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Moral Reasoning in Computer-Based Task Environments: Exploring the Interplay between Cognitive and Technological Factors on Individuals' Propensity to Break Rules

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Abstract This study examines the relationship between cognitive moral development (CMD), productivity features of information technology (IT) and unethical behavior or misconduct. Using an experimental design that randomly assigns subjects to one of four unique technology conditions, we assess the relationship between a subjects' predominant level of CMD and ethical misconduct on IT-oriented work tasks. Our results show that *both* higher levels of CMD and increased levels of IT productivity features at one's disposal have a significant role to play in explaining observed behavior in our sample. We find that CMD as measured by the Defining Issues Test's P-score is negatively related to task misconduct. Conversely, IT productivity features such as copy-and-paste are positively related to task misconduct. In addition, the CMD—misconduct relationship is significantly diminished by the introduction of IT productivity features. Lastly, a series of hazard analyses are conducted to explore the boundaries of our principal findings. These results demonstrate the significant role of technology in enabling negative behavior and the relative inability of subjects' use of principled moral reasoning to overcome it. Implications of these findings for academics and business managers are offered, as well as recommendations for mitigating misconduct in both academic and workplace environments.

Keywords Cognitive moral development · Defining issues test · Ethical decision-making · Information technology · Rule violations

Abbreviations

ICT	Information and communication technologies
IT	Information technology
CLT	Construal level theory
CMD	Cognitive moral development
CMC	Computer-mediated communication
COND	Technology condition
TC_0	Technology experimental condition—control group with access to no IT productivity features
TC_s	Technology experimental condition—search only
TC_{cp}	Technology experimental condition—copy-and-paste only
TC_{cps}	Technology experimental condition—both copy-and-paste and search
TOE	Time in minutes spent completing the experiment exercise
WORDCNT	Number of words contained in a submitted response document
TECHSAVY	Average score on the technology assessment instrument
GRMEMB	Similarity index group membership indicator variable. A dichotomy indicating whether or not the similarity index for a subject's response document is greater than or equal to the group membership cutoff

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	value. Where cutoff values range from 0 to 50 by 5 percentage point increments
PSI	Person–situation interactionist perspective
TECH	An indicator variable designating whether a subject was in any three of the technology experimental conditions TC_s, TC_{cp}, or TC_{cps}

Introduction

The recent and well publicized stream of corruption, ethical indiscretions, and rule violations befalling both public and private sector organizations has raised concerns and drawn the attention of policy-makers, ethicists, academics, corporate executives, and the general public. With the advent of widespread corporate scandals involving high-profile firms such as Enron, WorldCom, Tyco, Parmalat, and Adelphia (to name a few), corporate misconduct has emerged as a research topic of significant interest for scholars in the fields of business ethics and business and society. Even years removed from some of these scandals, the ripple effects across the economy are still being felt (Jickling 2010). As these cases demonstrate, the actions of a relative few corporate executives can have ruinous consequences for company stakeholders including, but not limited to, loss of employment, pensions, benefits, and investment dollars (Misangyi et al. 2008). Thus, it is clear that unethical behavior in an organization can impose heavy costs on both firms and their stakeholders.

Unethical conduct by individuals in organizations is commonly held to be a discretionary decision or choice (Celik 2009; Swanson 1995). Research in the field of psychology suggests that an individual's cognitive moral development (CMD) and moral reasoning have an effect on decision-making and behavior in general (Blasi 1980; Colby and Kohlberg 1987) and on policy violations in particular (Greenberg 2002; King and Mayhew 2002). Although ethical behavior is a function of individual factors, these factors alone do not explain unethical behavior (Blasi 1980; Treviño 1986). Behavior occurs in a social context; thus, situational or contextual factors are also likely to play a significant role (Higgins et al. 1984). An increasingly important situational influence in contemporary organizations is the technological milieu in which an organizations' employees function (Weatherbee and Kelloway 2006).

The present-day business environment is characterized by the presence of ubiquitous information and communication technologies (ICT) deployed to improve workplace productivity. Recently, however, evidence suggests that technology is a double-edged sword when it comes to workplace misconduct. Contemporary workplace technology platforms incorporate a broad range of work and non-work related software. Hence, in addition to increasing business productivity, technology also provides ample opportunity for employee misconduct (Anandarajan 2002; Venkatraman 2008) and technology-related rules violations (Weatherbee and Kelloway 2006). Technology-enabled misconduct exposes organizations to costly and undesirable consequences including, but not limited to, the misappropriation and inappropriate use of an organizations technology resources and exposure to various legal liabilities related to inappropriate use of technology (Bequai 1998). Thus, for business practitioners, it is important to understand how technology tools may be related to ethical misconduct.

The research presented here represents the examination of an important workplace person-situation context—the interplay of moral development and computer technology. Employing a person–situation interactionist perspective of ethical decision-making (Treviño 1986), we explore both individual cognitive and situational factors that influence the breakdown of integrity resulting in rule violations. Using a unique research design, we examine the roles of individual moral cognition and technology context on individuals' ethical behavior during the performance of a computer-based task.

Our research contributes to both theory and practice in several important ways. Surprisingly, given the prominence of workplace technology and the acknowledge role of individual factors such as CMD in determining behavior, we found no empirical studies investigating the relationship of moral cognition on employee misconduct in a technology context. Likewise, despite the general acceptance that both person and situation-level factors influence behavior (Kenrick and Funder 1988), we could find no studies that examined the effects of both person and situation variables on employee misconduct related to the use of technology. Thus, the research presented here aims to addresses these gaps. Our study contributes to the literature on ethical decision-making by examining how the capabilities of technology *differentially* affect ethical behavior. In addition, the conventional "command-and-control" approach (demonstrated through codes, laws, monitoring, and punishment of ethical breaches) has had limited success as a deterrent (Mazar and Ariely 2006) causing some business ethics scholars to call for new approaches for coping with rule violations (Wasieleski and Hayibor 2008). One such approach is to facilitate the design of work environments that discourage rule violations. A necessary first step is to understand the conditions in which employees are more or less inclined to break rules. Our research responds to that call by shedding light on relevant psychological characteristics, situations and their interactions that lead to rule violations. Lastly, methodologically, our research is the first to assess the role of technology as a facilitator of misconduct in an experimental setting.

Toward these ends, we explore the following research questions. (1) *How is unethical behavior influenced by an individual's moral development and,* (2) *how do common software productivity features impact the relationship between moral development unethical behavior?*

The remainder of the article is structured as follows: In "Breaches of Rules in Organizations" we examine the research on rule breaking in business organizations and establish a link with the propensity to use information technologies to facilitate the rule violations. In "Person: Situation Interactionist Perspective" we introduce the person–situation interactionist (SPI) perspective of ethical decision-making which serves as a framework to develop our hypotheses and organize the presentation of material. Within the SPI framework, we develop theoretically grounded hypotheses regarding the individual and contextual level factors used in our research. In "Methodology", we operationalize our constructs and develop our empirical models. In "Results", we report our estimation results and introduce addition analysis demonstrating the robustness of our findings. "Discussion" concludes our article with an interpretive discussion of our results, contributions, future research, limitations, and conclusions.

