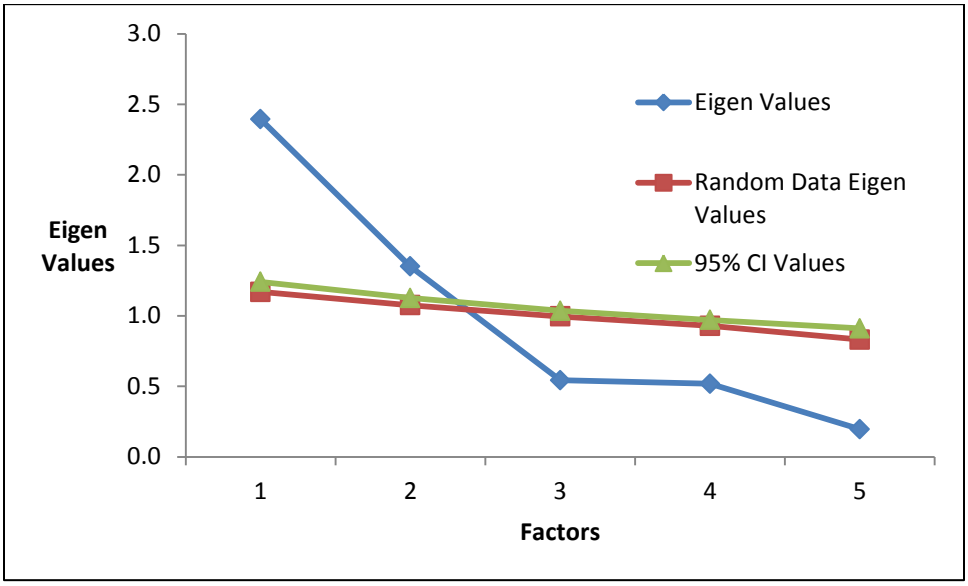

Figure 8. Scree Plot and Parallel Analysis of Media Capabilities

In addition, a parallel analysis is considered a more stringent test of factor structure than alternative methods (Fabrigar et al., 1999; Gorsuch, 1983; Hayton et al., 2004). To perform a parallel analysis, a randomly generated dataset was created that reflected the observations and variables in the data set (Horn, 1964). Eigen values were calculated from the correlation matrix of the randomly generated data set for appraisal against the observed data. Next, the Eigen values for the 95th percentile greater than the mean (alpha = 0.05) are calculated to create a more conservative test than the mean Eigen values generated by the random data sets, and to adhere more closely with heuristics from other statistical tests. Finally, the Eigen values for the random data sets at both the mean value and 95th percentile are plotted against the scree plot for the

Eigen values from the observed data. When the Eigen values of the random data set exceeded the Eigen values of the observed data set, there was strong evidence that these factors account for only trivial or random information, thus demarcating the optimal factor solution (Thompson and Daniel, 1996). As displayed in Figure 8, the parallel analysis indicated that two higher-order factors were evident in the data.

In the higher-order factor analysis, the pattern matrix, Kaiser-Guttman rule, scree plot, and parallel analysis all pointed to a model with two higher-order factors. As shown in Table 7, the higher-order EFA shows that rehearsability and reprocessability significantly loaded together onto one factor, while feedback immediacy, parallelism, and symbol variety significantly loaded onto a second factor. This finding was consistent with MST, which suggests that feedback immediacy, parallelism, and symbol variety are media transmission capabilities, while rehearsability and reprocessability are media processing capabilities. These loadings and the model fit supported the proposition that two second-order factors (i.e., media transmission capabilities and media processing capabilities) existed and offered a superior solution compared to a single-factor solution (i.e., one second-order factor representing the overall concept of synchronicity). This convergent solution supported the theoretical propositions that rehearsability and reprocessability support media processing capabilities, while feedback, parallelism, and symbol variety support media transmission capabilities. Thus, during the EFA process, first the validity of the constructs that represent the five media capabilities proposed in MST (i.e., feedback immediacy, parallelism, symbol variety, rehearsability, and reprocessability) was assessed. Subsequently a second-order factor structure with media transmission capabilities and media processing capabilities represented as higher-order formative constructs was evaluated and selected as the best representation of the factor structure of the media capabilities.

Table 7. Pattern Matrix of Media Capabilities

	Factor	
	1	2
RH	0.986	-0.018
RP	0.798	0.013
FB	-0.197	-0.703
SV	-0.154	0.633
PL	-0.313	0.510

While an EFA is useful for identifying the factor structure evident in the data, a CFA is also needed to assess the validity of the proposed measurement items. For the CFA, a covariance-based structural equation model was used. The AMOS statistical software program was employed to evaluate the measurement model for the 252 responses and create parameter estimates that reproduced the covariance matrix using maximum-likelihood estimation. The measurement model was necessarily identified using the T-rule. In this case, the 119 observed variables outnumbered the 52 estimated parameters, which resulted in 67 degrees of freedom. The model was sufficiently identified using the two-indicator rule for multifactor models. Subsequent analyses had the updated measurement item PL1 included, and used the three-indicator rule for model identification, instead. As a result of having only two indicators for parallelism in the initial CFA, the proposed model was just-identified for the parallelism construct and was globally over-identified. Thus, the proposed model was both necessarily and sufficiently identified, and it was appropriate to attempt to reproduce the covariance matrix using a structural equation model.

Various measures of model fit indicated that the measurement model fit well. First, a general fit statistic, the normed χ^2 value, was calculated by dividing the χ^2 value (125.621) by the degrees of freedom (67). Values less than 3.0 are considered to indicate a good fit for the

model (Hair et al., 2010); the proposed model had a value of 1.88, which indicated a good fit. The comparative fit index (CFI) is 0.977, was above the recommended 0.950, which also suggested a good fit (Hu and Bentler, 1999). The RMSEA was 0.059, which indicated a moderate to good fit (Hair et al., 2010; MacCallum et al, 1996). The normed fit index (NFI), which can be sensitive to large sample sizes, was 0.953, which indicated a good fit (Bentler and Bonnet, 1980; Bollen, 1986; Hu and Bentler, 1999). The non-normed fit index (NNFI or TLI), which is more robust than the traditional NFI to large sample sizes, was 0.969, which also suggested a good fit. Finally, the standardized root mean residual value for the model was 0.039, which was less than the recommendation of 0.08 and also pointed to a good fit (Hu and Bentler, 1999). Thus, the fit statistics, when considered together, indicated that the proposed model had a good fit.

Next, the composite reliability (CR) was used to evaluate the reliability of the proposed constructs in the confirmatory factor analysis model. Generally, a composite reliability should be above 0.7 to indicate that the items are consistent measures of the latent construct (Hair et al., 2010). As shown in Table 8, the composite reliabilities for all the media capabilities and synchronicity are above 0.84. Similarly, the convergent validity of the constructs was evaluated in the measurement model using the average variance extracted (AVE). Typically an AVE of 0.5 or greater is desired for each of the latent constructs in a model. The AVE values in the measurement model indicated that the measurement items correlated with one another under their parent factors. Finally, the maximum shared variance (MSV) and the average shared variance (ASV) can be compared to the average variance extracted to gauge the discriminant validity of the latent constructs. The AVE for each latent construct was greater than either the MSV or ASV, indicating that the variables correlated more strongly with the other variables

under the same latent factor than with variables that reflected other latent factors. While there was evidence of discriminant validity between constructs, rehearsability and reprocessability were very highly correlated; however, they both represent distinct theoretical concepts. The high correlation between rehearsability and reprocessability is most likely due to being first-order constructs of the same formative second-order construct, and may be a vestige of having a limited number of media forms in the analysis. When taken together, the tests and heuristics performed during the CFA suggest that the higher-order confirmatory factor model exhibited both reliability and validity.

Table 8. Construct Validity of Media Capabilities

	Composite Reliability	Average Variance Extracted	Maximum Shared Variance	Average Shared Variance	Correlations between Constructs				
					FB	PL	SV	RH	RP
FB	0.875	0.701	0.176	0.077	0.837				
PL	0.915	0.843	0.239	0.190	0.362	0.918			
SV	0.845	0.645	0.239	0.160	0.420	0.489	0.803		
RH	0.884	0.719	0.692	0.270	0.016	0.488	0.388	0.848	
RP	0.942	0.845	0.692	0.230	0.020	0.391	0.273	0.832	0.919

After determining that the scales exhibited reliability and validity, the measurement invariance of the model was tested for the e-mail and video conferencing groups. Tests of measurement invariance are important for comparisons between groups (Widaman and Reese, 1997). Although typically used to examine differences in various demographic groups among the sample population, evidence of configural invariance between the e-mail and video conferencing groups would be necessary for comparing the factor structures. This type of invariance would indicate that in both groups the same indicators load onto the same factors. There are no theoretical reasons to assume any stronger forms of measurement invariance, though MST makes the assumption that media characteristics are consistent in meaning across media forms.

However, MST would suggest that the means, intercepts, and factor loadings may vary in magnitude for different media forms.

To test configural invariance, an unrestricted baseline model where the same factor structure is imposed upon models was evaluated for fit. In the baseline model, each group was constrained to the exact same factor structure while factor loadings were estimated freely. Thus, this test analyzed if the proposed model fit well for both groups when analyzed independently. The baseline multigroup model had a χ^2 value of 235.787 with 134 degrees of freedom. The normed χ^2 value was 1.76, and was below the recommendation of 3.0. The baseline model exhibited good fit, and suggested that both groups evaluating the different media types had the same configural structure.

Factorial invariance is a stricter type of measurement invariance and assesses if the measures have a consistent scale between groups. To test factor invariance, the single parameter invariance testing technique was used. For this test, a set of nested hierarchical models was used in which each successive model constrained a new factor loading value between both groups (Chin and Dibbern, 2010; Chen et al., 2005). The models were compared using a χ^2 difference test to determine whether each new constraint imposed upon the model caused the model to fit significantly worse than the previous model (Bentler and Bonett, 1980). As shown in Table 9, the measurement model exhibited partial factor invariance. The majority of invariance (51%) came from items associated with rehearsability. As one would expect from theory, rehearsability can be interpreted differently when dealing with a synchronous media form, like video conferencing, in comparison to an asynchronous media form such as e-mail. This observation has both practical and theoretical implications in subsequent analyses. In terms of the theoretical implications of factorial measurement invariance, a model with measurement invariance suggests

the assumptions that all media forms have certain characteristics and that those characteristics are consistent across media, should be questioned. In terms of the practical implications on the subsequent analyses, factorial invariance suggests that the most conservative approach to evaluating models would be to perform an analysis of each group individually and to assess the similarities and differences between groups.

Table 9. Partial Factorial Invariance of Media Capabilities

Constraint	χ^2	**df**	Δ_{χ^2}	**p-value**
None	235.787	134	N/A	N/A
FB1	236.737	135	0.950	0.3297
FB2	237.088	136	0.351	0.5535
FB3	237.089	137	0.001	0.9748
PL2	240.827	138	3.738	0.0532
PL3	242.573	139	1.746	0.1864
SV1	248.577	140	6.004	**0.0143**
SV2	248.687	141	0.110	0.7401
SV3	248.746	142	0.059	0.8081
RH1	260.902	143	12.156	**0.0005**
RH2	271.132	144	10.230	**0.0014**
RH3	271.613	145	0.481	0.4880
RP1	274.117	146	2.504	0.1136
RP2	277.724	147	3.607	0.0575
RP3	279.945	148	2.221	0.1361

Based on the assessments of measurement invariance, both media types retained the same general factor structure, but the weights and relative influence of the measurement items varied. This finding supports the notion that media may have some differential characteristics as interpreted by individuals. Because the data provided evidence of structural invariance but only partial factorial invariance, subsequent analysis used the same structural model for both groups, but performed the model fit and parameter significance tests separately for each group. The localization of the majority of the invariance in the model to measures of rehearsability did suggest that there are differences in perception between how individuals interpreted

rehearsability between a synchronous communication event (e.g., face-to-face or video conferencing) and an asynchronous communication event (e.g., e-mail or writing a letter). Two strategies have been recommended in extant research for dealing with partial factorial invariance.

First, if the measurement items are not critical to the analysis they may be removed from subsequent tests (Gregorich, 2006). As an alternative, if there are only a few invariant factor loadings, extant research has suggested that the model may be robust against problems of estimation and that comparisons between group means may still be considered valid (Millsap and Kwok, 2004). However, as the rehearsability construct represents an important media characteristic, as defined in MST, rehearsability was not dropped from the analysis. Instead, the subsequent analysis focused on testing valid structural comparisons that were evidenced across the groups (Widaman and Reise, 1997). The recommendation for a conservative approach to dealing with partial factorial invariance is to limit the subsequent comparisons between groups for media characteristics to assessments of a structural model to path significance (Millsap et al., 2007; Schmitt and Kuljanin, 2008). In this conservative approach, equal means, covariances, or other estimated model parameters should not be assumed to be equal across groups.

Finally, tests were performed to analyze the possibility that common methods bias affected the analyses results, as recommended for the development of scales that will be used in causal modeling (Lindell and Whitney, 2001). To test for common methods bias in the data, first Harman's single-factor test was employed. In this test, an un-rotated factor solution is checked to see how much variance is explained by a single factor (Podsakoff et al., 2003). If the analysis indicates that greater than 50% of the variance in the model can be explained by a single factor, there is reason to suspect that a common methods bias is affecting the data. In this case, 40.2% of the variance is explained by the single factor, suggesting that common methods bias is not a

major problem. Additionally, a second test was conducted using a common latent factor and a marker variable to examine correlations with items from a different construct that theory would suggest is unrelated to MST. The construct social desirability was used as a marker variable for this assessment and used measurement items from a previously validated measurement scale (Reynolds, 1982). This test adds the new theoretically unrelated factor, social desirability, to the model and then incorporates a common latent factor (i.e., the composite of each of the five MST capabilities and social desirability) with paths to each of the 14 variable's error terms and constrains these paths to the same value. Because there are theoretical reason to assume social desirability is uncorrelated with the media synchronicity constructs, this technique allows the amount of common variance between factors that loads onto a common latent factor to be parsed out of other effects (Podsakoff et al., 2003; Lindell and Whitney, 2001; Pavlou et al., 2007). Any common variance seen in this analysis is likely a result of common methods bias. The factor loadings to the method factor were not significant ($p = 0.493$), and the indicators substantive variances were consistently much greater than the variances for the method factor, which indicates that common method variance is unlikely to be a serious concern for this model. The common factor explained only 1.69% of the variance, suggesting that variance due to a common method is not a problem in this analysis. Given these results, the measures developed in this paper hold promise as being a reliable, valid, and reusable set of measures for examining MST, particularly when examining the characteristics of individual media forms.

Evaluation of Fraud Triangle Scales

Just as an exploratory and confirmatory factor analysis were used to assess the media capabilities measurement items, the same analytical techniques were applied to items measuring

the latent constructs in the fraud triangle. Motivation, opportunity, capabilities, and rationalization are latent constructs in the fraud triangle model, and all these latent constructs were assessed in an exploratory factor analysis using PASW software. Principal axis factoring was used for the exploratory analysis, and oblimin (oblique) rotation was used to aid in the interpretation of the results. Following the exploratory analysis, a confirmatory factor analysis of the measurement model was performed using the AMOS software package. Maximum likelihood estimation was used for evaluating the measurement model. Since listwise removal of incomplete records was used in screening the data, the analyses used to develop and validate the scales for measuring the fraud triangle constructs also had a sample size of 252 records.