Breaches of Rules in Organizations

A 2009 study by the Ethics Resource Center in Washington, DC revealed that over a third of business managers surveyed witnessed ethical misconduct among employees. Annual estimates of the costs of various types of employee theft, whether it be physical or intellectual property, exceeds $400 billion (NBES 2009). "Most classifications of organizational misconduct have now been well established as matters of serious social and economic concern" (Szwajkowski 1992, p. 401). Since the adoption of the US Federal Sentencing Guidelines in 1991, and the subsequent Sarbanes–Oxley legislation, firms are mandated to put ethics codes into place in order to set rules of engagement. Despite the fact that nearly all Fortune-500 business firms now have institutionalized rules regarding proper professional and ethical conduct, company rules are often bent, ignored, or outright breached. Thus, codes are ineffective on their own (Kaptein and Schwartz 2008). We need a greater understanding as to why rule violations occur.

There has been much speculation regarding the reasons why individuals in organizations break company rules, but with little empirical backing. Some managers believe they are under pressure to challenge rules "because the rules are not always infallible, and fairness to other parties may demand nothing less" (Veiga et al. 2004, p. 84). Thus, sometimes individuals feel the rules are faulty and must be altered to address specific situations. In other words, some individuals do not always find that existing rules pertain to every contingency facing an organization.

One type of ethical misconduct that has received much attention in both the popular press and scholarly literature is the theft of intellectual property. In fact, this has become such a palpable worldwide concern that in 2008, developed countries joined together to negotiate and discuss issues related to global intellectual property (Riviere 2010) where intellectual property is defined as "original, intangible work created by the mind such as books, music, or an invention" (Winter et al. 2004, p. 280). Our study is conducted under a backdrop of the misappropriation of intellectual property.

Clearly, academics and business practitioners alike need to find an alternative to the "command-and-control" approaches to limiting dishonest behavior in the workplace. "Conventional preventative measures, such as surveillance, may only exacerbate the employee's feeling of mistreatment" (Szwajkowski 1992, p. 409). While opportunities for misconduct may decrease with monitoring mechanisms in place, individuals find new methods of deviance.

The literature on how to combat dishonest behavior can be organized into two main streams—the economic model stream, which emphasizes rational self-interest and the benefits and costs associated with an action, and the psychological stream, which focuses more on the cognitive factors affecting behavior. In the economic model, persons are viewed as being rationally self-interested and act according to the risks involved in a decision and the opportunities for personal gain that may be available (Misangyi et al. 2008). Corrupt or dishonest behavior often results when the potential opportunities for gain associated with a socially undesirable act outweigh the potential costs. Dishonest acts are assumed to occur, which often leads to the development of rules and punishments to mitigate the undesirable behavior (Misangyi et al. 2008, p. 752). The idea behind this type of structure is to make behavior more transparent, and people more accountable for their actions. Rational human beings are more likely to violate a rule when they perceive the risks of being caught are less than the benefits they could receive by engaging in the violation (Williams and Hosek 2003).

The psychological stream is the second main stream of research examining how to prevent dishonest conduct among individuals. Research in this stream focuses on individual-level cognitive factors such as personality, moral development, and emotions. Individuals are assumed not only to be motivated by rational self-interest, but to be affected by psycho-social variables as well (Wasieleski and Hayibor 2008). The study of psychological variables in the prevention of dishonest conduct has received scant attention in an organizational context (Kisamore et al. 2007).

Thus, in this article, we examine ethical decision-making in organizations using the psychological perspective. To discuss this approach and its relevance to our study, we adopt a person-situation interactionist perspective on ethical decision-making (Treviño 1986).

Person-Situation Interactionist Perspective

Ethical violations of rules have been analyzed using the ethical decision-making model (Hunt and Vitell 1986; Rest 1986). The basic four-step ethical decision-making model is rooted in a rationally oriented frame (Rest 1979). Individuals first form a moral awareness when faced with an ethical issue. Once an issue has been recognized, a moral judgment is formed about the more desirable way to act to resolve the dilemma. At this stage, individuals gather the relevant information, sort out and evaluate the available alternatives, and select the one that yields the most ethical solution. After this judgment is made, an individual intends to commit to the act, which ultimately leads to behavior. However, this rational decision-making process is moderated by a number of situational and individual factors (Jones 1991; Treviño 1986). Thus, rule breaking should be studied with the assumption that it is a complex behavior. Examination of individual factors or situational factors alone is unlikely to lead to a full understanding of unethical acts (Kisamore et al. 2007). It is critical to examine individual and situational factors as well as their interactions to gain a more comprehensive understanding of the conditions under which rule breaking occurs. This study examines both individual cognitive and situational factors on ethical misconduct. Following other behavioral ethics scholars (e.g., see Greenberg 2002 and Treviño 1986), we adopt person-situation interactionist (PSI) perspective of ethical decision-making. We now turn our attention to individual-level cognitive factors in the PSI framework. Specifically, we focus on how cognitive moral development affects a person's propensity to engage in unethical behavior.

Individual-Level Determinate of Misconduct: Cognitive Moral Development

Cognitive moral development (CMD) is a stage theory developed to explain how individuals think or reason with regard to their interactions with their social environment (Kohlberg 1971, 1981). A person's moral development reflects the mind's organization of moral preferences. Kohlberg's theory argues that as an individual develops, they acquire more perspectives and techniques to use in relating to their environment. As a result, an individual's current level of moral reasoning includes problem-solving techniques learned in earlier stages. Thus, a person perceives an ethical issue, judges and behaves in accordance with the predominant socio-moral perspective learned through experience, education, and physical growth (Weber and Wasieleski 2001). Moral reasoning has been found to moderate the different stages of the basic ethical decision-making model (Treviño 1992; Warming-Rasmussen and Windsor 2003; Weber 1996). In addition, studies have shown that ethical behavior is greatly influenced by an individual's moral reasoning (Colby and Kohlberg 1987) and moral reasoning can be affected by numerous situational factors (Treviño 1986).

Kohlberg theorized that a person reasons predominantly at one of three levels—pre-conventional, conventional, or post-conventional. Individuals process information about a situation according to pre-existing mental structure or schemas. These schemas help interpret a person's environment. Among these structures are moral schemas, which organize information and stimuli related to moral issues (Narvaez and Bock 2002). The moral schemas are different at each moral development level. An antecedent to moral behavior is the reasoning process used to make a judgment and each level characterizes a distinct reasoning process in relation to one's environment. Thus, a person's decision to act in a certain manner will be affected by the stage of moral reasoning they utilize to make that decision.