As part of the EFA, the reliability of the measures was assessed. Reliability is the internal consistency of items within a single factor. When interpreting Cronbach's alpha, the most common measure of reliability, typically values above 0.7 are considered acceptable (Field, 2009). The values in this data set were all greater than 0.9 and each factor was measured with five variables. This part of the analysis suggests that the proposed measurement items are a highly reliable way to measure the constructs defined in the fraud triangle.

For the 20 measurement items used to measure the fraud triangle constructs, theory would strongly suggest a first-order, four-factor, solution based on the constructs in the fraud triangle (i.e., motivation, opportunity, capabilities, and rationalization). The same heuristics described in the preceding section were used to evaluate the optimal factor solution in the EFA. These heuristics were used for determining how many factors, or latent constructs, the data indicates are represented in the data collected by the 20 items measuring the fraud triangle constructs. For determining the appropriate number of factors, extant theory recommends using the Kaiser-Guttman criterion, the percent of cumulative variance explained, a scree plot, and a

parallel analysis. First, the Kaiser-Guttman criterion suggests that only factors with an Eigen value greater than 1.0 should be retained in the model (Kaiser, 1960).

Table 10. Eigen Values of Fraud Triangle Constructs

Eigenvalues			
Factor	Total	% of Variance	Cumulative %
1	6.488	32.439	32.439
2	4.528	22.642	55.081
3	3.092	15.46	70.541
4	2.157	10.785	81.326
5	0.466	2.331	83.657
6	0.419	2.096	85.754
7	0.376	1.879	87.633
8	0.326	1.629	89.261
9	0.315	1.573	90.834
10	0.273	1.366	92.201
11	0.237	1.187	93.388
12	0.205	1.027	94.414
13	0.186	0.93	95.344
14	0.167	0.835	96.179
15	0.159	0.793	96.972
16	0.145	0.727	97.699
17	0.137	0.683	98.382
18	0.121	0.607	98.99
19	0.116	0.582	99.571
20	0.086	0.429	100

As shown in Table 10, the Kaiser-Guttman criterion indicated that a four-factor model would be most appropriate. As an alternative method for determining the appropriate number of factors, previous research has also suggested that a good stopping point for the number of latent factors in an EFA is when 70-80% of the total variance is explained by the factors (Field, 2009). In this data, the first three factors accounted for 70.5% of total variance and the first four factors accounted for 81.3% of the total variance, suggesting that a structure with three or four latent

factors was the most appropriate solution. These indications were consistent with expectations based on the fraud triangle that a four-factor model would emerge. This solution indicated that each of the four fraud triangle constructs was distinctly represented by a factor.

Finally, a scree plot was combined with values derived from a parallel analysis, as shown in Figure 9, to give a more stringent test of factor structure than other more arbitrary techniques (Horn, 1965; Patil et al., 2008). The scree plot and parallel analysis both suggested that four latent factors best described the variance in the data. Consequently, there is strong agreement between various methods suggesting a consensus of a four-factor solution.

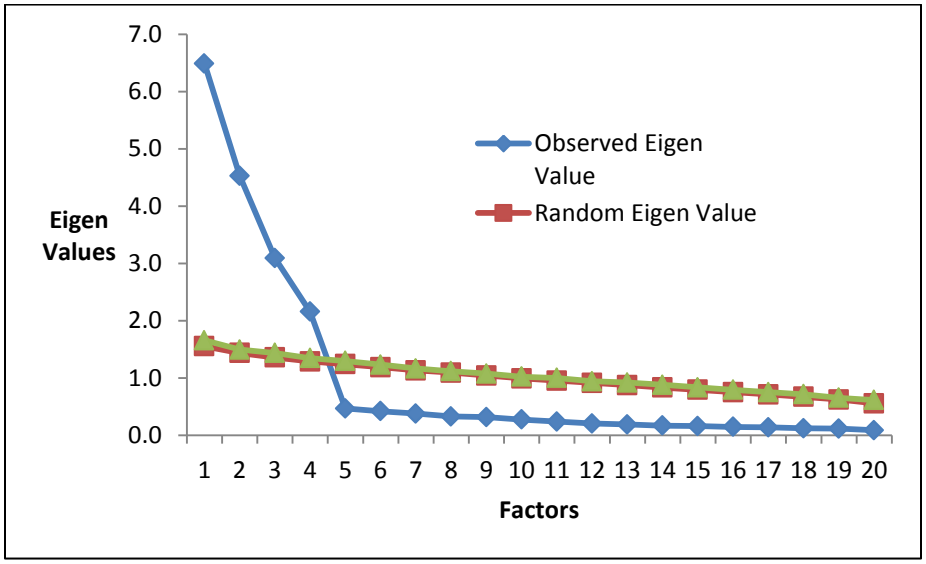

Figure 9. Scree Plot and Parallel Analysis of Fraud Triangle

The factor loadings in the EFA were used to assess construct validity in the four-factor structure proposed by theory. The rotated factor loadings exhibited strong magnitudes onto the appropriate latent constructs with weak cross-loadings and provided statistical evidence that each measure loaded onto the appropriate parent factor, and only that factor. The rotated factor loadings in the pattern matrix, shown in Table 11, are generally considered to be the best way to

interpret the factor structure. These factor loadings indicated that all the items for measuring the fraud triangle constructs grouped only onto the same factor as other items measuring the same latent construct, which is evidence of construct validity.

Table 11. Pattern Matrix of Fraud Triangle Constructs

Measure	Factor			
	MOT	OPP	CAP	RAT
CAP1	0.030	-0.004	**-0.886**	-0.027
CAP2	0.019	0.015	**-0.861**	-0.025
CAP3	-0.067	0.003	**-0.886**	0.025
CAP4	0.027	0.008	**-0.914**	-0.033
CAP5	-0.005	-0.014	**-0.841**	0.076
OPP1	0.002	**0.809**	0.019	-0.027
OPP2	-0.026	**0.924**	0.052	0.042
OPP3	0.041	**0.880**	0.043	-0.011
OPP4	0.009	**0.834**	-0.009	-0.011
OPP5	-0.013	**0.737**	-0.112	0.008
MOT1	**0.924**	0.004	-0.018	-0.021
MOT2	**0.948**	0.022	-0.027	-0.054
MOT3	**0.876**	-0.01	-0.001	0.024
MOT4	**0.901**	0.015	-0.002	0.029
MOT5	**0.864**	-0.019	0.048	0.055
RAT1	0.059	0.025	-0.079	**0.757**
RAT2	-0.095	0.030	0.062	**0.910**
RAT3	-0.011	-0.004	-0.036	**0.910**
RAT4	0.019	-0.005	0.012	**0.918**
RAT5	0.114	-0.072	0.002	**0.805**

Typically, factor loadings over 0.4 are considered significant (Field, 2009). Convergent validity was evidenced by the significant loadings for related measurement items onto a single factor. Similarly, discriminant validity is evidenced by the lack of significant factor loadings to other latent factors. Typically, values less than 0.4 are considered to not significantly load on a factor. All of the factor loadings adhered to the correct factors as specified by theory, so both

convergent and discriminant validity were evident in the four-factor model. Thus, the analysis indicated that the measurement items intended to measure each of the fraud triangle constructs loaded significantly only onto the intended construct. This supports the notion that motivation, opportunity, capabilities, and rationalization represent distinct, measurable constructs.

In conjunction with an EFA being used to determine the factor structure evident in the data, a CFA was used to assess the validity of the proposed measurement items. For the CFA, a covariance-based structural equation model was utilized to evaluate the measurement model. This analysis was performed using the AMOS statistical software program and maximum likelihood estimation. The measurement model was non-deviational and necessarily identified. The measurement model was necessarily identified using the T-rule, where the 230 observed variables outnumbered the 66 estimated parameters, resulting in 164 degrees of freedom. The measurement model was sufficiently identified using the three-indicator rule for multifactor models. As a result, the proposed model was over-identified. Thus, the proposed model was both necessarily and sufficiently identified and it was appropriate to attempt to reproduce the covariance matrix using a structural equation model.

Various measures of model fit indicated the model had a good fit. The normed χ^2 value was calculated by dividing the χ^2 value (372.010) by the degrees of freedom (164). Values less than 3.0 are considered to indicate a good fit for the model (Hair et al., 2010); the proposed model had a value of 2.27, which indicated a good fit. The CFI was 0.957, which was above the recommended 0.950 and suggested a good fit (Hu and Bentler, 1999). The RMSEA was 0.071, and indicated a moderate to good fit (Hair et al., 2010; MacCallum et al, 1996). The NFI was 0.925, and indicated a good fit (Bentler and Bonnet, 1980; Bollen, 1986; Hu and Bentler, 1999). The NNFI, or TLI, was 0.950, and also suggested a good fit. Finally, the standardized root mean

residual value for the model was 0.042, which was less than the recommendation of 0.08 and also pointed to a good fit (Hu and Bentler, 1999). Thus, the fit statistics, when considered together, indicated that the proposed model had a good fit.

Next, the composite reliability (CR) was used to evaluate the reliability of the proposed constructs in the confirmatory factor model. A composite reliability should be above 0.7, which would indicate that the items are consistent measures of the latent construct (Hair et al., 2010). As shown in Table 12, the composite reliabilities for all the media capabilities and synchronicity were above 0.90. Thus, the heuristic for measuring reliability indicates that the measures of the fraud triangle constructs were consistent and precise.

The convergent validity of the constructs in the measurement model can be evaluated using the AVE. The AVE was above the 0.50 threshold, providing additional evidence of convergent validity (Fornell and Larcker, 1981). The AVE values in the measurement model indicated that the measurement items correlated with one another under their parent factors. Finally, the MSV and the ASV were compared to the average variance extracted to gauge the discriminant validity of the latent constructs. The AVE for each latent construct was greater than either the MSV or ASV. This indicated that the variables correlated more strongly with variables under the same latent factor than they did with variables that reflected other latent factors. This result provided evidence of convergent validity for the constructs in the fraud triangle. In both groups, the square root of the AVE for each construct was also larger than any correlations to other constructs, providing additional evidence of discriminant validity (Chin, 1998). When taken together, these data suggested that the constructs in the four-factor measurement model exhibited both reliability and validity. Consequently, the survey measures of represent precise and accurate methods for measuring the fraud triangle constructs.

Table 12. Construct Validity of Fraud Triangle Constructs

	Composite Reliability	Average Variance Extracted	Maximum Shared Variance	Average Shared Variance	Correlations between Constructs			
					RAT	OPP	MOT	CAP
RAT	0.939	0.757	0.194	0.085	0.870			
OPP	0.921	0.702	0.035	0.020	-0.140	0.838		
MOT	0.958	0.819	0.194	0.080	0.441	0.063	0.905	
CAP	0.944	0.772	0.041	0.039	0.199	0.188	0.203	0.879

After determining that the scales exhibited both reliability and validity, the model was tested when grouped by media form for measurement invariance across groups. Then, the same tests of group invariance between groups were performed for respondents who were presented with either the $100 or $10 scenarios. Tests of measurement invariance are important when using survey data to perform comparisons between groups. These comparisons ensure that each group interprets the survey measurement items the same way (Widaman and Reese, 1997). Although typically used to examine differences in various demographic groups among the sample population, evidence of configural invariance between groups is necessary for most other comparisons, as well. Configural invariance indicates that in both groups the same indicators load onto the same factors. To test configural invariance, an unrestricted baseline model was evaluated for fit where the same factor structure was imposed upon the model for each group. In the baseline model, each group was constrained to the exact same factor structure while factor loadings were estimated freely. Thus, the test of configural invariance analyzed whether the proposed model fit well for both groups.

The baseline model for the e-mail and video conferencing groups had a χ^2 value of 635.401 with 328 degrees of freedom, and the normed χ^2 value was 1.88. Thus, there was evidence of configural invariance for the fraud triangle constructs across media forms. Similarly, the baseline model when grouped by the dollar amounts appearing in the scenarios had a χ^2

value of 585.491 with 328 degrees of freedom, and resulted in a normed χ^2 value of 1.79. Therefore, there was also evidence of configural invariance for the fraud triangle constructs across dollar amounts. Consequently, the various tests of measurement invariance all indicated acceptable fit and suggested configural invariance across groups.

Factorial invariance is a stricter type of measurement invariance and assesses if the measures have a consistent scale between groups. Each measurement item, or survey question, should be invariant across groups if it maintains the same meaning irrespective of the scenario it described. To test the fraud triangle constructs for factor invariance, the single parameter invariance testing technique was utilized. Using this technique, a set of nested hierarchical models constrained a new factor loading value between both groups in each successive model (Chin and Dibbern, 2010; Chen et al., 2005). The models were compared using a χ^2 difference test to determine whether each new constraint imposed upon the model caused the model to fit worse than it had prior to the constraint being added (Bentler and Bonett, 1980). As shown in Table 13, the measurement model exhibited overall factorial invariance. Only item CAP5 was not invariant between media types. The items OPP4 and RAT5 indicated variance across dollar amounts. However, both models displayed strong indications of factorial invariance and indicated that the measurement items were consistent for both media types and for both dollar amounts. Consequently, there was evidence of weak measurement invariance in the media capabilities constructs and the stronger forms of measurement in the fraud triangle constructs. Thus, measuring impacts of media type upon the fraud triangle constructs was feasible using a multi-group structural equation model with constraints imposed across groups in the model by media form (i.e., invariance in fraud triangle constructs would be assumed, but invariance in media characteristics would not be assumed).

Table 13. Factorial Invariance of Fraud Triangle Constructs

Tests by Media Type					Tests by Dollar Amount				
Constraint	**χ^2**	**df**	**Δ_{χ^2}**	**p-value**	**Constraint**	**χ^2**	**df**	**Δ_{χ^2}**	**p-value**
None	635.401	328	N/A	N/A	None	585.491	328	N/A	N/A
MOT1	635.405	329	0.004	0.950	MOT1	585.506	329	0.015	0.903
MOT2	636.126	330	0.721	0.396	MOT2	585.594	330	0.088	0.767
MOT3	636.145	331	0.019	0.890	MOT3	586.347	331	0.753	0.386
MOT4	636.169	332	0.024	0.877	MOT4	587.116	332	0.769	0.381
MOT5	636.297	333	0.128	0.721	MOT5	587.121	333	0.005	0.944
OPP1	636.371	334	0.074	0.786	OPP1	587.702	334	0.581	0.446
OPP2	638.517	335	2.146	0.143	OPP2	589.413	335	1.711	0.191
OPP3	639.119	336	0.602	0.438	OPP3	589.849	336	0.436	0.509
OPP4	640.046	337	0.927	0.336	OPP4	594.365	337	4.516	0.034
OPP5	640.339	338	0.293	0.588	OPP5	594.858	338	0.493	0.483
RAT1	640.388	339	0.049	0.825	RAT1	595.104	339	0.246	0.620
RAT2	640.390	340	0.002	0.964	RAT2	596.693	340	1.589	0.207
RAT3	640.421	341	0.031	0.860	RAT3	597.715	341	1.022	0.312
RAT4	643.288	342	2.867	0.090	RAT4	600.859	342	3.144	0.076
RAT5	644.742	343	1.454	0.228	RAT5	605.367	343	4.508	0.034
CAP1	645.142	344	0.400	0.527	CAP1	605.384	344	0.017	0.896
CAP2	645.338	345	0.196	0.658	CAP2	605.677	345	0.293	0.588
CAP3	646.047	346	0.709	0.400	CAP3	605.826	346	0.149	0.699
CAP4	646.196	347	0.149	0.699	CAP4	605.843	347	0.017	0.896
CAP5	653.250	348	7.054	0.008	CAP5	607.954	348	2.111	0.146
All	653.250	20	17.849	0.597	All	607.954	20	22.463	0.316

Finally, when developing new scales, testing for mono-methods bias is particularly important for survey studies. In survey studies, differences measured between variables can be attributed to the way the survey questions are administered or the survey is constructed (Lindell and Whitney, 2001). To test for common methods bias, Harman's single-factor test was used. In this test, an un-rotated factor solution was checked to see how much variance is explained by a single factor (Podsakoff et al., 2003). If the analysis indicates that greater than 50% of the variance in the model can be explained by a single factor, there is reason to suspect that a

common methods bias is affecting the data. In the proposed model, 32.4% of the variance was explained by the single factor, suggesting that common methods bias is not a major problem.