Employees who reason at a pre-conventional level, and are only concerned with their own interests, will likely evaluate the organization's treatment of them based on the degree to which their interests are met, or to the degree to which they avoid punishment. An individual operating at this level is concerned only with the personal consequences associated with any action, or the instrumental benefit that can be obtained for the self.

At the conventional level, employees will likely look to others in their social group or consider laws and social norms when evaluating the degree to which the organization supports them. Thus, social reciprocity is driven in part by the specific environment surrounding the individual. Within this level, a person may be motivated by living up to the expectations of her peers, family, and social group or driven by a consistent set of codes and procedures. In organizations, employees reasoning at this level will be differentially sensitive to treatment by the organization, because of either the salience or the relevant social group or the societal law.

Individuals at the post-conventional level will likely consider the greater good or respect for universal human rights and perceptions of justice when evaluating the degree to which the organization fulfills their expectations of society. The socio-moral perspective associated with this reasoning goes beyond society in the sense that individuals using this schema will tend to use universal moral principles that maintain the social contract. These are principled reasoners. Post-conventional reasoners may view behaviors as acceptable if the organization is doing what is best for all. Employees with the highest levels of moral reasoning are more likely to perceive actions as morally acceptable if the behaviors allow the organization to better serve the collective good.

Higher stages of moral reasoning are thought to lead to more ethically desirable behavior (Ryan 2001). Those individuals who reason predominantly at the post-conventional level of reasoning utilize universal ethical norms and principles to form their attitudes and ultimately make decisions. Maintenance of the social contract is paramount to people reasoning at this level. Thus, the principles used to preserve the proper functioning of the implicit social contract with society are perceived as being critical to decision-making. To maintain mutually trusting relationships between two or more parties requires a respect for the other's human rights, which includes a right to fair treatment and honesty. If a person is partly basing his/her judgments on deontological principles, then it logically follows that individual is less likely to engage in behaviors that disregard or breach these principles, all other factors held constant. Indeed, in a recent review of the ethical decision-making literature, O'Fallon and Butterfield (2005) conclude that the extant empirical research generally supports a positive relationship between CMD (or ethical judgment) and ethical decision-making. Thus, it is expected that persons reasoning with principled moral schema would be less likely to behave unethically on a work task. Therefore, Hypothesis 1 states:

H1 The use of principled moral reasoning will be negatively associated with the incidence of ethical misconduct.

Situation-Level Determinate of Misconduct: Technology Capability

As discussed above, an individual's moral choices are explained, in part, by their level of moral development. Although CMD represents how a person actually thinks about a moral dilemma depending on the level of reasoning attained, "cognitions of right and wrong are not enough to explain or predict ethical decision-making behavior" (Treviño 1986, p. 602). Situational factors make up the other main determinant of ethical behavior. Thus, the context of the situation at hand affects how an individual will act (Weber and Wasieleski 2001). Similar to person-level determinates, however, the situation alone cannot predict behavior. Rather, behavior is contingent on the *interaction* between the personal psychological variables and the situation's effect on the person's decision-making process. In this research, we are interested in situations or contexts requiring the use of technology. In the paragraphs that follow, we develop theoretically grounded arguments for how the use of technology can be expected to affect behavior by affecting opportunity, increasing psychological distance, and as the result of a cultural lag or "gap" that develops between technology and the social norms that guide its use.

Opportunity

Perhaps, the most intuitively appealing explanation for why technology is likely to be associated with misconduct is one of increased opportunity. Theories of deviance have been used not only to explicate deviance that reaches the level of criminality but for many types of general deviance including academic misconduct and other types of rules violations (Smith 2000; Bolin 2004). In a study on attitudes of university students across the United States, Bolin (2004) found that when subjects perceived there being a clear opportunity to cheat, they were more likely to do so. This has implications for our study as technology may enhance opportunity for unethical behavior and misconduct.

Opportunity is a common construct in theories of deviance including the General Theory of Crime (GTC, Gottfredson and Hirschi 1990). According to the CTC, unacceptable behavior (or deviance) can only be expressed in the presence of an obvious opportunity. Moreover, such opportunities are "circumscribed by the potential of bringing immediate benefits, the ease of committing the act, and the absence of a high risk of detection" (Smith 2004, p. 549). Research has shown that opportunistic behavior is facilitated by technology itself (Chatterjee 2008) and that characteristics of the technology may act to enhance opportunity for wrong doing (Auer and Krupar 2001; Comas-Forgas and Sureda-Negre 2010; Rubin 1994). These characteristics are speed, anonymity, virtualization, and ease of use.

Several scholars cite the speed of technology (vis-à-vis more traditional methods) as being partially culpable for increases in misconduct such as plagiarism (Auer and Krupar 2001; Chester 2001; Fitzgerald 2002; Rubin 1994). This efficiency can "lead to carelessness in thought, carelessness in citing material, and ultimately to plagiarism" (Auer and Krupar 2001, p. 419). Indeed, popular press accounts of high-profile acts of plagiarism by respected scholars and journalists are often attributed to "sloppy" computer-based note-taking resulting in a loss of information regarding the source and extent of digitally copied material (Fitzgerald 2002).

A consistent finding in the studies of computer-mediated communication (CMC) is that the technology serves to increase the anonymity of users (Sproull and Kiesler 1986; Sussman and Sproull 1999). This increase in anonymity gives rise to behaviors that are often uncharacteristic and would be unlikely to occur in a more traditional face-to-face exchange (Sproull and Kiesler 1986). Judgments regarding one's anonymity are directly related to one's assessment of detection. That is, an increased sense of anonymity contributes to one's belief that deviant acts will go undetected and thus may increase occurrence (Comas-Forgas and Sureda-Negre 2010). Judgments regarding the likelihood of detection are a common factor cited in criminal, moral, and academic acts of deviance (Loch and Conger 1996; Hirschi and Gottfredson 1994; McCabe et al. 2001; Willard 1998). In addition, the speed with which acts can be carried out using technology increases their anonymity and decreases the chance of detection. If individuals believe the risk of being caught is low, they may be more willing to engage in the misconduct (Bolin 2004).

In several recent works examining digital plagiarism, researchers have found that digital technology increases the opportunity for ethical misconduct by removing nearly all physical barriers to locating and illicit copying of electronic materials (Auer and Krupar 2001; Comas-Forgas and Sureda-Negre 2010; Etter et al. 2006). This virtualization applies not only to the location of artifacts but to the artifacts themselves. For example, the virtualization of previously physical artifacts such as articles, books, CDs (music), DVDs (movies), etc. appear to give users a sense that items are in the public domain and not worthy of the same level of protection or treatment as their physical counterparts and are thus more likely to be misappropriated by users (Friedman 1997; Renard 1999).

Lastly, technical advances in user interface design, network bandwidth, and available content have effectively lowered the barriers to many types of technology-enabled activities—both good and bad (Anandarajan 2002). The opportunity afforded by the ease with which work activities can now be carried out is often cited as a contributing factor in the violations of security and acceptable use policies (Campbell 2010; Eastin et al. 2007; Venkatraman 2008). As noted by Rubin (1994), "It is very easy to be bad, when using information technologies" (p. 130).

Psychological Distance

Another explanation for why one might expect technology use to be associated with inappropriate behavior or rules violations lies in technologies ability to increase the sense of psychological distance between users and digital artifacts (Crowell et al. 2005; Oh et al. 2008). The effect of this distance may be explained using the Construal Level Theory (CLT) of psychological distance. CLT offers a rich conceptualization of psychological distance and its dimensions and has been shown to have a variety of important consequences for judgments and behaviors (Trope and Liberman 2010). CLT maintains that events and objects are perceived (construed) as either being more psychologically proximate or distant where the concept of psychological distance has several possible dimensions. Changes in construal level have been found for spatial, temporal, hypotheticality (i.e., probability of occurrence), and social distance. Relevant to this discussion is the social distance dimension.

A facet of social distance is a feeling of being alienated or separated from others, which often leads to behavior that violates established social norms (Postmes and Spears 1998). While research has shown that technology moderates the relationship between actual distance and psychological distance in computer-mediated environments (e.g., Internet-based video chats), there is evidence that technology when used in asynchronous ways (e.g., web browsing, music downloading, email, etc.) is associated with increased feelings of social distance (Oh et al. 2008). Computer-induced social distance appears to reduce one's ability to identify other individuals who may be affected by their actions resulting in more frequent antisocial and unethical behavior (Loch and Conger 1996). As noted by Jones (1991), ethical behavior is not viewed as morally imperative when the proximity of the victims of the behavior is reduced, either physically or psychologically. Thus, the distance between the act and the responsibility to act ethically is increased. For example, research has shown that CMC increases extreme and deregulated behavior such as flaming (hostile and insulting interaction) or flouting social and workplace conventions (Sproull and Kiesler 1986) and is more likely to be used to deliver bad news or negative feedback (Sussman and Sproull 1999). As a person's construal becomes more abstract, behaviors that are socially unacceptable, uncharacteristic, and often uninhibited become more likely (Fujita et al. 2006). Relatedly, Eyal et al. (2008) demonstrate that a more socially proximate construal of violations of general moral principles is judged as less objectionable than a more socially distant construal. Thus, the behaviors observed in the context of computer-mediated communication are consistent with a less "other-regarding" sensitivity and are indicative of a higher level of construal, which is characteristic of greater psychological distance.

Cultural Lag

That a lag exists between digital workplace technology and societal norms is consistent with Ogburn's theory of Cultural Lag (Ogburn 1966). A cultural lag is said to exist when material culture advances more rapidly than the non-material culture. Equipment and technologies are part of the material culture, whereas ethics, mores, and social norms are part of the non-material culture. The science relevant to material culture has historically advanced much more quickly in comparison with the social sciences. As noted by Brinkman and Brinkman (1997).

> "…a major source of cultural lag is that whereas the process of a science-fed technology prevails in the sector of material technology, it has as yet to be institutionalized and applied with a similar vigour in the realm of social technology. The result of which appears in the classic case of a cultural lag in which material technology advances exponentially and the social technics of control lag behind." (p. 617)

This lag can be thought of as a time period without social consensus on what constitutes the proper use of technology. During such time, guiding moral principles regarding its use are nascent or non-existent. Thus, individuals are left without guidance regarding unacceptable or unethical use of technology and are more likely to act in ways that are incompatible with socio-moral value systems. During such lags, a gap may exist between the technology and the ethics associated with its use (Marshall 1999).

Following from the discussion above, we contend that technology serves to increase the opportunity for misconduct while also increasing the psychological distance between actor and actions which is associated with increases unethical behavior. In addition, the pace with which innovation occurs has resulted in a gap between the technology and the ethics associated with its use. Therefore, Hypothesis 2a states:

H2a Information technology use will be positively associated with ethical misconduct.

Patterns of Technology Usage

Building on our first hypothesis, we contend that technology features have a cumulative effect on unethical behavior. Increases in ethical misconduct have been shown to run parallel to increases in the deployment, use, and capabilities of technology (Auer and Krupar 2001; Mann 2006). For example, the observed and reported increase in employee misconduct surrounding intellectual property has been associated with the newfound ease with which information can be transferred via technology (Auer and Krupar 2001). Moreover, it has long been thought that unethical behavior among individuals who use information technology "may be directly related to the characteristics of the technologies themselves" (Rubin 1994, p. 124). For example, it is easier to cut-and-paste information than it is to retype the material manually. Hence, the ease of information transfer may logically be expected to increase in the number of intellectual property breaches (Fass 1990). Thus, it can be argued that as IT capabilities evolve in an ever increasing effort to improve productivity, there is a simultaneous lowering of barriers to illicit uses of that same technology—uses that distort the original purpose.

It is generally accepted that information location and retrieval precede consumption (Leedy and Ormrod 2005). Research in the fields of human computer interaction and software engineering support that this pattern of behavior applies in an electronic context as well. Researchers studying how end users interact with an electronic clipboard through cut, copy, and paste actions found that use of the clipboard was often preceded by a "find" or "search" feature for specific words or phrases (Stolee et al. 2009). This search-copy-paste pattern of behavior has also been observed in the software engineering literature in a study examining how software programmers make use of electronic productivity features in the performance of their day-to-day activities (Kim et al. 2004). Following this logic, we might reasonably expect that features such as electronic search coupled with a copy-and-paste will be associated with higher levels of misappropriation of intellectual property than either search, or copy-and-paste features alone. Thus, following from the above discussion, we expect that more advanced technology features will be associated with more rule violations. Therefore, Hypothesis 2b states:

H2b Increased technical leverage afforded by escalating productivity features and ease of use will be associated with higher levels of ethical misconduct.

Interaction Effects of Determinates

As previously discussed, the PSI perspective advocates that neither individual-level factors nor situation-level factors alone can fully explain behavior. Relevant to the present case, research has shown that persons having higher levels of CMD are less susceptible to situational influences than those having lower levels of CMD (Treviño et al. 2006). This implies a differential impact of technology on misconduct conditioned on an individual's level of moral development.