Again, a second test of common methods bias was conducted using a common latent factor and a marker variable to examine correlations with items from a different construct that theory would suggest is unrelated to the fraud triangle. The construct social desirability was used as a marker variable for this assessment and was measured by items from a previously validated measurement scale (Reynolds, 1982). This test of methods bias added the new theoretically unrelated factor, social desirability, to the model and then incorporated a common latent factor (i.e., the composite of each of the four fraud triangle constructs and social desirability) with paths to each of the 20 variables. The paths from the common latent factor to the measurement items are constrained to the same value. Because there is theoretical reason to assume social desirability is uncorrelated with the fraud triangle constructs, this technique allows the amount of common variance between factors that loads onto a common latent factor to be parsed out (Podsakoff et al., 2003; Lindell and Whitney, 2001; Pavlou et al., 2007). As a result, any common variance seen in this analysis is likely a result of common methods bias. The factor loadings to the method factor were not significant ($p = 0.06$) which indicated that common method variance was unlikely to be a serious concern for this model. The common factor explained only 3.57% of the variance, and also suggested that variance due to a common method was not a problem in this analysis. Given these results, the measures developed in this paper hold promise as being a reliable, valid, and reusable method for examining media capabilities and the fraud triangle. Consequently, all of these analyses suggested that the measures of the latent constructs for media capabilities and the fraud triangle may be used to evaluate the causal relationships hypothesized in this manuscript.

CHAPTER 6. FINDINGS

Results – Fraud Triangle

Because the scales proposed for both media capabilities and the fraud triangle have shown evidence of reliability and validity, they are appropriate measures for testing the hypothesized causal relationships. However, consistent with current best practices in scale development, the validity of the scales must also be re-evaluated prior to testing the structural model with a second data set (MacKenzie et al., 2011). To re-assess the validity of the scales and to evaluate the hypothesized casual relationships, the second data set of 647 records was used. This data set expanded the media types for the analysis to e-mail, video-conferencing, voicemail, and social network posts.

The scales that were created, developed, and validated for measuring the fraud triangle constructs were assessed first in a CFA using common measures of fit in covariance-based SEM. AMOS modeling software using maximum likelihood estimation was used for testing the groups. First, a single measurement model that combined data from all four media forms was tested. These groups were tested together because the previous assessments of measurement invariance indicated that the fraud triangle constructs exhibited strong invariance. This analysis tested the second data set to ensure the measurement items were valid for the expanded media forms and that the measurement items again exhibited evidence of reliability and validity. For the measurement model, the χ^2 value was 558.615 with 220 degrees of freedom. The normed χ^2 value was 2.54 which indicated a good fit (Hair et al., 2010). The CFI was 0.978 and was above the recommended 0.950. This suggested a good fit (Hu and Bentler, 1999). The RMSEA was 0.049, which indicated a good fit (Hair et al., 2010; MacCallum et al, 1996). The NFI was 0.964 and also indicated a good fit (Bentler and Bonnet, 1980; Bollen, 1986; Hu and Bentler, 1999).

The NNFI, or TLI, was 0.975, and the SRMR was 0.030. Those measures both also suggested a good fit. Thus, the fit statistics, when considered together, indicated that the measurement model had a good fit and supported the validated scales for measuring the fraud triangle constructs.

Additionally, the loadings of all the measurement items onto their parent constructs were highly significant and suggested that the items in the second data set also fit well with the factor structure suggested by the first data set. Because the scales again exhibited construct validity, there is strong reason to believe the scales were measuring the intended latent constructs and that the measures would be appropriate for analyzing the hypothesized relationships between the fraud triangle constructs. These relationships were first evaluated in a SEM model, combining all four groups, to evaluate the relationships between the latent constructs measuring the fraud triangle and test H1-H5.

To evaluate these relationships, a structural model was tested using the same measures of model fit that the measurement model was assessed with. For the structural model, the χ^2 value was 672.782 with 225 degrees of freedom. The normed χ^2 value was 2.99 which indicated a good fit (Hair et al., 2010). The CFI was 0.971 and was above the recommendation of 0.950 (Hu and Bentler, 1999). The RMSEA was 0.056, and indicated a moderate to good fit (Hair et al., 2010; MacCallum et al, 1996). The NFI was 0.957 and indicated a good fit (Bentler and Bonnet, 1980; Bollen, 1986; Hu and Bentler, 1999). The NNFI, or TLI, was 0.967, and suggested a good fit. Consequently, the path model for the proposed model exhibited a good overall fit. Next, various individual measures of the relationships between the constructs were evaluated to test the hypotheses H1-H5. The evaluation of these relationships included assessments of the statistical significance of regression paths and R^2 values. The significance of the parameter estimates between the fraud triangle constructs are displayed in Table 14.

First, I had hypothesized that the greater perception that one holds about their own capabilities to commit a fraudulent act would result in an increased perception of an opportunity to commit the fraudulent act. This hypothesis was based on the idea that the more capable an individual feels, the more likely they are to perceive opportunities to commit acts of fraud. The regression weight from capabilities to opportunity had a parameter estimate of 0.258, and was highly significant (< .001), which supported H1.

I had also hypothesized that the greater perception that one holds about their capabilities to commit a fraudulent act would result in an increased likelihood that the person will rationalize the fraudulent act. This hypothesis indicated that an individual who feels more capable of committing an act of fraud would perceive that action would take less effort and would more easily rationalize that action. The regression weight from capabilities to rationalization had a parameter estimate of 0.341, and was highly significant (< .001), which supported H2.

Then, I had hypothesized that the greater perceived opportunity to commit a fraudulent act results in an increased likelihood to rationalize a fraudulent action. The logic supporting this hypothesis was rooted in the notion that widely available opportunities to commit fraud would be perceived as easier to act upon, resulting in an increased ability to rationalize those actions. The regression weight from opportunity to rationalization had a parameter estimate of -0.284 and was highly significant (< .001). Thus, while these findings supported the notion that the perception of opportunity does indeed effect a person's rationalization of fraud, the effect was in the opposite direction than had been hypothesized. Thus, these findings were more supportive of a marketing-based approach where the perception of a rare or valuable opportunity is more likely to induce action than the perception that an opportunity is ubiquitous. Consequently, the direction of the relationships proposed in similar marketing-based research (MacInnis and Jaworski, 1989), that

posits that the perception of a decreased opportunity results in an increased rationalization to perform a behavior, is better aligned with our findings. This suggests that H3 should have been hypothesized as being negative, and consequently, the findings indicated support for the reverse relationship for that hypothesis.

Next, I had hypothesized that a greater motivation to commit a fraudulent act results in an increased likelihood to rationalize a fraudulent action. The logic supporting this hypothesis was based on the notion that when an individual thought they had more to gain from committing a fraudulent action, they were more likely to rationalize that action. The regression weight from motivation to rationalization had a parameter estimate of 0.269, and was highly significant (< .001), which supported H4.

Finally, I had hypothesized that a greater likelihood that a person will rationalize a fraudulent act will result in an increased likelihood of that fraudulent act occurring. The logic supporting this hypothesis was based on the idea that someone who is able to rationalize an act of fraud would have less trouble justifying their intentions with their own moral code and would be more likely to develop an intention to perform that act (Murphy and Dacin, 2011). The regression weight from rationalization to fraudulent intention had a parameter estimate of 0.714, and was highly significant (< .001), which supported H5.

Table 14. Regression Weights of Fraud Triangle Model

Hypothesis	Exogenous Variable	Endogenous Variable	Weight	p-Value
H1	CAP	OPP	0.258	< .001
H2	CAP	RAT	0.341	< .001
H3	OPP	RAT	-0.284	< .001
H4	MOT	RAT	0.269	< .001
H5	RAT	FI	0.714	< .001

After analyzing the individual relationships between constructs in the proposed structural model, the strength of the individual effects was also evaluated. As summarized in Figure 10, for this analysis, 12.4% of the variance in the perception of the opportunity to commit fraud was explained by the perception an individual has of their own capabilities. This is a moderately-sized effect and indicates that perceptions of individuals' own capabilities did influence the opportunities they perceived to commit an act of fraud. Additionally, 15.9% of the variance in a person's ability to rationalize an act of fraud was explained by the combination of their motivation, their perception of the existence of an opportunity, and their perception of their personal capabilities. This is also a moderately-sized effect and supported the idea that a person's willingness to rationalize an act of fraud was influenced by their motivation, opportunity, and capabilities. Finally, 47.6% of the variance in the intention to act fraudulently was explained by the ability to rationalize an act of fraud. This is a strong effect size and indicates that an individual's ability to rationalize an act of fraud strongly influenced their decision to act in the same deceitful manner.

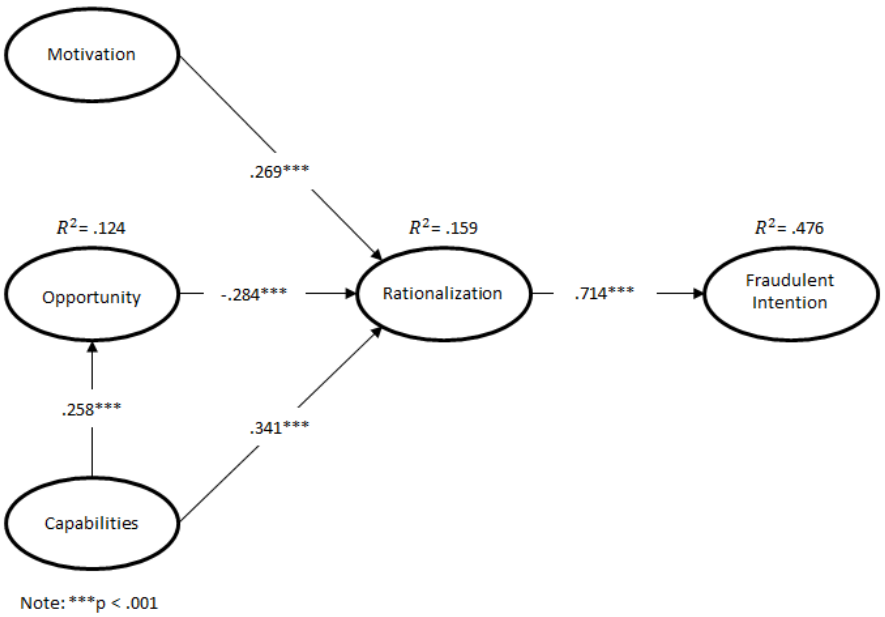

Figure 10. Results of the Fraud Triangle Model

The preponderance of evidence from these findings indicates that the proposed measures of the fraud triangle represent a nomologically valid new method for quantitatively assessing computer-mediated interpersonal fraud. Furthermore, these findings strongly suggested that adding a causal form to the fraud triangle significantly aided in the interpretation of the effects of the fraud triangle constructs. Thus, a structural model of the fraud triangle extends fraud research beyond taxonomies into causal behavioral models. This represents an important contribution to integrating the fraud triangle with other strong behavioral theories. Finally, a causal model of the fraud triangle creates new research opportunities for incorporating and evaluating the effects of other related behavioral and psychological constructs.

The model containing the fraud triangle was also examined when segmented by the dollar amount manipulation (i.e., $10 and $100) to gain insights into the relationships between the constructs. This analysis addressed questions about why the sign associated with the parameter estimate for the effect of opportunity on rationalization was negative. In effect, a comparison of groups by dollar amount was used to indicate whether the negative sign in the relationship between opportunity and rationalization was caused by different assessments of the benefits accrued through the act of fraud. Thus, if subjects in both treatments displayed the negative relationship between opportunity and rationalization, there was most likely a deeper theoretical reason for the relationship. One potential theoretical reason for this negative relationship could be the influence of the rareness of an opportunity compelling an individual to act (MacInnis and Jaworski, 1989). In contrast, if the groups had drastically different parameter estimates for the relationship, the negative sign may have been interpreted as a vestige of the research design.

The resulting analysis indicated that the same model fit well for scenarios with either $10 or $100 amounts. As shown in Figure 11, all of the relationships indicated effects with the same

signs, although the magnitude of effects varied by group. The same negative relationship between opportunity and rationalization persisted for both groups and had similar magnitudes for the parameter estimates. Though the relationship was statistically significantly different, it was not substantially different and did not seem to imply that the negative relationship between opportunity and rationalization was a vestige of having two sets of dollar amounts in the research design. The negative association of opportunity and rationalization was supported in all eight groups in the study and was consistent irrespective of the media form or dollar amount presented in the scenario. This supports the post hoc interpretation that rare or fleeting opportunities to commit an act of fraud may be more compelling, and, thus, easier to rationalize for individuals compared to ubiquitous opportunities.

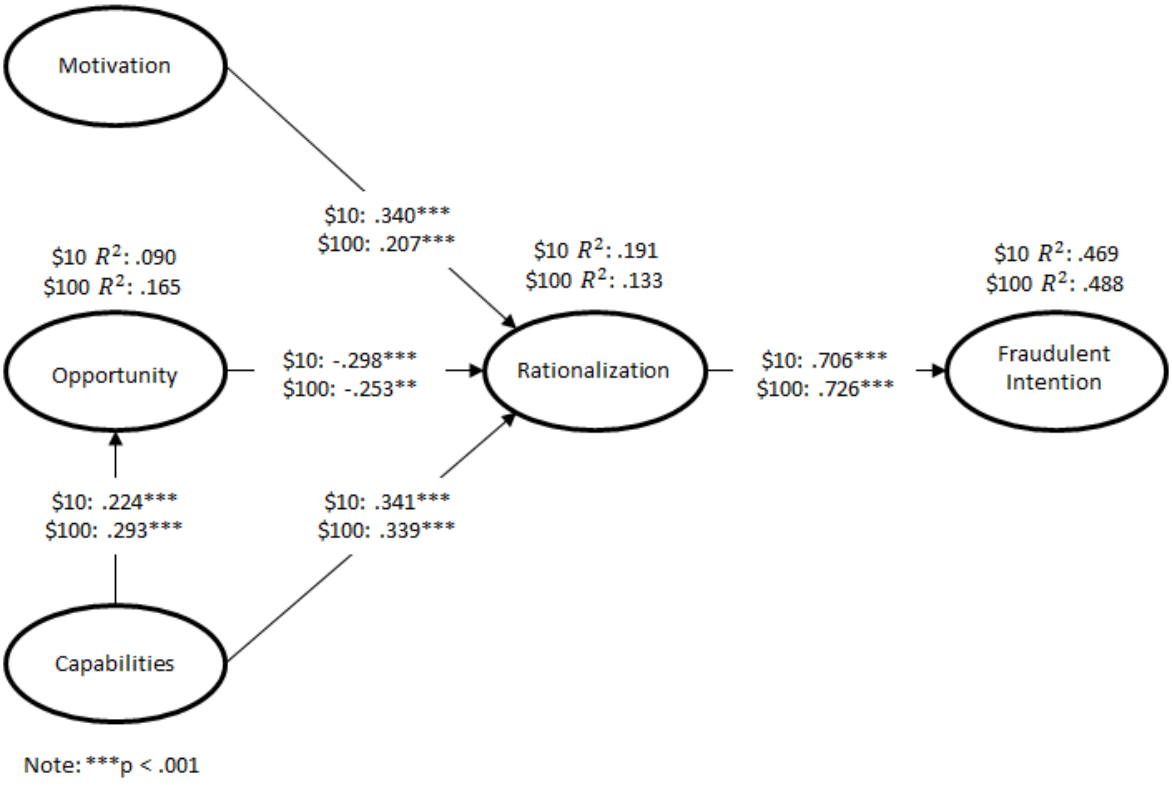

Figure 11. Results of the Fraud Triangle Model by Amount

In conjunction with statistical tests of the causal model of the fraud triangle, two control variables were included in the analysis. These control variables represented an individual's sex and if they had previously been defrauded. Males are considered to be more likely perpetrators of many white-collar crimes (Sutherland, 1983). Thus, the effects of the sex of respondents were included in the model to determine the effects of sex on the fraud triangle constructs. In addition, people who have been defrauded before are often more hesitant to engage in transactions where their trust may be manipulated again (McKnight, 2002). Thus, there has been some evidence that the cognitive processes for victims of previous acts of fraud may differ from individuals who have never been defrauded. However, as described in Appendix I, the control variables did not substantially alter the results of the model. All factor weights retained the same general magnitude and signs when the control variables were either included or excluded from the analysis. While the control variables may have had some significant effects on constructs within the model, they did not have any substantial confounding effects on the results of the analyses.