One of the situational factors that affect decisions is the moral intensity construct (Jones 1991). Moral intensity refers to the perceived ethical severity of an issue. Thus, when an agent is faced with an issue with an ethical component, her decision-making process will be influenced by how *intense* she perceives the issue to be (McMahon and Harvey 2006). The moral intensity of an issue is determined by the characteristics of the issue itself. Jones and his colleagues identified elements of an issue that factor into how much of a moral imperative that issue has to the decision-maker. Intensity is affected by the *magnitude of consequences* to the victims of the act in question; the emotional or psychological *proximity* the decision-maker feels toward the victims of the act; the *probability* that the consequences predicted actually take place; and the amount of *social agreement* that a given group feels about the morality of the act in question. Empirically, moral intensity has been shown to moderate the entire ethical decision-making process (May and Pauli 2002). This construct is important for cognitive psychology because it has been found that the more intense a decision-maker perceives an issue, the more likely that agent will actively attempt to resolve the issue in an ethical manner (Carlson et al. 2002).

When the moral component of a situation is not readily salient to an individual, individual factors are muted. The greater the ambiguity of the ethical nature of a situation, the less likely ego strength will be an intervening factor in the individual's decision-making and behavior. When a situation is not perceived as being morally intense, then the person's moral convictions are less likely to be elicited. On the other hand, this moral ambiguity in a situation could lead to more field dependence in that individuals are more likely to look to referent others for behavioral guides. Due in part to the cultural lag associated with the adoption of information technologies, this moral ambiguity may be implicit in the situation and thus affect the perceptions of the severity of the issue. There may be no *social consensus* about the proper use of the technology, nor may people be aware of the *consequences* associated (positive or negative) with the use of the technology. There may also be a low level of perceived *proximity* to the people associated with the behavior, which also would lead us to believe that individuals may be more inclined to engage in unethical behavior. This last component of moral intensity relates to the psychological distance factor we outlined above.

Important to our study, moral intensity moderates an individual's cognitive moral reasoning (Weber 1996). The components of moral intensity "do not replace the traits of the decision-maker such as moral development, ego strength, field dependence, or locus of control…" (p. 6). Rather they interact with these individual traits to affect decision-making. In terms of moral reasoning, Weber found that economic issues or context evoke lower stages of moral reasoning than do life-and-death issues or contexts. The kind of harm to victims of an act does evoke different moral reasoning schemas. In our study, the use of technological productivity efficiency tools for performing work tasks does not create any physical harm to any known victims. Thus, higher stages of moral reasoning may not be induced.

Thus, we contend that cognitive features of the individual will interact with the availability of technological features in the situation to influence a person's behavior. We would expect that the influence of principled moral reasoning schemas would be less profound in limiting ethical misconduct in the presence of information technology features designed to improve productivity. Thus, Hypothesis 3 states:

H3 The relationship between principled moral reasoning and ethical misconduct will be negatively affected by the use of information technology features designed to improve productivity.

Methodology

To explore the relationship between cognitive moral development, technology, and rules in computer-based tasks, we used a mixed methods approach involving both subjective and objective measures (Tashakkori and Teddlie 1998). Our study involved (1) assessing participants' CMD and general technology knowledge and (2) measuring the degree of deviation from established rules regarding the treatment of copyrighted information during the completion of a computer-based exercise. Consistent with the installation of behavioral rules regarding the appropriate use of technology in organizations (such as Acceptable Use Polices, Information Security Policies, etc.) participants were (1) given multiple exposures to the rules and expectations regarding appropriate behavior in light of those rules, (2) given opportunity to demonstrate understanding of the rules (3) apprised of the consequences of rule violation (4) asked to acknowledge their acceptance of the rules and (5) essentially left on their own regarding compliance (See for example, Cavusoglu et al. 2004; Doherty and Fulford 2005; Myyry et al. 2009; Siponen and Vance 2010).

Participants

The participants used in this study were all first semester freshman business students at a private mid-Atlantic university. While there is a legitimate concern regarding the generalizability of results based on student samples, there is substantial evidence that business student conduct is a bellwether for future professional conduct (Atmeh and Al-Khadash 2008; Baldwin et al. 1996; Graves 2008; Klein et al. 2007; Lawson 2004; Nonis and Swift 2001; Sims 1993; Stevens 1984).

One hundred eighty-eight students from two sections of an introductory business course were randomly assigned to one of four unique technology conditions detailed below.

Table 1 Summary statistics

		Similarity index (SI)	Cognitive moral development (CMD)	Time on exercise (TOE)	Word count (WORDCNT)	Average IT literacy (TECHSAVY)	Age (AGE)
Overall sample	Mean	14.36	30.46	46.50	390.89	8.90	18.40
$N = 105$	Std	20.13	13.76	11.87	140.68	0.97	0.48
$N_{males} = 57$	Min	0.00	8.00	22.00	114.00	4.67	18
$N_{females} = 48$	Max	84.00	99.90	110.00	826.00	10.31	20
Search only technology condition (TC_s)	Mean	14.38	32.11	51.09	405.06	8.61	18.41
$N = 34$	Std	23.16	14.39	14.86	148.61	1.14	0.54
$N_{males} = 15$	Min	0.00	8.00	29.00	199.00	4.67	18
$N_{females} = 19$	Max	84.00	56.00	110.00	826.00	10.00	20
Copy–paste only technology condition (TC_{cp})	Mean	16.40	32.91	42.64	403.32	9.04	18.45
$N = 25$	Std	18.88	11.41	8.33	143.49	0.89	0.49
$N_{males} = 12$	Min	0.00	14.00	22.00	115.00	6.00	18
$N_{females} = 13$	Max	61.00	54.00	55.00	744.00	10.00	19
Copy–paste + search technology condition (TC_{cps})	Mean	23.41	23.43	45.23	399.59	9.18	18.31
$N = 22$	Std	21.87	8.68	10.98	143.94	0.76	0.45
$N_{males} = 15$	Min	0.00	10.00	30.00	218.00	7.67	18
$N_{females} = 7$	Max	77.00	44.00	70.00	720.00	10.00	19
Control condition (TC_{ctrl})	Mean	3.92	32.00	45.17	349.88	8.92	18.34
$N = 24$	Std	7.63	17.15	9.32	122.91	0.88	0.44
$N_{males} = 15$	Min	0.00	12.00	31.00	114.00	7.33	18
$N_{females} = 9$	Max	25.00	99.90	69.00	582.00	10.31	19

$N = 105$

Of the initial 188 participants, 34 failed to complete the session two instrument used to assess cognitive moral development. Of the remaining 154 participants, 21 were removed for failing the DIT2 instrument's basic internal consistency check. This check tests the validity of a response using a combination of 4 individual reliability checks. The checks are designed to detect random responses, excessive missing data, inordinate selection of meaningless (decoy) items and non-discrimination of answers (e.g., those you select the same scale response for all answers). A respondent's score is purged if the sum of the 4 individual reliability checks exceeds 200 (c.f., Rest et al. 1999b). Of the remaining 133 participants, 15 failed to submit a response document for similarity assessment. Of the 118 candidate response documents, 13 documents were identified during outlier analysis as being 4 or more standard deviations below the mean word count. Inspection of these outliers revealed a lack of good-faith-effort by the participant to complete the exercise resulting in removal from the sample. Thus, the final sample used in our analysis consists of 105 participants distributed across the four technology conditions. See Table 1 for details regarding the distribution of participants across conditions.