Finally, the second set of data with 647 responses was also tested for common methods bias for the fraud triangle model, since it was used to test causal hypotheses. To test for common methods bias, Harman's single-factor test was used again and did not indicate any issues with common methods bias. In the proposed model, 49.22% of the variance was explained by the single factor, which was well below the recommended 50% (Podsakoff et al., 2003), suggesting that common methods bias is not a major problem. Again, a common latent factor and a marker variable were used to parse out common variance, using social desirability as the marker variable (Reynolds, 1982). In this model, the factor loadings to the method factor were highly non-significant ($p = 0.261$), and the common factor explained 2.66% of the variance. Thus, there were no indications that common method bias had any influence on the model results.

Results – Effects of Media Capabilities on Fraud

Effects of Individual Media Capabilities on Fraud

The effects of the individual media capabilities upon the fraud triangle constructs were also tested using structural equation models. SEM allowed for the evaluation of the relative salience of each individual media capability on fraud behaviors, and comparisons of the effects of media forms on fraud behaviors using a multi-group model with cross-group constraints. The signficance of the regression weights of the relationships between latent factors and the variance explained in endogenous variables were used to test the hypotheses about media effects.

The statistical tests to evaluate the effects of media capabilities on fraud were performed in two parts. First, the direct effects of each individual media capability were examined upon the fraud triangle constructs. This analysis provided insight into the relative salience and influence of each individual media characteristics as it pertained to fraud, and directly tested hypotheses H6A-H6E. Next, the behavioral model of the fraud triangle described in the previous section was compared across media forms. This analysis provided a rigorous statistical methodology for comparing differences between various media forms and tested how media forms influenced behaviors. The combination of these two analyses provided both a detailed investigation of the effects of individual media characteristics and an overview of which media forms are more conducive to fraud-like behaviors.

For the first part of the analysis, the investigation of effects of media characteristics on fraud, the measures of media characteristics for the second data set, containing 647 responses, was re-assessed for construct validity. Then, factor weights from each of the media characteristics to the latent constructs capability and opportunity were evaluated for both significance and effect sizes. Statistical tests of significance can be used to determine if the

constructs had an effect on each other, and tests of effect sizes describe how substantial that effect was. Because the media characteristics exhibited weak measurement invariance, the validity of each media form was assessed individually. To perform this analysis, first, the factor structure for the new set of data was evaluated to support the previous findings that the scales for measuring media capabilities were reliable and valid, albeit with weak measurement invariance across media forms. Consistent with the scale development and validation from the first data set, the results of this analysis indicated that the measures were reliable, valid, and exhibited structural measurement invariance.

Model fit statistics were assessed using a multi-group measurement model to test the measurement invariance of the scales with the second set of data. For this model, the χ^2 value was 488.732 with 320 degrees of freedom. The normed χ^2 value was 1.53 which indicated a good fit (Hair et al., 2010). The CFI was 0.980 and was above the recommended 0.950, which suggested a good fit (Hu and Bentler, 1999). The RMSEA was 0.029, and indicated a good fit (Hair et al., 2010; MacCallum et al., 1996). The NFI was 0.945, and indicated a moderate to good fit (Bentler and Bonnet, 1980; Bollen, 1986; Hu and Bentler, 1999). The NNFI, or TLI, was 0.974, and the SRMR was 0.038. Both the NNFI and SRMR suggested a good fit. Thus, the fit statistics, when considered together, indicated that the media characteristics measurement model had structural invariance (i.e., the same model structure fits well irrespective of media form), and supported the previously validated scales (Cheung and Rensvold, 2002). This was consistent with the scale development performed on the first data set with 252 responses.

Consequently, the relationships describing how media characteristics affect perceptions of opportunity and capabilities were analyzed next using a variance-based SEM approach. This analysis was performed using SmartPLS, which utilizes partial-least squares to develop estimates

that explain as much variance in the dependent variables as possible and is considered useful for evaluating casual model structures (Ringle et al., 2005). An approach using PLS is generally recommended when using formative constructs, which are problematic when using covariance-based techniques or when evaluating causal relationships (Chin and Dibbern, 2010). Because the measures of media capabilities had been derived from the higher-order formative construct media synchronicity and the scale development process found evidence of this factor structure, an approach using PLS seemed most consistent with best-practices. The scales for measuring media capabilities had varied when grouped by media, so a grouped approach was used for re-evaluating the construct validity of the media capabilities. By separating the groups, the differences in the hypothesized relationships are measurable and more discernable.

In this grouped approach, the models for each media type were specified with the exact same form, due to previous evidence of structural invariance but were assessed for construct validity separately due to previous evidence of only partial factorial invariance. Measures of reliability and validity for the constructs when analyzed by media group are described in Table 15. In each of the four groups (i.e., e-mail, video conferencing, voicemail, and social network posts), the Cronbach's alpha and composite reliability values were consistently above recommended thresholds of 0.7 and 0.6, respectively (Field, 2000; Fornell and Larcker, 1981). Similarly, the values of the average variance extracted were consistently greater than 0.5, indicating convergent validity (Fornell and Larcker, 1981). In all the groups, the square root of the AVE for each construct was also larger than any correlations to other constructs, providing evidence of discriminant validity, as well (Chin, 1998). Thus, there was evidence that for any of the four media forms, the measures of media characteristics represented reliable and valid representations.

Table 15. Construct Validity of Fraud Triangle Model by Media Type

E-Mail, n = 163				Correlations between Constructs						
	α	CR	AVE	FB	SV	PL	RH	RP	CAP	OPP
FB	0.925	0.953	0.870	0.933						
SV	0.921	0.950	0.863	0.433	0.929					
PL	0.943	0.963	0.896	0.537	0.391	0.947				
RH	0.950	0.968	0.908	0.485	0.457	0.581	0.953			
RP	0.930	0.956	0.877	0.455	0.403	0.550	0.661	0.937		
CAP	0.953	0.964	0.842	0.059	0.032	0.026	-0.033	0.103	0.918	
OPP	0.919	0.939	0.755	0.198	-0.050	0.203	0.151	0.263	0.267	0.869
Video Conferencing, n = 160				**Correlations between Constructs**						
	α	CR	AVE	FB	SV	PL	RH	RP	CAP	OPP
FB	0.938	0.960	0.889	0.943						
SV	0.902	0.938	0.836	0.329	0.914					
PL	0.922	0.950	0.864	0.297	0.322	0.930				
RH	0.925	0.946	0.854	0.016	0.340	0.217	0.924			
RP	0.930	0.955	0.877	0.040	0.346	0.084	0.558	0.936		
CAP	0.957	0.967	0.853	0.100	0.135	0.092	0.075	0.047	0.924	
OPP	0.915	0.936	0.747	0.318	0.248	0.050	-0.005	0.144	0.390	0.864
Voicemail, n =198				**Correlations between Constructs**						
	α	CR	AVE	FB	SV	PL	RH	RP	CAP	OPP
FB	0.864	0.914	0.779	0.882						
SV	0.936	0.955	0.877	0.415	0.937					
PL	0.939	0.961	0.892	0.519	0.726	0.944				
RH	0.834	0.896	0.743	0.286	0.404	0.412	0.862			
RP	0.784	0.873	0.697	0.136	-0.146	-0.073	0.167	0.835		
CAP	0.948	0.960	0.829	0.094	0.138	0.197	0.181	0.043	0.910	
OPP	0.887	0.917	0.690	0.148	-0.026	-0.009	0.083	0.393	0.296	0.831
Social Network Posts, n =126				**Correlations between Constructs**						
	α	CR	AVE	FB	SV	PL	RH	RP	CAP	OPP
FB	0.899	0.937	0.832	0.912						
SV	0.805	0.880	0.711	0.459	0.843					
PL	0.918	0.948	0.859	0.818	0.451	0.927				
RH	0.835	0.829	0.626	0.528	0.511	0.561	0.791			
RP	0.862	0.916	0.784	0.598	0.447	0.657	0.615	0.885		
CAP	0.967	0.974	0.882	0.108	0.067	0.047	0.006	-0.021	0.939	
OPP	0.934	0.950	0.791	0.395	0.173	0.363	0.272	0.301	0.385	0.889

Once construct validity was demonstrated for models when grouped by individual media forms as well as when the media forms were combined into a single group, the hypotheses H6A-H6E and H1 were tested using a structural equation model. First, the hypotheses were tested with the data from all groups combined into a single model. After testing this aggregated model, a subsequent analysis tested the media effects when grouped by media type to validate the findings of the combined model.

I had hypothesized that a communication medium with a greater amount of parallelism would result in an increased perception of an opportunity to commit fraud. The underlying logic to this hypothesis was that when using media with a high degree of parallelism, cues to fraudulent acts would be masked by the volume of messages being communicated. In the PLS model, the factor weight from parallelism to opportunity had a parameter estimate of -0.023, and was not significant (< .001), which did not support H6A.

I had also hypothesized that a communication medium with a greater amount of rehearsability would result in an increased perception of an opportunity to commit fraud. The logic supporting this hypothesis was based on the idea that when using with high rehearsability, individuals could better prepare their deceptive messages and better mask cues to their acts of fraud. In the PLS model, the factor weight from rehearsability to opportunity had a parameter estimate of -0.103, and was not significant (< .001), which did not support H6B.

Next, I had hypothesized that a communication medium with a greater amount of symbol sets would result in a decreased perception of an opportunity to commit fraud. The logic behind this hypothesis was that when using a communication media with a wide range of symbol sets, subjects would expect that it would be harder to coordinate a deceptive message between those symbols. Due to the difficulty in coordinating the various symbols more cues of fraudulent

actions would unintentionally be displayed to potential victims. In the PLS model, the factor weight from symbol sets to opportunity had a parameter estimate of -0.098, and was not significant (< .001), which did not support H6C.

In addition, I had hypothesized that a communication medium with a greater amount of feedback immediacy would result in a decreased perception of an opportunity to commit fraud. The logic behind this hypothesis was that when potential victims of fraud have the opportunity to ask for clarification and get immediate, less practiced, feedback, more cues about deceptive actions will be observed. This relative abundance of cues to deception would make individuals perceive media with high feedback immediacy as providing less opportunity for fraud. In the PLS model, the factor weight from feedback immediacy to opportunity had a parameter estimate of 0.254, and was highly significant (< .001), which reversed the expected direction of H6D.

I had also hypothesized that a communication medium with a greater amount of reprocessability would also result in a decreased perception of an opportunity to commit fraud. The logic supporting this hypothesis was that the more chances an intended victim has to review the message, the more likely they are to discover cues to deceit. This would make individuals perceive a lesser chance to successfully commit an act of fraud when using media with high rehearsability. In the PLS model, the factor weight from reprocessability to opportunity had a parameter estimate of 0.265, and was highly significant (< .001), which reversed the expected direction of H6E.

Finally, the hypothesized relationship between capability and opportunity was also evaluated. I had hypothesized that the greater perception that one holds about their own capabilities to commit a fraudulent act would result in an increased perception of an opportunity to commit the fraudulent act. As described earlier, this hypothesis was based on the idea that the

more capable an individual feels, the more likely they are to perceive opportunities to commit acts of fraud. In the PLS model, the factor weight from capabilities to opportunity had a parameter estimate of 0.319, and was highly significant (< .001), which supported H1. Consequently, there was partial support for the model displayed in Figure 12.

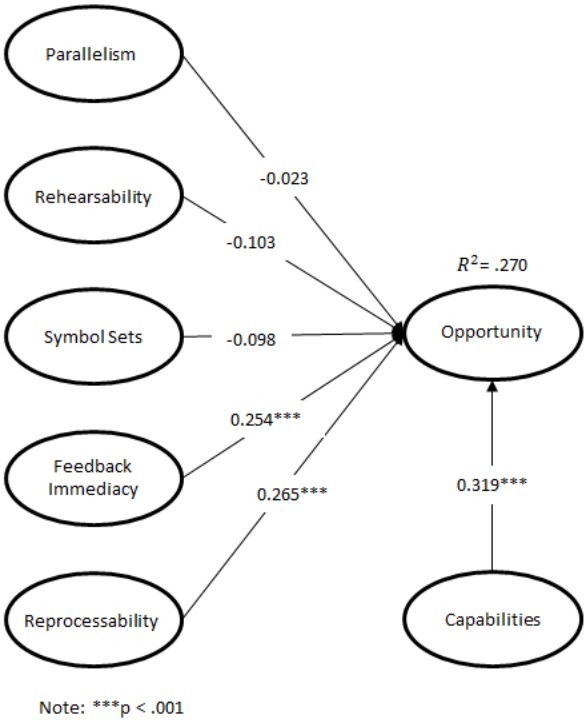

Figure 12. Results of the Media Capabilities Model

None of the weights from the media characteristics had a significant effect on the latent construct capability. As displayed in Table 16, only two media characteristics, feedback immediacy and reprocessability, had a significant effect on the latent construct opportunity. However, both of these relationships were highly significant and had a moderate effect size (Hair et al., 2010). Feedback immediacy and reprocessability had positive factor weights, meaning that both media characteristics (i.e., faster responses and more time to reprocess messages) increased the perception that there was an opportunity to commit fraud. Finally, the factor weight from capability to opportunity was also highly significant, confirming earlier tests of this relationship.

Table 16. Results of Media Capabilities Hypotheses

Exogenous Construct	Endogenous Construct	
	Hypothesis	OPP
PL	H6A	-0.023
RH	H6B	-0.103
SV	H6C	-0.098
FB	**H6D**	**0.254***
RP	**H6E**	**0.265***
CAP	**H1**	**0.319***

*supported at <.001 level of significance

The effect sizes indicate that media capabilities and individual capabilities have a moderate combined effect on perceptions of opportunity (Hair et al., 2010). The analysis indicates that the media characteristics only describe 1.4% of the variance in capabilities and 2.4% of the variance in motivation, but media characteristics and capabilities describe 20.1% of the variance in opportunity. Thus, based on these effect sizes, media capabilities did not have a substantial effect on motivation or capabilities but, as expected by theory, media capabilities described a substantial amount of variance in cooperative acts of communication (53.5%) when a cooperative act of communication was added as an endogenous variable. The measurement items used to collect the respondents' expectations of the success afforded by media forms for communicating cooperatively are displayed in Appendix E. Thus, there was a greater amount of variance explained by the media capabilities when applied to cooperative communication in comparison to the more modest amount of variance the same capabilities described when applied to an act of fraud. This difference indicated that the MST constructs were more useful when describing acts of cooperation than when applied to deceptive acts, such as fraud. Thus, MST constructs were more useful and more successful in describing cooperative acts of

communication, which was the intent of the original theory, than when extended beyond their boundary conditions to describe deceptive acts.