Procedures

To ensure participants were aware of the rules regarding the proper use and treatment of intellectual property in general and copyrighted material in particular, our data collection was timed to follow two pedagogical exercises, which reflected the customary method of rule introduction discussed above. The foremost exercise was completed 10 days prior to our experiment—the participants' completion of 5 one-hour information literacy modules taught as part of the university requirements. The objective of the literacy modules is to support the development of the requisite research skills needed to succeed at the university level. Relevant to this research, these five instructor-delivered modules specifically addressed the rules regarding the appropriate treatment of intellectual property and copyrighted material—with special emphasis placed on digital material.[1] In addition to the rules introduction and

[1] The research and information skills course covered the following 5 one-hour modules ending the week prior to our data collection. Information Ethics: Citing and Avoiding Plagiarism, Using Books for Research, Using Articles for Research (1), Using Articles for

training, all study participants were presented with the *University Student Code of Conduct* approximately 4 weeks prior to the experiment. Coverage of the code was delivered using a participatory style that involved numerous examples regarding both appropriate and inappropriate use and treatment of intellectual property and included ample opportunity for clarifying questions. Following the discussion, all students were asked to sign a pledge card that acknowledged (a) their understanding of the university academic integrity rules as outlined in the code and (b) their willingness to abide by those rules.

We examined our research questions using a between subjects design with data collection carried out over two sessions. The objective of the first session was to collect and measure rule violations in an in-laboratory exercise. The objective of second session was twofold—(1) gauge participants' cognitive moral development by assessing the degree to which they employed principled moral reasoning and (2) assess participants' proficiency with commonly used information technologies. All data collection was conducted in university computer laboratories containing identical hardware and software configurations.

To collect our measure of rule compliance under varying technology conditions, participants were randomly assigned to one of four unique technology capability conditions. Participants were instructed to access one of four specially constructed websites—one site for each technology condition. All participants were required to complete the same exercise; however, the technological capability of the website hosting the stimuli article was varied according to condition assignment. The exercise required participants read a short on-line article and submit an electronic response document containing essay responses to 4 article-related questions. The participants were allotted 75 min to complete the exercise. A pre-test of the exercise indicated that 75-min time constraint was not an impediment to completion. Lastly, response documents were reviewed and edited by one of the authors to remove inclusion of question text and any other extraneous data such as course number, assignment number, student names, etc. The reviewed documents were converted to plain text and analyzed for occurrences of rule violations.

For purposes of empirical control, we assessed participants' proficiency with commonly used information technology (such as word processors and Internet browsers) and technology features (such as text search and copy-and-paste) via a technology proficiency survey instrument. The technology proficiency instrument consists of 12 questions drawn from two existing technology proficiency surveys (Bunz 2004; Tesch et al. 2006). All questions used were directly related to the information technology required to complete the exercise.

Measures

Similarity

For the dependent variable in our study, we adopt a conservative measure of rule violation—the degree of *word-for-word* similarity between participants' responses to the exercise described above and the stimuli document. The measure of similarity between a response and stimuli document was calculated using software from two different originality checking software products—*Turnitin Originality Checking* Web published by iParadigm's, LLC (iParadigms 2010) and *WCopyFind* published by L.A. Bloomfield and the Physics Department at University of Virginia (Bloomfield 2010). Each program has a nearly identical objective. Viz., compare two documents and track the occurrence of word-for-word phrases between them. Both programs were configured to compare each response document in our sample against our control document to produce a measure of similarity referred to as a similarity index.

Specifically, a similarity index is the percentage of words in the response document that originate from word phrases that are an *exact* match to a phrase in the control document. For example, a 500-word response document containing 100 words that come from *identical phrases* in the control document would yield a similarity index of 20. Both programs were configured to detect and ignore all quoted text and to judge similarity based on identical word phrases.[2] A high level of reliability was achieved between the two programs' similarity index estimates (Cronbach's Alpha = 0.94; Krippendorff's Alpha = 0.87); therefore, an average of the two index scores was used in this research.

It is important to note that we make no attempt or claim to classify any particular level of similarity as misconduct per se; rather, our objective in this research is to examine the role of information technology as an enabler of similarity and thus by extension, misconduct.

Technology Condition

We operationalize the technology aspect of our research questions by varying the "amount" of technology available to participants for completion of the exercise. Our design

Footnote 1 continued
Research (2), Citing Tips and Tools, and Information Ethics: Copyright, Fair Use.

[2] For WCopyFind, the size of the word phrase is configurable parameter and was set to the control document's average sentence length measured in words.

makes use of one control and three technology groups. The technology conditions comprising the experimental conditions are none (i.e., the control condition—TC_0), search only (TC_s), copy-and-paste only (TC_{cp}), and copy-and-paste plus search (TC_{cps}). All participants received electronic access to the exercise by way of specially constructed web pages where the level of technology reflected their condition assignment.

Consistent with H2a, we expect the technology conditions (excluding the control condition) to be significant and positively associated with our measure of document similarity. Moreover, and consistent with hypothesis H2b, we expect that increased levels of technological capability will be associated with increased levels of document similarity. In addition, and consistent with H3, we expect the introduction of the technology conditions to negatively moderate the influence of cognitive moral development on similarity scores.

Cognitive Moral Development

We assess respondents' level of cognitive moral development using Rest et al.'s (1999a) Defining Issues Test, Version 2 (DIT2). Rest (1979, 1986) depicts the development of moral reasoning as distributional shifts where primitive forms of thinking about moral issues are replaced by more complex forms. Rest refers to these forms of thinking as moral schemas. The DIT2 is a device for activating moral schemas and provides measures of a respondent's use of moral reasoning schema. The DIT-2 is made up of 5 scenarios each framed as an ethical dilemma within varying contexts. After the presentation of each scenario, respondents are asked a closed-ended question regarding how they would act. Next, respondents are presented with 10 statements describing various motives for their decision as well as 2 irrelevant control statements. Using a 5-point Likert scale, respondents are asked to evaluate each statement in terms of its importance for making the decision. Once all 12 statements are rated, respondents are to list their top 4 preferred reasons for their decision from the list of 12. Once complete, responses are subject to a series of analyses designed to assess which moral schemas were evoked.

One DIT2 measure assesses respondents' use of a post-conventional schema (i.e., P-Score). The P-Score represents the percentage of times an individual selected arguments grounded in moral ideals and thus is reflective of the use of advanced or principled moral reasoning.(Andreoli and Lefkowitz 2009; Thoma 2006). The P-score is considered to be a reliable and consistent measure of the use of principled reasoning with Chronbach alpha scores commonly exceeding 0.80 (e.g., see Thoma 2006). Thus, consistent with H1, we expect higher levels of cognitive moral development—as measured by the P-Score—to be associated with *lower* levels of rule violation.

Control Variables

In addition to the measures of primary interest outlined above, we add several independent control variables that can logically be linked to additional unexplained variance in our model. These variables are age, gender, time spent working on the exercise, word size of the response document, and a measure of familiarity with common productivity applications and features.

Time on Exercise—An increased sense of urgency may be associated with a decrease in socially desirable behavior. For example, Bettman et al. (1998) found that under strict time constraints, individuals accelerate their mental processing and do not take into account depth of information. Normative strategies become more difficult in time-intense environments. While the 75-min time constraint was not an impediment to completing the exercise, we nevertheless control for the time on exercise (TOE) measured as the number of minutes between the beginning of the session and the electronic submission time-stamp of the response document. All other factors equal, we expect the time spent on exercise to be a proxy for thoroughness in preparation of the response document and thus to have a negative relationship with similarity.

Submission Size—We also control for the size of the submission measured as the number of words in the response document. Unlike time on exercise, an argument can be made for either a negative or positive association between word count and document similarity. If word count is positively and significantly correlated with time on exercise then a thoroughness argument can reasonably be made and we would expect a negative relationship with document similarity. If, however, word count is negatively correlated with time on exercise then we might infer that the inflated word count reflects that "shortcuts" were taken and we would expect a positive relationship with document similarity.

Technology Proficiency—Participants who are more familiar with technology may have a skills-based advantage for higher levels of technology use (Lazonder et al. 2000). In our context, this may translate in a propensity to use the technology available to them to the fullest extent possible. To account for the possibility that a disparity in technical ability plays a part in the final similarity scores, we control for technological experience using the average score on the technology skills instrument previously discussed.

Gender—Studies of technology adoption and usage frequently indicate the existence of a gender gap (Jeyaraj et al. 2006). While the role of gender in studies of moral development do not reveal any stage differences between men and women (Rest et al. 1999a; Weber and Wasieleski 2001), we nonetheless control for gender.

Age—Like gender, studies of technology adoption and usage frequently indicate the existence of a gender gap (Morris et al. 2005). In addition, age has also been shown to play a significant role in moral development (Rest et al. 1999a), thus we also control for participants' age.

Description of Sample

Table 1 shows the descriptive statistics for our overall sample and for each of the four technology condition subsamples. The average similarity index indicates that 14% of the words in a submitted response document are composed from word phrases that match a word phrase in the control document. Consistent with the arguments laid out above, we note that the group means for similarity are increasing in technology condition with the greatest and most significant difference appearing between the means of copy-and-search and the control conditions ($p < 0.001$).

Table 2 shows the bivariate correlations for our model variables. Overall, there are no indications of colinearity among our independent variables and the correlations between the dependent and independent variables are in expected direction. The relationship between our non-control technology conditions and the response document similarity are positive. Moreover, the strength of association between the dependent variable (similarity) and each of the technology conditions follows the predicted trend with the control group (TC_0) displaying a negative correlation and the copy-and-paste plus search group (TC_{cps}) displaying the highest positive correlation. Also as hypothesized, our measure of the use of a principled moral reasoning is negatively correlated with response document similarity.

Empirical Models

To assess our hypotheses, we develop and test several models designed to evaluate the relationships among our measure of rule violation (similarity), cognitive moral development (P-Score) and technology. As the inclusion of multiplicative terms fundamentally alters the interpretation of main effects involved in the interactions, we conducted our analysis using a nested model approach (Brambor et al. 2006). First, we estimated a simple effects only model to explicate the mean effects of CMD and technology condition on similarity. Next, to assess how technology condition differentially impacts similarity (our moderation hypothesis), we extend our base model to include interaction terms involving cognitive moral development and technology condition. Lastly, following the discussion of

Table 2 Correlation table

Variable	Label	SI	MR	TC_s	TC_{cp}	TC_{cps}	TC_{ctrl}	TOE	WORDCNT	TECHSAVY	TECH	Gender	Age
SI	Similarity index	1.00	−0.22	0.06	0.00	0.23	−0.28	0.02	−0.14	0.19	0.28	0.04	−0.08
CMD	Cognitive moral development		1.00	0.10	0.08	−0.26	0.06	0.17	0.12	−0.11	−0.06	0.12	0.09
TC_s	Search only technology condition			1.00	−0.39	−0.29	−0.30	−0.18	0.05	0.12	0.30	0.09	0.08
TC_{cp}	Copy–paste only technology condition				1.00	−0.36	−0.38	0.27	0.07	−0.20	0.38	0.13	0.04
TC_{cps}	Copy–paste + search technology condition					1.00	−0.28	−0.06	0.03	0.11	0.28	−0.17	−0.08
TC_{ctrl}	Control condition						1.00	−0.06	−0.16	−0.01	−1.00	−0.07	−0.05
TOE	Time on exercise							1.00	0.27	−0.08	0.06	0.06	−0.08
WORDCNT	Word count								1.00	0.08	0.16	0.11	0.14
TECHSAVY	IT skills									1.00	0.01	0.07	−0.13
TECH	Average IT literacy										1.00	0.07	0.05
Gender	Gender											1.00	−0.13
Age	Age												1.00

$N = 105$

our primary results, we estimate a series of hazard models designed to explore the robustness and boundaries of our results.

Base Regression Model

We assess the relationship between document similarity, technology, and moral development by means of multiple regression using a model having the following functional form:

$$\begin{aligned}\mathrm{SI}_i = \beta_0 + \beta_1\mathrm{CMD}_i + \beta_{2-4}\mathrm{COND}_{ji} + \beta_5\mathrm{GENDER}_i \\ + \beta_6\mathrm{TOE}_i + \beta_7\mathrm{WORDCNT}_i + \beta_8\mathrm{TECHSAVY}_i \\ + \beta_9\mathrm{AGE}_i + \varepsilon_i. \qquad (1)\end{aligned}$$

where the dependent variable SI is the measure of similarity between the response document for participant i and the control document. Of principal interest, our focal variables are CMD and COND. CMD_i is a measure of respondent i's use of principled moral reasoning (i.e., P-Score). COND_{ji} is the jth technology condition to which respondent i has been assigned. For model estimation, COND enters the model as three reference-coded dummy variables where the control group serves as the reference group. The technology conditions used in this research are none (i.e., the control condition—TC_0), search only capability (TC_s), copy-and-paste only capability (TC_{cp}), and copy-and-paste plus search capabilities (TC_{cps}). The remaining independent variables are the control variables previously discussed—time on exercise (TOE), word count (WORDCNT), technology proficiency (TECHSAVY), gender (GENDER), and age (AGE).