Due to the measurement invariance between media types, the effects of media capabilities on motivation, opportunity, and personal capabilities were also analyzed by media group. This analysis provided a more thorough understanding of the similarities and differences between media types, and supported the findings from the analysis that aggregated all four groups. In the grouped analyses, only the relationships from feedback immediacy, reprocessability, and capabilities consistently demonstrated significant effects on opportunity.

Table 17. Results of Media Capabilities Hypotheses by Media Type

Exogenous Construct	**Endogenous Construct**			
	CAP	**MOT**	**OPP**	
PL	EM: -0.009 VC: 0.033 VM: 0.182** SN: -0.075	EM: 0.027 VC: 0.175** VM: 0.084 SN: 0.011	H6A	EM: 0.095 VC: -0.084 VM: -0.117** SN: 0.089
RH	EM: -0.201*** VC: 0.043 VM: 0.118** SN: 0.012	EM: 0.013 VC: -0.094 VM: 0.002 SN: 0.164**	H6B	EM: 0.004 VC: -0.156** VM: -0.028 SN: 0.136**
SV	EM: 0.014 VC: 0.095 VM: -0.015 SN: 0.058	EM: -0.023 VC: -0.060 VM: 0.010 SN: -0.030	H6C	EM: -0.251*** VC: 0.138** VM: 0.028 SN: -0.095
FB	EM: 0.060 VC: 0.059 VM: -0.038 SN: 0.217**	EM: 0.160** VC: 0.161** VM: 0.026 SN: 0.068	**H6D**	**EM: 0.136**** **VC: 0.259***** **VM: 0.130**** **SN: 0.200****
RP	EM: 0.209*** VC: -0.014 VM: 0.041 SN: -0.134**	EM: 0.072 VC: 0.098 VM: 0.222*** SN: -0.139**	**H6E**	**EM: 0.226***** **VC: 0.163***** **VM: 0.362***** **SN: 0.096**
CAP			**H1**	**EM: 0.240***** **VC: 0.357***** **VM: 0.292***** **SN: 0.363*****

The significance tests associated with the effects of media capabilities on motivation, opportunity, and personal capabilities are displayed in Table 17. Furthermore, the signs of these relationships were consistent between the groups, and the magnitudes remained relatively stable. This indicates that the effects of feedback immediacy, reprocessability, and capabilities on opportunity were sustained, and largely consistent, irrespective of media type, and that these were the only constructs that consistently exerted significant effects on opportunity.

The effect sizes of relationships supported the proposition that media characteristics affected the fraud triangle constructs through the relationships between the media characteristics and perceptions of opportunity. The total effects of media characteristics on opportunity were substantial at 18.3%, 27.6%, 24.6%, and 30.5%, respectively, for e-mail, video conferencing, voicemail, and social networking posts. In comparison, the total effects of media characteristics on capabilities were 3.2%, 2.4%, 5.4%, and 2.7%, and the total effects of media characteristics on motivation were 4.8%, 7.0%, 5.9%, and 2.9%. Consequently, when performing the analysis at the level of individual media forms or when aggregating the effects of media across groups, the results were similar. These results indicate that for the purposes of the scenario that was outlined (i.e., the intentional misrepresentation of an asset) media effects are largely driven by the impact of feedback immediacy and reprocessability on opportunity. In contrast, the results indicate that an individual's perceptions of their personal capabilities to commit this act of fraud were generally not affected by the capabilities that a media form offered. Similarly, in subsequent checks of the model, the effects of media characteristics on perceptions of motivation were not significant and generally accounted for a minimal amount of the variance in motivation. Finally, the significance of the relationship between capabilities and opportunity again indicated that an

individual's perception of their personal capabilities to act in a fraudulent manner were mediated through their perception of the opportunity they perceived to commit that act.

The second set of data with 647 responses was also tested for common methods bias for the media capabilities model, since it was used to test causal hypotheses. To test for common methods bias, Harman's single-factor test was used again and did not indicate any issues with common methods bias. In the proposed model, 31.86% of the variance was explained by the single factor, which was well below the recommended 50% (Podsakoff et al., 2003), suggesting that common methods bias was not a major problem. Again, a common latent factor and a marker variable were used to parse out common variance, using social desirability as the marker variable (Reynolds, 1982). However, in this model, the factor loadings to the method factor were significant ($p < 0.05$), and the common factor explained 5.76% of the variance. Thus, there were inconsistent indications that common method bias may have, or may not have, some influence on the model. However, there is currently no broadly accepted, valid, method for testing common methods bias, or measure of how much method bias is acceptable (Chin et al., 2012). In addition, previous tests of common method bias have indicated that it was not significant for the same factors. Overall, because the inconsistencies in the results of common methods testing and indications from extant research that no current method is adequate for validly assessing common methods bias the results were deemed acceptable for this study.

Effects of Media Forms on Fraud using Multi-group Analysis

The second part of the analysis used a multi-group approach to compare the data from the casual model of the fraud triangle when grouped by media type (i.e., e-mail, video conferencing, voicemail, and social network posts). Thus, while the earlier section delved into the effects of

specific media characteristics on opportunity and capabilities, this section describes how the four media forms affected the fraud triangle constructs. This cross-group approach is recommended as a stringent test of moderating effects, and can be used to compare how causal relationships vary across groups. The cross-group tests were performed using the same model of the fraud triangle that had been tested with aggregated data previously, but divides the data into groups based on media form, as shown in Figure 13. Thus, comparisons can be made as the model is applied to each of the 4 media forms to determine if the model is consistent and valid irrespective of the communication medium being used.

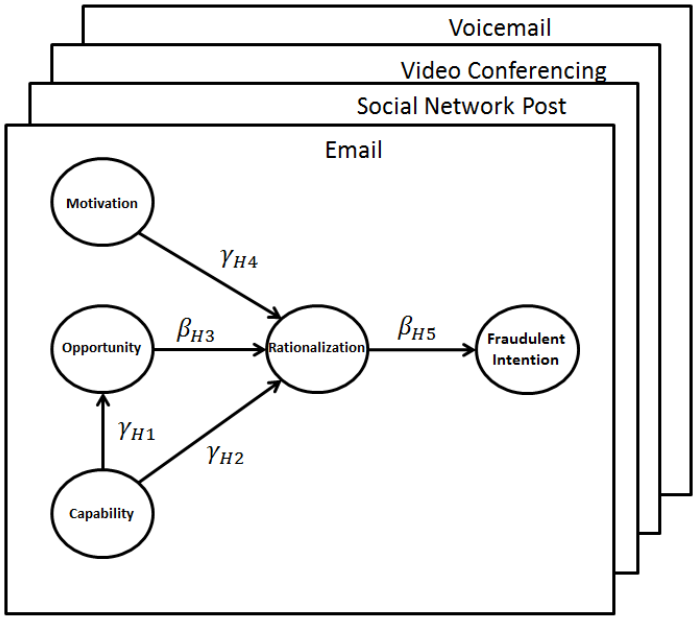

Figure 13. Fraud Triangle Model using Cross-Group Equality Constraints

In the multi-group analysis, first the validity of the scale items with the second data set, containing 647 records, was re-validated using the fit of a multi-group measurement model in a covariance-based structural equation model (Hair et al., 2010). Next, maximum likelihood estimation, in the AMOS software package, was used to estimate the parameters to reproduce the

covariance matrix. Then, the factor loadings for each of the measurement items for the fraud triangle constructs were constrained across the groups one at a time, as shown in Table 18.

Table 18. Cross-group Equality Constraints on Factor Loadings

Constraint	χ^2	df	Δ_{χ^2}	p-value
None	1262.182	656.000	N/A	N/A
MOT1	1262.496	659.000	0.314	0.957
MOT2	1265.962	662.000	3.466	0.325
MOT3	1267.915	665.000	1.953	0.582
MOT4	1270.641	668.000	2.726	0.436
MOT5	1271.688	671.000	1.047	0.790
OPP1	1279.276	674.000	7.588	0.055
OPP2	1281.723	677.000	2.447	0.485
OPP3	1284.979	680.000	3.256	0.354
OPP4	1288.294	683.000	3.315	0.346
OPP5	1291.912	686.000	3.618	0.306
RAT1	1292.702	689.000	0.790	0.852
RAT2	1296.837	692.000	4.135	0.247
RAT3	1297.239	695.000	0.402	0.940
RAT4	1298.181	698.000	0.942	0.815
RAT5	1304.540	701.000	6.359	0.095
CAP1	1305.182	704.000	0.642	0.887
CAP2	1308.652	707.000	3.470	0.325
CAP3	1316.381	710.000	7.729	0.052
CAP4	1319.368	713.000	2.987	0.394
CAP5	1320.377	716.000	1.009	0.799

To perform this analysis, one factor loading at a time was constrained to the same value across all four groups, and the model fit statistics were compared between the constrained and unconstrained versions of the model using a χ^2 difference test. Using this approach, if any cross-group constraint that is imposed on the model makes the model fit significantly worse than it did before the constraint was applied, the results imply differences between the meaning of these measurement items across groups. None of the factor loadings for the measurement items made the model fit significantly worse when constrained across groups. The lack of significant effects

when imposing these constraints indicates that the measurement items for motivation, opportunity, capabilities, and rationalization are interpreted in the same manner without regard to media type.

Consequently, since the model showed evidence of measurement equality for motivation, opportunities, capabilities, and rationalization when grouped by media forms, the non-deviational structural model was then analyzed using the same approach. Thus, the cross-group constraints were applied to the relationships in the structural model, as well. The analysis of the structural relationships can be used to describe if the relationships between constructs vary across groups. This analysis used χ^2 difference tests to compare how the overall fit of the structural model changed as relationships between the latent constructs were constrained across groups (Hair, 2010). The results, shown in Table 19, indicated that the gamma loadings did not vary by group, and that the relationships between the fraud triangle constructs were consistent irrespective of media form. This suggested that it would also be appropriate to examine the differences in means between the exogenous latent variables across groups.

Table 19. Cross-group Equality Constraints on Beta and Gamma Parameters

Constraint	**CFI**	**TLI**	**NFI**	**RMSEA**	χ^2	**df**	$\Delta_{\chi 2}$	**p-value**
Factor Structure Equivalence	0.945	0.943	0.892	0.038	1851.832	969	N/A	N/A
CAP -> OPP (γ_{H1})	0.945	0.943	0.891	0.038	1854.427	972	2.595	0.176
CAP -> RAT (γ_{H2})	0.945	0.943	0.891	0.038	1857.722	975	3.295	0.139
OPP -> RAT (β_{H3})	0.945	0.943	0.891	0.037	1858.271	978	0.549	0.225
MOT -> RAT (γ_{H4})	0.945	0.944	0.891	0.037	1860.336	981	2.065	0.204
RAT -> FI (β_{H5})	0.945	0.944	0.891	0.037	1861.781	984	1.445	0.233

To test the difference in means between the four groups, a version of a multiple-indicator, multiple-cause, SEM was used (Bollen, 1989). Because the data had four groups, a comparison of mean values and intercepts using cross-group constraints only provides information about

whether the mean values of a focal group would differ from the mean values of the remaining groups. Pairwise comparisons of mean parameter estimates are useful in determining significant differences; however, first the difference in mean estimates for each latent factor must be computed. Consequently, a pairwise comparison of group means using a multiple-indicator, multiple-cause, approach can provide the same information (Hair, 2010). The mean values of the measurement items for the fraud triangle constructs when grouped by media type can be found in Appendix J. The mean values for the fraud triangle constructs when grouped by dollar amount and the mean values for media characteristics when grouped by media type can be found in Appendix K and Appendix L, respectively.

In contrast to using a cross-group constraints approach, using a multiple-indicator, multiple-cause, approach allowed individual comparisons between the mean values of the groups to be evaluated. Using this approach, it is possible to tell which means were differ from each other using multiple pairwise comparisons. This approach assumes measurement invariance between the constructs in the model, which had been demonstrated previously in the cross-group analyses. Thus, the means of the latent variables in the fraud triangle model were tested using a group code approach, which is a specialized version of a multiple-indicator, multiple-cause, structural equation model (Bollen, 1989; Dimitrov, 2006). This approach uses a structural equation model for each latent variable and is similar conceptually to conducting a regression analysis using dummy coded variables (Muthen, 1989; Hancock, 2001). To facilitate the testing of the group code approach for determining differences in latent means between groups, an observed dummy coded variable was added as a predictor of the latent variable. Thus, an analysis similar to a CFA of a measurement model was performed on paired groups, where a dummy code corresponded to a different value for each of two groups. The models of the latent

variables also contained reflective observed variables and error terms. Consequently, if the model continued to fit well, the significance of the path from the dummy variable to the latent variable could be interpreted as the difference between the means of the groups when controlling for all other effects in the model (Dimitrov, 2006).

As displayed in Table 20, the mean of capabilities was significantly different across media types. The mean of video conferencing for capabilities was consistently the greatest among the four media types, and was significantly different from the means of voicemail and social network posts. The other media, however, had mean values that were not significantly different from one another. Thus, respondents considered themselves to have the same capabilities irrespective of media, except when the scenario involved video conferencing. Respondents who were presented with the scenario involving video conferencing consistently believed that they had greater capabilities to commit an act of fraud. The mean value of motivation also varied between the video conferencing and the social networking posts groups. The mean of the video conferencing group was greater than the mean of the social network posts group. The other group means for motivation were not significantly different from one another. Thus, when presented a scenario with video conferencing, respondents were more motivated to commit an act of fraud and were more confident in their own skills set to successfully commit that act.

However, the mean values for opportunity, rationalization, and fraudulent intention were not significantly different based on media type. Consequently, no particular media form consistently rated the highest in terms of the respondents' perceptions of opportunity, rationalization, or the intention to commit an act of fraud. When taken together with the previous analyses, these findings support the notion that individuals perceived synchronous

communication technologies to afford the best opportunity to commit acts of fraud. However, only two characteristics of the technologies, feedback immediacy and reprocessability, were considered to make a medium more or less useful for committing that act of fraud. Thus, these findings indicated that people assessed the benefits of individual characteristics instead of amalgamating the entire suite of characteristics a technology possessed when judging the usefulness of a technology for committing an act of fraud.

Table 20. Pairwise Group Tests of Mean Differences

Capabilities				**Motivation**				**Rationalization**			
	EM	**VC**	**VM**		**EM**	**VC**	**VM**		**EM**	**VC**	**VM**
EM				**EM**				**EM**			
VC	0.282			**VC**	-0.046			**VC**	-0.056		
VM	-0.050	**-0.325***		**VM**	-0.099	-0.090		**VM**	0.032	0.074	
SN	-0.064	**-0.328***	-0.015	**SN**	-0.143	-0.149	-0.037	**SN**	-0.073	-0.037	-0.135
Opportunity				**Fraudulent Intention**							
	EM	**VC**	**VM**		**EM**	**VC**	**VM**				
EM				**EM**							
VC	-0.187			**VC**	0.174						
VM	0.277	-0.206		**VM**	0.059	-0.104					
SN	0.090	**-0.382***	-0.187	**SN**	0.105	-0.080	0.040				

*Indicates $\alpha = 0.05$ level of significance
Note: positive values indicate the mean of the row element is greater; negative values indicate the mean of the column element is greater

Finally, the same group code tests were performed for the fraud triangle constructs when grouped by dollar amount instead of media type. Again the model indicated measurement invariance, and suggested that the group code approach was appropriate for analyzing differences in means. When grouped by dollar amount, opportunity and motivation varied at an $\alpha = 0.05$ level of significance. At an $\alpha = 0.05$ level of significance, capabilities and fraudulent intention varied by dollar amount. All of the constructs except rationalization tended to increase

as the dollar amount increased. Rationalization did not show a significant difference in means between the two groups. The implication was that the greater dollar amount that would be accrued by an act of fraud would increase perceptions of motivation, opportunity, rationalization, capabilities, and fraudulent intention without necessarily increasing rationalization. This suggests that the reasoning pertaining to the risk, effort, and reward of an act and the intention, and ultimate fulfillment of that act, may be more complex than suggested in previous cognitive models. As an alternative, it may simply indicate that individuals are more likely to engage in acts of fraud that yield greater financial rewards, but may not be any more likely to explicitly articulate, or express, their rationalization of the act.

CHAPTER 7. DISCUSSION

Discussion of the Fraud Triangle

The causal model of fraud proposed and supported in this study enhances our understanding of the cognitive and behavioral aspects of fraud. The constructs motivation, opportunity, rationalization, and subsequently capabilities, as well, have become a dominant paradigm for studying fraud (Morales et al., 2014). However, the relationships between these constructs have been underrepresented in research. Thus, the descriptions of the constructs in the fraud triangle have remained at the level of a taxonomy and the causal relationships between the constructs had remained a mystery. These constructs were typically expressed in analogy to fire where heat, fuel, and oxygen are all necessary components for a fire (Albrecht et al., 2009). However, the causal model supported by the analyses in this paper provides a much richer, more thorough understanding of the fraud triangle constructs. This study strongly supports a causal model that depicts motivation, opportunity, and capabilities affecting rationalization. This model of fraud is useful in extending research behaviors beyond taxonomies and audits and allowing theoretically-driven causal research about fraud.

The quantitative analysis of the fraud triangle constructs strongly supported the view that the four constructs of motivation, opportunity, rationalization, and capabilities influence an individual's decision-making pertaining to acts of fraud. As shown in Table 21, most of the findings were consistent with the predictions of the proposed causal model of the fraud triangle. For example, the analysis of the fraud triangle indicated that increased motivation, opportunity, and capabilities did lead to increased rationalization for a fraudulent act. The findings also suggested that the impact of an individual's assessment of their own personal capabilities was mediated through their perception of a specific opportunity to commit fraud.

The analysis associated with Hypothesis 1 supported the idea that an individual's assessment of their own capabilities increased their perception of opportunities to commit fraud. Thus, people that felt they were highly capable due to their own social, economic, or technical skills were more likely to perceive opportunities to mislead others to their own financial advantage. Thus, individuals with better communication skills, knowledge of transactional systems, or ability to manipulate the communication medium would be more likely to perceive opportunities to commit fraud.

The results from the analysis supported Hypothesis 2 and indicated that individuals who believed they possessed greater social, economic, or technical skills were also more likely to rationalize an act of fraud. These findings support the notion that individuals who believe they possess the skills to commit an act of fraud would perceive that act as easier to commit and as a result would be more likely to rationalize the act. Similarly, these findings could also be interpreted as an indication of some level of narcissism, which has been linked to both crime and egoism (Sutherland, 1983).

Results from testing Hypothesis 4 suggested that individuals who felt more motivated to commit an act of fraud were also more likely to rationalize that action. This result supports a vast array of previous causal behavioral models that posit that motivation or reward compel individuals to act, and that the greater motivation or reward an individual perceives, the greater the likelihood they will decide to fulfill a potential action (Davis, 1989; Ajzen, 1991; MacInnis and Jaworski, 1989).

The analysis also supported the premise of Hypotheses 5, which proposed that individuals rationalized their actions prior to enactment. Thus, the results of the analysis support the idea that cognitive processes act as antecedents to fraud, and individuals rationalize

committing an act of fraud prior to forming an intention to act (Cressey, 1953; Morales et al., 2014).

Table 21. Fraud Triangle Results

	Hypothesis	Findings
H1	A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased perception of an opportunity to commit the fraudulent act.	Supported
H2	A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased likelihood that person will rationalize the fraudulent act.	Supported
H3	A greater perceived opportunity to commit a fraudulent act will result in an increased likelihood to rationalize a fraudulent action.	Reversed
H4	A greater motivation to commit a fraudulent act will result in an increased likelihood to rationalize a fraudulent action.	Supported
H5	A greater likelihood that a person will rationalize a fraudulent act will result in an increased likelihood of that fraudulent act occurring.	Supported

Although most of the analyses supported the hypotheses regarding the fraud triangle, the findings were interesting in that opportunity had a negative relationship with motivation. The analyses indicated that an individual is less likely to rationalize committing an act of fraud that they consider to be a ubiquitous opportunity. The relationship from opportunity to rationalization was consistently negative, irrespective of which of the eight groups were being analyzed and irrespective of what other constructs were included in the model. This suggests that the negative relationship between opportunity and motivation was neither spurious or a product of colinearity. The most meaningful interpretation of this result is that individuals were more likely to rationalize opportunities to commit fraud that they considered more rare or unique. This type of sensitivity to the relative abundance or scarcity of opportunity was more consistent with the

MOA model than it was to the logic of the fraud triangle (MacInnis and Jaworski, 1989; Albrecht et al., 2009). The MOA model was developed as a cognitive-based model of consumer behavior, in which perceptions of motivation, opportunity, and personal ability (e.g., capabilities) influence purchase decisions. The logic derived from this model states that the rarer and more special or individualized an opportunity is, the greater the likelihood of an individual acting upon that opportunity. In a model derived from MOA, the relationship between the opportunity construct and the behavior construct is negative to indicate that individuals are more likely to act impulsively when presented with a rare or fleeting opportunity. The logic is derived from the idea that in a consumer setting potential customers feel compelled to act when presented a rare or fleeting opportunity (MacInnis and Jaworski, 1989). This also indicates that when presented ubiquitous opportunities to commit fraud, less rationalization is required. Consequently, the findings from this analysis for Hypothesis 3 indicate that in the scenarios of fraud described to respondents, the perception of a lesser opportunity to commit the act of fraud actually resulted in a greater rationalization of that action. Because the scenarios presented to respondents described acts of interpersonal fraud for relatively small amounts (i.e., $10 or $100), this suggests that for the rationalization of petty types of fraud individuals are more likely to rationalize and impulsively act on what are perceived as rarer opportunities to commit fraud.

Discussion of Effects of Media Capabilities on Fraud

After the scales and fraud triangle model were constructed, the research question about how technologies affect fraud behaviors could be addressed. By integrating Media Synchronicity Theory and the fraud triangle model, it was possible to evaluate the effects of individual media characteristics and how they can ultimately deter or compel individuals who are contemplating

fraudulent actions. The results from this study indicate that feedback immediacy and reprocessability play a significant role in the formation of perceptions of opportunities to commit acts of fraud. Consequently, the characteristics of media can, and do, influence behavior and can either compel or deter individuals from committing acts of fraud.

Table 22. Media Capabilities Results

Hypothesis		Findings
H6A	A communication medium with a greater amount of parallelism will result in an increased perception of an opportunity to commit fraud.	Not Supported
H6B	A communication medium with a greater amount of rehearsability will result in an increased perception of an opportunity to commit fraud.	Not Supported
H6C	A communication medium with a greater number of symbol sets will result in a decreased perception of an opportunity to commit fraud.	Not Supported
H6D	A communication medium with a greater amount of feedback will result in a decreased perception of an opportunity to commit fraud.	Reversed
H6E	A communication medium with a greater amount of reprocessability will result in a decreased perception of an opportunity to commit fraud.	Reversed
H1	A greater perception that one holds about his capabilities to commit a fraudulent act will result in an increased perception of an opportunity to commit the fraudulent act.	Supported

The analyses indicated that only certain media characteristics, as defined by MST, are germane for investigating deceitful interpersonal exchanges. Whereas all five media capabilities are important when working cooperatively, the findings indicated that only feedback immediacy and reprocessability have significant effects in the context of fraudulent exchanges. Thus, while Media Synchronicity Theory proposes that five specific media characteristics are critical in cooperative acts of communication, in the context of a fraudulent exchange, most individuals' decisions to commit fraud were only influenced by two of the five media characteristics, as

shown in Table 22.

The rationale for hypotheses 6A, 6B, 6C, 6D, and 6E were based on Interpersonal Deception Theory. Whereas the previous hypotheses about the relationships between constructs in the fraud triangle were largely supported by this study, most of the hypotheses based on Interpersonal Deception Theory were not supported. These hypotheses were all based on the premise that that media capabilities that masked cues to deception (i.e, parallelism and rehearsability) would increase opportunities to commit fraud, while media capabilities that illuminated cues to fraud (i.e., symbol sets, feedback immediacy, and reprocessability) would decrease opportunities to commit fraud. However, the analyses suggested that parallelism, rehearsability, and symbol sets, which were hypotheses 6A, 6B, and 6C, respectively, did not have significant effects on the opportunity that individuals perceived to exist to commit fraud.

In contrast, the hypotheses about the effects of feedback immediacy (H6D) and reprocessability (H6E) were both highly significant. However, both feedback immediacy and reprocessability were thought to be media characteristics that would illuminate cues to fraud. It had been hypothesized that greater feedback immediacy would alert victims to cues of fraud by letting those potential victims ask more questions to look for signs of inconsistency. Similarly, reprocessability would alert victims to more cues of fraud by allowing the potential victims more time to thoroughly and skeptically assess the messages they were presented. However, the analysis consistently described the effects of both feedback immediacy and reprocessability on opportunity as significant and positive, irrespective of media forms or model specification. This suggests that these unexpected and reversed relationships were not the result of colinearity or spurious relationships. Consequently, the most convincing explanation for these unexpected findings is that greater feedback immediacy and reprocessability are perceived as useful for

creating more compelling and convincing lies.

Recall that most respondents believed that the scenarios of fraudulent misrepresentation presented to them described acts of communication in which both parties needed to work together to develop a shared understanding of the transaction. This "shared" understanding contained deceit about the state of the tablet computer in each scenario, so the outcome of the conversation was meant to cause the victim to develop convergent, but untrue, meaning based upon a misrepresented condition of the asset. Consequently, characteristics that were useful for persuasion, such as the ability to answer more questions or provide a clearer understanding of their description of the asset, were actually coveted by individuals seeking to engage in an act of fraud. It is also noteworthy that the scenarios included no serious repercussions for being caught, so the worst potential outcome for a fraudster would have been being social ostracized by the victim for violating social norms. Thus, it is possible that for the type of interpersonal fraud described in the scenario (i.e., the misrepresentation of an asset) the benefits of having media characteristics that provided a more compelling and convincing lie were deemed to outweigh the drawbacks of illuminating more cues to their deceit.

Of the two media characteristics that the analysis suggested had a significant influence on fraud, feedback immediacy and reprocessability, feedback immediacy was a media transmission capability and reprocessability was a media processing capability. However, when presented descriptions of communication focusing on convergence and conveyance, respectively, most individuals considered the act of fraud described in their scenarios (i.e., the misrepresentation of an asset) to be an act of convergence. Typically, media processing capabilities are presumed to be more germane in convergent communication; however, for the act of misrepresenting an asset the analyses indicated that one media processing and one media transmission capability each had

significant effects. Taken together, these findings suggest that MST does provide some useful predictions about media capabilities as they pertain to acts of fraud, but MST may need to be extended to an act outside of the bounds of the original theory (i.e., non-cooperative acts).

Thus, the analysis indicates that while the five media capabilities defined in MST are well-suited to describing cooperative communication, only two of the five capabilities in MST are germane to acts of fraud, and that there may be other, yet undiscovered, media capabilities that are important in acts of fraud. While the hypotheses about the effects of media capabilities were based on the logic that fraudsters would generally prefer technologies with less auditing capabilities, in practice respondents were less concerned with being "caught" and more concerned with making compelling messages to their intended victims.

Finally, it is interesting to note that only an individual's perception of an opportunity to commit fraud seems to be consistently affected by media capabilities. Their perceptions of their own individual capabilities and their motivation to act were not strongly affected by the media capabilities present in a communication medium. Thus, individuals perceived that they possessed certain general skills and that the media form being used to facilitate the exchange did not affect those perceptions of their own abilities. Similarly, the person's motivation to participate in the act of fraud was derived from the benefit they perceived the act to afford. The media form being used to facilitate the transaction did not significantly affect their motivation either. However, consistent with the fraud triangle hypotheses, findings from the analysis about H1 indicate that the perceptions of individual capabilities did significantly affect perceptions of opportunities to commit fraud. The more individual social, economic, or technical skills an individual deemed themselves to possess, the more likely they were to perceive an opportunity to defraud others. Thus, while the media capabilities did not affect perceptions of personal capabilities, both media

capabilities and personal capabilities did affect perceptions of opportunity.

Limitations of Study

During this research, students were used as test subjects, and the use of student subjects has been criticized as lacking generalizability (Burnett and Dune, 1986). In spite of this, there are indications that the results are valid and generalizable. First, the subjects in the sample were from the millennial generation, which is renowned as being a media savvy population (Vodanovich et al., 2010). Furthermore, these data were collected as part of a study examining fraudulent sales of items online. E-commerce is a task domain in which the student-aged subjects surveyed had experience and they would also expected to have future involvement with. Thus, for this analysis student subjects seemed to have sufficient domain knowledge and experience to offer valid and generalizable results.

Another potential limitation of this study is that the domain of interpersonal fraud extends beyond the scenario and the general domain of fraud extends well beyond interpersonal fraud. While the misrepresentation of an asset is a very common form of interpersonal fraud, many other forms of interpersonal fraud including advanced payment fraud, non-delivery fraud, romance frauds, and refund frauds are common (IC3, 2012). Consequently, testing the model of interpersonal fraud with a scenario that focuses on the misrepresentation of an asset, which is one type of interpersonal fraud, may not be entirely generalizable to the entire domain of interpersonal fraud. Furthermore, the fraud triangle has traditionally been applied to corporate, financial, and managerial fraud (Albrecht, 2007), and findings about relationships in the fraud triangle from analyses about interpersonal fraud may not be generalizable to the entire domain of fraud.

A final potential limitation is that intention does not always translate to action. Thus, having a final endogenous variable based on the intention to commit an act of fraud may not represent or translate into actual fulfillment of that intention into an act of fraud. While previous research has supported a strong relationship between the intention to act and engagement in that actual action (Sheppard et al., 1988; Venkatesh and Davis, 2000, McKnight et al., 2002), this relationship is assumed in the theoretical model used for this study.

Summary

The goal of this study was to explore how media characteristics influenced fraud. In particular, this study analyzed the effects of the five media characteristics defined by Media Synchronicity Theory on a causal model of fraud derived from the fraud triangle. This chapter discussed the empirical findings and anecdotal evidence from the survey and quantitative analysis employed in this study. First, the evidence of causal relationships between constructs in the fraud triangle was discussed. Next, the effects of media characteristics on fraud behaviors were described. An effort was also made to interpret the unexpected finding that only two of the five media characteristics influenced fraud behaviors. The theoretical and methodological limitations of the study were also described. The next chapter will summarize the key conclusions learned from this study and will describe how those conclusions will influence both future research and practice.

SECTION 8. CONCLUSIONS

Conclusions from the Study

This study was meant to explore how the characteristics of communication technologies affect the decision-making processes of individuals engaging in fraudulent transactions. In an effort to answer this research question, scales were developed to measure both media characteristics and fraud, then a model describing a casual structure of fraud was presented and evaluated, and finally, the effects of media characteristics on that model of fraud were assessed. The empirical analysis and anecdotal evidence from this study suggests five major themes: (1) media characteristics do affect one's willingness to engage in fraud, (2) the impacts of individual media characteristics were more salient than the impacts of media forms, (3) the media characteristics germane to interpersonal fraud are feedback immediacy and reprocessability, (4) unique or timely opportunities to commit fraud may be easier to rationalize than ubiquitous ones, and (5) the fraud triangle has a casual structure similar to the Theory of Planned Behavior. Finally, the limitations of the current research, and how these trade-offs in research design may affect study outcomes, were discussed.

First, the analyses indicated that the only two media characteristics that consistently play a salient role in the cognitive processes that result in fraud are feedback immediacy and reprocessability. Irrespective of media form, feedback immediacy and reprocessability consistently had strong and significant effects on opportunity. In contrast, the other media characteristics had substantial effects on cooperative communications, but did not significantly affect any of the constructs in the fraud triangle. Thus, while feedback immediacy, parallelism, symbol sets, rehearsability, and reprocessability all affect cooperative acts of communication, only feedback immediacy and reprocessability affected whether an individual intended to engage

in the act of misrepresenting an asset. Thus, while these findings have been supportive of Media Synchronicity Theory, that support is tempered by the findings that not all of the media synchronicity constructs are relevant in the context of an act of fraud. The lack of significant effects for three of the five media capabilities has substantial implications for extending MST outside the bounds of cooperative communication. Furthermore, this finding suggests that media characteristics may be task-specific and other, as of yet undiscovered, media capabilities may be more germane during non-cooperative acts of communication.

The cross-group comparisons also indicated that there was often very little difference in the way individuals interpreted their willingness to engage in fraudulent behaviors based on media type. However, the analysis of the effects of media on the cognitive model of fraud indicated that certain media characteristics, feedback immediacy and reprocessability, did consistently affect whether or not an individual intended to commit an act of fraud. Consequently, the analysis of individual media characteristics seems to represent a more precise method for understanding the effects of media on fraud than comparing behaviors and outcomes solely by media type.

An important finding from this research suggests that while all media characteristics were useful in the context of cooperative acts of communication, only feedback immediacy and reprocessability were important in the context of interpersonal fraud. Unexpectedly, both of these media characteristics were found to increase the opportunities individuals perceived to commit fraud, despite the theoretical reasoning that they would elucidate cues to deceit and thus reduce opportunities to commit fraud. In light of these findings, the best alternative hypothesis seemed to be that these two media characteristics were coveted for deceit because they were perceived to allowed fraudsters to make more compelling and convincing messages.

Next, the causal structure evident in the model of the fraud triangle is particularly important in light of the finding that for the specific act of misrepresenting the value of a tablet computer in a computer-mediated exchange, the relationship between opportunity and rationalization was consistently negative across all media forms. Thus, the greater the perception of the opportunity to commit the act of fraud, there was less rationalization of the act by the individual. This indicates that common and ubiquitous opportunities are less likely to cause individuals to rationalize fraudulent behaviors than situations that are fleeting or urgent. These findings support the perspective that there are more complex relationships between the latent constructs in the fraud triangle than has been previously supposed (Murphy and Dacin, 2009).

Finally, evidence indicated that the proposed structural model of fraud fit well, and motivation, opportunity, and capabilities act as antecedents to rationalization and ultimately the intention to commit fraud. These relationships were consistent irrespective of the media form being used to facilitate the transaction. This suggests that previous conceptualizations of the fraud triangle as a taxonomy would be enriched by adding these causal relationships. For example, the analyses indicate that an individual's perception of their personal capabilities to commit an act of fraud is mediated through their perception of a specific opportunity to commit that fraud. Similarly, the model describes how rationalization depends on motivation, opportunity, and capabilities. These causal relationships between the constructs in the fraud triangle have not been previously described or tested in research about interpersonal fraud.

The five themes described above support the perspective that fraud is a cognitive process and that the characteristics of the media being used to facilitate conversations and transactions do influence fraudulent behaviors. These five major themes have important implications for both research and practice.

Implications for Research

The most stimulating implications for the information systems research domain pertain to the development and extension of Media Synchronicity Theory. First, findings suggest that the constructs in MST can be reliably and validly measured using survey methodologies. This indicates that MST can be tested outside of the context of experiments using expert opinion to assess the characteristics of technologies. The use of survey measures also indicates that multi-method approaches, which are generally considered to be more valid, may be used in future research to measure MST constructs. Findings also indicate that while the characteristics defined by Media Synchronicity Theory were useful in evaluating both cooperative and dishonest communication, certain characteristics were more salient depending on the context of the communication. Thus, the findings suggested that the five media characteristics described by Media Synchronicity Theory may not be an appropriate or exhaustive list of the characteristics that alter behaviors when the theory is stretched beyond cooperative acts of communication. Finally, the evidence of measurement invariance in media characteristics across media forms indicates that further investigation is needed of the assumption that all media forms have the same characteristics. For example, there was evidence that reprocessability is interpreted differently by individuals engaging in communication using e-mail or video conferencing.

The most interesting implications for research within the accounting domain are related to the constructs in the fraud triangle. In this study, constructs in the fraud triangle, which has been a dominant paradigm within the accounting field for decades (Morales et al., 2014), showed evidence of a previously undescribed causal structure between them. Previously, the relationships between the constructs in the fraud triangle have typically been described with the analogy of fuel, air, and heat, which are conceptualized as being necessary elements of a fire.

When described by this analogy, the constructs have been generalized as having the same conditions and similar effects in all forms of fraud (Albrecht et al., 2009). However, the results of our analysis indicate that these relationships are both causal and complex. There is strong evidence that motivation, opportunity, and capabilities all affect rationalization, and that the effects of capabilities are partially mediated through opportunity. Finally, the finding that the relationship between opportunity and rationalization is reversed in the context of interpersonal fraud suggests that the relationships in the fraud triangle may be different than they would be in the context of corporate or investment fraud. Thus, when the chance of being caught is low, and the repercussions are minimal, a lesser opportunity to commit fraud may actually compel a greater rationalization of an act of fraud because the opportunity is perceived as rare or urgent.

Implications for Practice

The first and most significant implication for improving systems to deter fraud is that current systems that focus only on reducing the opportunities available to potential fraudsters are short-sighted and potentially waste resources on ineffective strategies for deterring fraud. The findings from this research indicated that the cognitive processes involved in a decision to commit an act of fraud can be complex. Paradoxically, a fraud that results in a greater dollar amount can increase perceptions of motivation compelling individuals to act deceptively, but generally ubiquitous, petty, acts of fraud are easier for individuals to rationalize. Thus, as described in previous research on corporate fraud, rationalization may increase as the amount of a fraud grows larger and the prospect of a reward gets more enticing, resulting in an individual's greater ability to justify and rationalize a larger, more risky act (Ramamoorti, 2008; Murphy and Dacin, 2011). However, when all other factors are held constant, potential fraudsters are

generally more willing to rationalize a petty act of fraud than an act of a larger magnitude. This study indicates that the rationalization of ubiquitous, petty, acts of fraud may be based on quite different factors when compared to corporate or investment fraud. In these circumstances systems designed with features meant to reduce the opportunity of individuals to commit dishonest acts, without considering other contextual factors, may not actually be discouraging fraudulent behaviors because they are making the opportunity to commit an act of fraud seem more fleeting or rare and are actually increasing individuals' rationalization of that action. Consequently, to develop a more holistic approach to deterring fraud, shrewd systems developers should consider whether the rationalization of a fraudulent act is being driven by motivation and the benefits an individual hopes to procure through their actions versus being driven by the ease, ubiquity, and availability of the opportunity.

Future Research

A few key areas to consider for future research involve testing the model supported in this study in various other types of communication tasks ranging from strongly convergence-based communication to strongly conveyance-based communication. This research could unravel the seeming contradiction that individuals sometimes perceive greater opportunities to commit acts of fraud when using technologies that record illegal or unlawful activities when those technologies allow them to create more compelling and persuasive lies. While this study explored the context of a relatively inexpensive item being misrepresented online, for acts of fraud with a higher magnitude of damages or for acts that require conveyance instead of convergence, individuals may perceive greater opportunities stemming from technologies that mask cues to behavior instead of technologies that facilitate better persuasive capabilities. For

example, one could expect to see personal persuasion and conveyance potentially play a lesser role in the context of corporate fraud where an expense report might be altered to mask embezzlement.

In addition, one could expect that the inverse relationship between opportunity and rationalization may differ in the context of other forms of fraud. As a result of the unexpected direction of the relationship between opportunity and rationalization, an alternative explanation was offered that posited the inverse relationship was representative of the increased willingness to engage in acts that are rare, urgent, or unique. However, in a corporate context where individuals may be more sensitive to the negative results of their deception being unmasked, perhaps the types of small-magnitude but high-frequency opportunities represented by the scenarios in this study may be more compelling to individuals. It has often been noted that fraud is rarely a one-time act and that in the context of corporate fraud rather than in the context of a single-time interpersonal transaction, individuals may base their rationalization of a fraudulent act differently. Corporate systems for detecting fraud based on key financial indicators and public reports have lacked behavioral components and have to date been largely unsuccessful in detecting financial fraud (Abbasi et al., 2012). The blending of expert systems designed to ferret out fraudulent reports with these types of behavioral cues of fraud, which could be gleaned from corporate communication systems, would provide an avenue for improving current algorithms for detecting corporate fraud.

Finally, the measurement variance evidenced in various media capabilities questions a fundamental assumption of most media capabilities theories. If some media capabilities are perceived as different when applied to various forms of media, future research is needed to determine if it is possible to develop a generalizable theory with invariant media characteristics

across media forms. This indicates that media characteristics like feedback immediacy, symbol variety, parallelism, rehearsability, and reprocessability may not have a consistent meaning or effect when applied to different media. This indicates a fruitful area for future research because the underlying assumption of all former communication and media theories is that media share certain communication characteristics and that those characteristics are consistent across media forms (Rice and Williams, 1984; Daft and Lengel, 1986; Dennis et al., 2008).

Summary

The main findings from this study include: (1) media characteristics do affect the decision-making processes that may result in fraud, (2) individual media characteristics are generally more preferable for measuring the influence of media than media forms, (3) the capabilities defined in Media Synchronicity Theory are useful but probably not comprehensive for examining media effects when extended to deceptive acts, (4) the fraud triangle has a casual structure in which perceptions of motivation, opportunities, and capabilities influence the rationalization of an act of fraud, and (5) the relationship between the fraud constructs indicates that in some instances a unique or urgent opportunity to commit fraud may be more compelling than a ubiquitous opportunity. These conclusions address the original research question presented in this paper, which is, "*How do the characteristics of e-commerce and communication technologies affect the decision-making processes of individuals engaging in fraudulent transactions?"* In particular, these conclusions suggest that the media characteristics feedback immediacy and reprocessability play the most significant role in determining whether an individual will consider misrepresenting the value of an object, a form of interpersonal fraud. For this specific act, feedback immediacy and rehearsability were both viewed by potential fraudsters

as being useful in presenting a more compelling case during the misrepresentation of the object. Thus, for a similar situation where interpersonal fraud has few negative consequences, individuals are focused on utilizing their communication skills to present a compelling case rather than limiting communication in an attempt to mask their cues of fraud. These findings are important for guiding future research because they indicate that for interpersonal fraud the decision-making processes of potential fraudsters are more complex than previously described in extant research. Additionally, there are strong methodological implications that media characteristics can be measured by survey at an individual level rather than aggregating media characteristics as media forms and using expert opinions to derive or classify media features.

These findings also have important implications for practice, including the suggestion that more holistic approaches to fraud prevention should be considered during the design of communication and transaction systems. In particular, one must consider that the media effects on fraud behaviors are mediated through perceptions of opportunity. Thus, other related perceptions such as capabilities and motivation may not be represented or affected by features of the system that solely focus on utilizing media characteristics to elucidate cues of fraud. Instead, this research suggests that practitioners would be best served to also consider the role motivation and perceptions of individual capabilities play in rationalizing, and ultimately performing, an act of fraud. Although this manuscript addressed how the characteristics of communication systems affect interpersonal fraud, it also indicated promising new venues for future research including extensions to corporate fraud and the other psychological factors that contribute to the rationalization of fraudulent acts. Finally, this research also suggests that there may be some other task-specific media characteristics may exist that are germane to acts of deception or fraud and have been overlooked in research designed to examine cooperative acts of communication.

APPENDIX A. MEDIA CAPABILTIES IN EXTANT RESEARCH

Construct	Description	Reference
Feedback Immediacy	"the extent to which a medium enables users to give rapid feedback"	Dennis and Valacich, 1999, pg. 2
	"transmission velocity is generally alluded to in terms of immediate or rapid feedback and interactivity"	Dennis et al., 2008, pg. 584
	"rapid feedback from (their) communications"	DeLuca and Valacich, 2005, pg. 3
Parallelism	"the number of simultaneous conversations"	Dennis and Valacich, 1999, pg. 2
	"number of effective simultaneous conversations"	DeLuca and Valacich, 2006, pg. 326
	"the extent to which signals from multiple senders can be transmitted over the medium simultaneously"	Dennis et al., 2008, pg. 585
Symbol Variety	"the number of ways in which information can be communicated"	Dennis and Valacich, 1999, pg. 2
	"the number of ways in which a medium allows information to be encoded for communication"	Dennis et al., 2008, pg. 585
	"format by which information is conveyed, verbal and non-verbal symbols included"	DeLuca and Valacich, 2005, pg. 3
Rehearsability	"the extent to which the media enables the sender to rehearse or fine tune the message"	Dennis and Valacich, 1999, pg. 2
	"Media that support rehearsability enable the sender to carefully craft a message before transmission to ensure that the intended meaning is expressed precisely"	Dennis et al., 2008, pg. 587
	"The ability of participants to rehearse prior to the actual communication event"	Carlson and George, 2004, pg. 193
Reprocessability	"the extent to which a message can be reexamined or processed again"	Dennis and Valacich, 1999, pg. 3
	"enables the sender to reexamine and consider previously sent content for the development of understanding"	Dennis et al., 2008, pg. 587
	"media that involve the permanent storage of the information (electronic or otherwise) allow participants to review and analyze the material more than once and at subsequent points in time"	Carlson and George, 2004, pg. 193

APPENDIX B. FRAUD TRIANGLE IN EXTANT RESEARCH

Motivation	"A non-sharable financial problem"	Dorminey et al., 2012, pg. 558
	"a perceived benefit from committing fraud"	Wilks and Zimbelman, 2004b, pg. 176
	"financial (e.g., money), pressure (e.g., pressure to retain their job), or social (e.g., the desire to retain or gain respect or enhance their self-esteem and status)"	Murphy and Dacin, 2011, pg. 604
Opportunity	"Opportunities result from circumstances that provide chances to commit fraud"	Lou et al., 2009, pg. 65
	"conditions or situations that allow a person to commit fraud"	Wilks and Zimbelman, 2004a, pg. 724
	"the perceived opportunity that one can perpetrate the fraud while not getting caught"	Murphy and Dacin, 2011, pg. 604
Capabilities	"the necessary traits and abilities to be the right person to pull it off"	Wolfe and Hermanson, 2004, pg. 39
	"an individual's personal traits and abilities that play a major role in whether fraud may actually occur "	Dorminey et al., 2012, pg. 564
	"essential traits thought necessary for committing fraud, especially for large sums over long periods of time, include a combination of intelligence, position, ego, and the ability to deal well with stress"	Dorminey et al., 2012, pg. 565
Rationalization	"the fraudster seeks to justify the fraudulent action before the first fraud act "	Dorminey et al., 2012, pg. 558
	"an individual who is able to rationalize personal gain at the expense of others is likely to commit fraud when incentive and opportunity exist"	Wilks and Zimbelman, 2004a, pg. 725
	"is a mechanism that allows individuals to justify an inconsistent (''bad'') behavior to reduce or avoid the negative affect that would normally accompany it"	Murphy and Dacin, 2011, pg. 610
Fraudulent Intention	"behavioral intention construct captures an individual's projection or anticipation that she/he will behave in a specified way"	McKnight et al., 2002, pg. 301
	"Intentions are conceptualized as a direct and significant predictor of actual usage behavior"	Agarwal and Prasad, 1998, pg. 205
	"a person's performance of a specified behavior is determined by his or her behavioral intention"	Davis et al., 1989, pg. 983

APPENDIX C. PRESCREENING QUESTIONS

1. Have you ever bought anything over the Internet? (Yes/No)
2. Have you ever sold anything over the Internet? (Yes/No)
3. Have you ever been defrauded over the Internet? (Yes/No)
4. Have you ever used…(Yes/No)
    a. E-mail
    b. a social network (Facebook, Twitter, Foursquare, MySpace, Pinterest, Weibo, etc.)
    c. video conferencing (Skype, AIM, GoogleTalk, WebEx, Facetime, gotomeeting, etc.)
    d. cell phone voice mail

APPENDIX D. SURVEY ITEMS – FRAUD TRIANGLE

*In response to the scenario described above please answer the following questions…

1. Capabilities
    a. If I wanted to, I am confident I have the skills needed to sell this tablet computer for more than it is worth
    b. I have the capability to sell this tablet computer for more than it is worth
    c. I have the skills necessary to represent this tablet computer as being in better condition than it really is
    d. I am skillful enough to sell this tablet computer for more than it is worth
    e. I would be good at making a tablet appear in better condition than it really is
2. Opportunity
    a. In general, a person could easily sell their tablet computer online for more than it is worth
    b. It is easy for someone to take advantage of other people buying tablet computers
    c. A person could regularly exploit the trust of people purchasing tablet computers
    d. In general, it would be easy to trick people into buying a tablet computer for more than it is worth
    e. In general, it would be easy to persuade people into buying a tablet computer for more than it is worth
3. Motivation
    a. Selling a tablet computer for more than it is worth would benefit me
    b. I would benefit by selling my tablet computer to someone else for more than it is worth
    c. I have something to gain by overstating the value of the tablet computer I am selling
    d. I could benefit by selling the tablet computer for more than it is worth
    e. Making a tablet computer appear to be in better condition than its true condition would be beneficial to me
4. Rationalization
    a. I can justify selling this tablet computer for more than I think it is worth
    b. I believe that it is appropriate to sell the tablet computer for more than it is worth online
    c. In my opinion, it is acceptable to sell this tablet computer for more than I think it is worth
    d. In this circumstance, it is acceptable to make the tablet computer appear to be in better condition than it really is
    e. I deserve the chance to make a little extra by selling this tablet computer for more than I think it is worth
5. Behavioral/Fraudulent Intention
    a. If I were going to sell a tablet computer online, I would misrepresent the condition of the tablet computer.
    b. I intend to misrepresent the condition of the tablet computer if I sell it online.
    c. If I sell a tablet computer online, I plan to misrepresent the condition of the tablet computer

APPENDIX E. SURVEY ITEMS – CHARACTERISTICS OF TECHNOLOGY

*Spaces below would be replaced by e-mail, video conferencing, voicemail, and social network posts

1. Feedback Immediacy
    a. ____ allows immediate feedback from others
    b. A person may reply immediately using ____
    c. ____ lets people reply immediately to each other
2. Parallelism
    a. ____ allows people to have many conversations occurring at the same time
    b. More than one discussion can occur at the same time when using ____
    c. When using ____ a person can have many conversations occurring at the same time
3. Symbol Variety
    a. ____ uses many different symbols like words, images, and charts to communicate
    b. ____ mixes pictures, words, and other symbols
    c. Using ____ the same message can be described using multiple methods like words, images, and charts
4. Rehearsability
    a. Messages using ____ can be edited before being sent
    b. ____ allows people to check their messages before they are sent
    c. People can rehearse message prior to sending them when using ____
5. Reprocessability
    a. Messages using ____ can be reexamined again later
    b. If someone wanted to observe a message again it would be easy using ____
    c. People can read or watch a message a second time to get a clearer understanding when using ____
6. Cooperative Communication Capabilities (derived from Dennis and Valacich, 1999; Dennis et al., 2008)
    a. ____ allows individuals working together at the same time
    b. Individuals can work well together at the same time using ____
    c. ____ makes it easy for people to work together on something at the same time

APPENDIX F. CONTROL VARIABLES

1. Sex (Male/Female)
2. Social Desirability (Reynolds, 1982)
    a. It is sometimes hard for me to go on with my work if I am not encouraged.
    b. I sometimes feel resentful when I don't get my way.
    c. No matter who I'm talking to, I'm always a good listener.
    d. There have been occasions when I took advantage of someone.
    e. I'm always willing to admit it when I make a mistake.
    f. I sometimes try to get even rather than forgive and forget.
    g. I am always courteous, even to people who are disagreeable.
    h. I have never been irked when people expressed ideas very different from my own.
    i. There have times when I was quite jealous of the good fortune of others.
    j. I am sometimes irritated by people who ask favors of me.
    k. I have never deliberately said something that hurt someone's feelings.

APPENDIX G. MANIPULATION CHECKS

1. Which of the following media technologies were you primarily asked about during this survey?
    a. Social Network Posts
    b. Cell Phone Call
    c. Video Conferencing
    d. Instant Messaging
    e. E-mail

2. In the scenario you were presented, you could reap an additional benefit of how much money by exaggerating the condition of the tablet computer?
    a. $10
    b. $25
    c. $50
    d. $100
    e. $200

APPENDIX H. PARTICIPANT PERCEPTIONS OF SCENARIOS

Respondents	Percent	Type	Scenario
Which situation below better describes the buying and selling of tablet computers online?			
Data Set 1: 116 Data Set 2: 228	36.0% 35.2%	Conveyance	The buyer analyzes and makes sense of the seller's information about the product and terms of sale before making a decision.
Data Set 1: 175 Data Set 2: 367	54.3% 56.7%	Convergence	The buyer and seller engage in back and forth dialog to come to a shared understanding about the condition of the tablet computer and the terms of the exchange.
Data Set 1: 31 Data Set 2: 52	9.7% 8.0%	Neither	Neither situation describes the exchange better than the other.

APPENDIX I. EFFECTS OF CONTROL VARIABLES ON FRAUD TRIANGLE

Exogenous Variable	Endogenous Variable	Factor Weight (before controls)	Factor Weight (after controls)
PL	OPP	-0.038	-0.046
RH	OPP	-0.095	-0.083
SV	OPP	-0.078	-0.046
FB	OPP	0.236*	0.223*
RP	OPP	0.269*	0.257*
CAP	OPP	0.319*	0.340*
CAP	RAT	0.293*	0.287*
OPP	RAT	-0.172*	-0.154*
MOT	RAT	0.240*	0.243*
RAT	FI	0.671*	0.670*

APPENDIX J. MEANS OF FRAUD CONSTRUCTS BY MEDIA TYPE

	Capabilities				
	CAP1	**CAP2**	**CAP3**	**CAP4**	**CAP5**
E-Mail	4.69	4.75	4.57	4.62	4.48
Video Conferencing	4.94	5.07	4.81	4.84	4.88
Voicemail	4.65	4.62	4.50	4.60	4.51
Social Network Post	4.58	4.63	4.63	4.54	4.42
	Opportunity				
	OPP1	**OPP2**	**OPP3**	**OPP4**	**OPP5**
E-Mail	5.21	5.32	5.33	5.15	5.17
Video Conferencing	5.26	5.37	5.29	5.14	5.08
Voicemail	5.22	5.10	5.20	5.07	5.02
Social Network Post	5.10	5.18	5.12	5.08	4.93
	Motivation				
	MOT1	**MOT2**	**MOT3**	**MOT4**	**MOT5**
E-Mail	4.90	4.82	4.72	4.90	4.61
Video Conferencing	5.40	5.26	5.18	5.37	5.01
Voicemail	5.10	5.14	4.93	5.21	4.83
Social Network Post	4.89	4.85	4.90	5.13	4.60
	Rationalization				
	RAT1	**RAT2**	**RAT3**	**RAT4**	**RAT5**
E-Mail	3.51	3.38	3.31	3.37	3.66
Video Conferencing	3.51	3.26	3.31	3.39	3.51
Voicemail	3.61	3.44	3.34	3.38	3.63
Social Network Post	3.43	3.34	3.25	3.30	3.40
	Fraudulent Intention				
	FI1	**FI2**	**FI3**		
E-Mail	2.60	2.53	2.59		
Video Conferencing	2.74	2.81	2.73		
Voicemail	2.64	2.64	2.65		
Social Network Post	2.71	2.7	2.63		

APPENDIX K. MEANS OF FRAUD CONSTRUCTS BY DOLLAR AMOUNT

	Capabilities				
	CAP1	**CAP2**	**CAP3**	**CAP4**	**CAP5**
$10	4.73	4.76	4.57	4.63	4.54
$100	4.70	4.77	4.67	4.67	4.61
	Opportunity				
	OPP1	**OPP2**	**OPP3**	**OPP4**	**OPP5**
$10	5.17	5.19	5.15	5.03	5.03
$100	5.23	5.29	5.33	5.19	5.07
	Motivation				
	MOT1	**MOT2**	**MOT3**	**MOT4**	**MOT5**
$10	5.06	4.97	4.90	5.13	4.69
$100	5.10	5.09	4.97	5.18	4.86
	Rationalization				
	RAT1	**RAT2**	**RAT3**	**RAT4**	**RAT5**
$10	3.60	3.45	3.46	3.37	3.61
$100	3.44	3.28	3.15	3.36	3.51
	Fraudulent Intention				
	FI1	**FI2**	**FI3**		
$10	2.65	2.67	2.66		
$100	2.69	2.66	2.64		

APPENDIX L. MEANS OF MEDIA CHARACTERISTICS BY MEDIA TYPE

	Feedback Immediacy		
	FB1	**FB2**	**FB3**
E-Mail	5.03	5.33	5.09
Video Conferencing	5.91	5.66	5.84
Voicemail	3.71	3.88	3.70
Social Network Post	5.67	5.93	5.86

	Rehearsability		
	RH1	**RH2**	**RH3**
E-Mail	5.96	5.93	5.89
Video Conferencing	3.91	3.88	4.43
Voicemail	3.49	3.62	4.63
Social Network Post	5.88	5.74	5.75

	Symbol Variety		
	SV1	**SV2**	**SV3**
E-Mail	5.09	5.06	5.19
Video Conferencing	5.16	5.22	5.20
Voicemail	2.44	2.83	2.44
Social Network Post	5.68	5.33	5.83

	Reprocessability		
	RP1	**RP2**	**RP3**
E-Mail	6.17	6.21	6.02
Video Conferencing	4.26	4.31	4.30
Voicemail	5.27	5.61	5.24
Social Network Post	5.83	5.69	5.79

	Parallelism		
	PL1	**PL2**	**PL3**
E-Mail	5.42	5.49	5.55
Video Conferencing	5.00	5.11	5.10
Voicemail	2.88	3.04	2.99
Social Network Post	6.06	5.90	5.98

APPENDIX M. IRB APPROVAL LETTERS AND CONSENT FORM

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 4/22/2013

To: Andrew Harrison
3235 Gerdin

CC: Dr. Brian Mennecke
3313 Gerdin Business Bldg

From: Office for Responsible Research

Title: Virtual Fraud Scale Validation

IRB ID: 13-167

Approval Date:	4/22/2013	**Date for Continuing Review:**	4/21/2015
Submission Type:	New	**Review Type:**	Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, **including the recruitment materials and informed consent documents that have the IRB approval stamp.**
- **Retain signed informed consent documents for 3 years after the close of the study,** when documented consent is required.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- **Immediately inform the IRB of** (1) **all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems involving risks** to subjects or others.
- **Stop all research activity if IRB approval lapses,** unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. **Approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **IRB approval in no way implies or guarantees that permission from these other entities will be granted.**

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 5/3/2013

To: Andrew Harrison
3235 Gerdin

CC: Dr. Brian Mennecke
3313 Gerdin Business Bldg

From: Office for Responsible Research

Title: Virtual Fraud Scale Validation

IRB ID: 13-167

Approval Date: 5/2/2013 **Date for Continuing Review:** 4/21/2015

Submission Type: Modification **Review Type:** Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

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OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 8/28/2013

To: Andrew Harrison
3235 Gerdin

CC: Dr. Brian Mennecke
3313 Gerdin Business Bldg

From: Office for Responsible Research

Title: Virtual Fraud Scale Validation

IRB ID: 13-167

Approval Date:	8/27/2013	**Date for Continuing Review:**	4/21/2015
Submission Type:	Modification	**Review Type:**	Expedited

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IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1138 Pearson Hall
Ames, Iowa 50011-2207
515 294-4566
FAX 515 294-4267

Date: 12/3/2013

To: Andrew Harrison
3235 Gerdin

CC: Dr. Brian Mennecke
3313 Gerdin Business Bldg

From: Office for Responsible Research

Title: Virtual Fraud Scale Validation

IRB ID: 13-167

Approval Date:	12/3/2013	**Date for Continuing Review:**	4/21/2015
Submission Type:	Modification	**Review Type:**	Expedited

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Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

Title: VF Scale Development and Validation

Lead Researcher: Andrew Harrison, PhD student, College of Business, Iowa State University, 515-291-3408; ajharris@iastate.edu

Co-Researcher: Dr. Brian Mennecke, Associate Professor, College of Business, Iowa State University, 515-294-8100; mennecke@iastate.edu

• You are being asked to participate in a research study about online commerce. This study is classified as social/behavioral research.

• You may participate only if you are over 18 years of age.

• The online questionnaire should take approximately 15-30 minutes to complete.
• If you choose to participate in the research study, you will be presented a series of questions describing your attitudes and opinions about the online selling of merchandise in an auction environment.

• The only foreseeable discomforts associated with the study are the invasion of your privacy or any emotional discomfort associated with describing your attitudes and behaviors. To minimize these risks you are allowed to skip questions you find uncomfortable. There are no direct benefits from participation in the study. However, this study may provide information and awareness about e-commerce transactions.

• Participation in this study is voluntary. There is no cost to you for participating. You may refuse to participate or discontinue your involvement at any time without penalty. You may choose to skip a question or a study procedure.

• There is no payment for completing this survey. If you do complete the survey you will receive 1% of extra credit towards your total grade in MIS 330 or MIS 207. As an alternative to participation in the study, students may choose to write a 200 word entry about the perils of e-commerce, an emerging topic in Information Systems, to earn the extra credit.

• All research data collected will be stored securely and confidentially. No information that could be used to discern your identity will be stored with your question responses. Consequently, participant names cannot be published. All electronic data will be stored on a secure network server, or on portable devices, such as a laptop, with encryption software and password protection.

• Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, the study sponsor, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

• If you have any comments, concerns, or questions regarding this research please contact the researchers listed at the top of this form. If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

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