Extended Regression Model

To test our moderation hypothesis, we extend the model in Eq. 1 with CMD and COND interaction terms. Thus, we estimate a model having the following functional form:

$$\begin{aligned}\mathrm{SI}_i = \beta_0 + \beta_1\mathrm{CMD}_i + \beta_{2-4}\mathrm{COND}_{ji} + \beta_5\mathrm{GENDER}_i \\ + \beta_6\mathrm{TOE}_i + \beta_7\mathrm{WORDCNT}_i + \beta_8\mathrm{TECHSAVY}_i \\ + \beta_9\mathrm{AGE}_i + \beta_{10-12}\{\mathrm{CMD}_i \times \mathrm{COND}_{ji}\} + \varepsilon_i. \qquad (2)\end{aligned}$$

where the interaction terms {CMD × COND} are added to the model and reflect the person–situation interactionist perspective taken by this research. The interactions enter the model as the product of CMD and each of the true technology condition dummy variables (i.e., TC_s, TC_{cp}, TC_{cps}). All other Eq. 2 variables are unchanged from Eq. 1.

Variable Transformations

To account for a moderate degree of skewness in the similarity index measure, we applied a natural log transformation prior to the estimation of both models. In addition, to facilitate interpretation of our results as the overall average effect of cognitive moral development and technology condition on document similarity, we mean center all continuous independent variables and use an effects-coding scheme for gender. These transformations allow the coefficient for each of the base model technology condition dummy variables to represent the estimated mean similarity index difference between that condition and the control group when all other regressors are equal to their sample means. In the extended model, the coefficients on the CMD–COND interactions indicate how these mean differences change given a one-unit increase in CMD (Hardy 1993).

Results

Table 3 reports the results from the estimation of four nested regression models following from Eqs. 1 and 2 above. Overall, the estimation of both Eqs. 1 and 2 results in a good fit to the data with adjusted R^2s exceeding 20 and 30%, respectively. In addition, standard tests for multicollinearity revealed no significant problems for our regression models with all variance inflation factors below 3.1 and all intercept adjusted condition indices less than 3.7. We tested our extended model for homoscedastic error terms values using white's test for heteroscedasticity. No evidence of heteroscedasticity was indicated in our results as we fail to reject the null hypothesis of homoscedastic errors ($X^2_{(65)} = 71.57$; $p > 0.05$). Lastly, to eliminate concerns of common method bias in our data, we performed Harman's single-factor test (Podsakoff et al. 2003). We conclude common method bias is not an issue in our data, as results of the test reject the single common factor hypothesis ($X^2_{(28)} = 50$, $p < 0.01$).

Base Regression Model Results

The results of the estimation of Eq. 1 are shown in Table 3 columns 1 through 3. Each column reflects the estimation results from an increasingly complex model. This approach allows us to appraise whether a significant improvement in model fit is achieved through the addition of the explanatory variables. Column 1 reflects the results of a model compromised of only the control variables resulting in poor fit to the data ($F = 0.82$, $p > 0.05$). Column 2 shows the results from the next model estimation—one that adds CMD. Unlike the previous model, the overall model fit to the data is significant ($F = 2.67$, $p < 0.05$) explaining over 9% of the variance ($R^2 = 9.2\%$). Thus, the addition of CMD has significantly improved the model performance

Table 3 Regression results

Variable	Coefficient	Description	Column 1	Column 2	Column 3	Column 4
Intercept	B_0	Intercept	−0.205	−1.6798	−2.5463	−3.8522
			(6.5775)	(6.458)	(6.2013)	(5.9568)
Gender	B_5	Gender	0.0948	0.1443	0.1665	0.2043
			(0.1703)	(0.1677)	(0.1639)	(0.1592)
TOE	B_6	Time on exercise	0.0085	0.0133	0.018	0.0269
			(0.0148)	(0.0146)	(0.0145)	(0.0141)
WORDCNT	B_7	Word count	−0.0013	−0.0012	−0.0018	−0.0017
			(0.0013)	(0.0012)	(0.0012)	(0.0012)
TECHSAVY	B_8	IT skills	0.3099	0.2681	0.2101	0.2383
			(0.1774)	(0.1742)	(0.1696)	(0.1618)
AGE	B_9	Age in years	0.0931	0.1739	0.1763	0.2458
			(0.3577)	(0.3513)	(0.3377)	(0.3245)
CMD	B_1	Cognitive moral development (P-score)		−0.0291	−0.0232	0.0053
				(0.0123)*	(0.0111)*	(0.0185)
TC_s	B_2	Search condition			0.6494	0.6703
					(0.4392)	(0.4172)
TC_{cp}	B_3	Copy–paste condition			1.2441	1.4427
					(0.4648)**	(0.4469)**
TC_{cps}	B_4	Copy–paste + search condition			1.5544	2.1794
					(0.4863)**	(0.5247)***
$TC_s \times$ CMD	B_{10}	Cognitive moral development—search condition interaction				−0.052
						(0.0252)*
$TC_{cp} \times$ CMD	B_{11}	Cognitive moral development—copy-paste condition interaction				−0.0909
						(0.0331)**
$TC_{cps} \times$ CMD	B_{12}	Cognitive moral development—search + copy condition interaction				0.0551
						(0.0428)
Adjusted R^2			3.98%	9.22%	19.71%	30.12%
F-Statistic overall model fit			0.82	2.67*	2.59*	3.30***
F-Statistic for change in R-square from previous column				5.65*	4.14**	4.57**

*, **, *** represent *p*-values < 0.05, < 0.01, and < 0.001, respectively. Dependent variable is natural log of response document similarity index. Continuous predictor variables are grand-mean centered. Gender is effects-coded. $N = 105$

compared with model 1 ($F = 5.65$, $p < 0.05$). Column 3 shows the results from adding the COND dummy variables TC_s, TC_{cp}, and TC_{cps} and thereby completing the Eq. 1 model. The addition of the COND dummies results in a significant improvement in model performance over the previous model ($F = 4.14$, $p < 0.01$) explaining nearly 20% of the variance in similarity ($R^2 = 19.71\%$). In the following paragraphs, we interpret the coefficients on our explanatory variables in terms of their influence on document similarity.

Cognitive Moral Development

The CMD coefficient in column 3 reflects the effect of CMD on similarity after controlling for the remaining covariates. As our model is a log-linear, we can interpret a one-unit change in continuous predictor variable coefficients as a 1% change in similarity. Thus, in support of H1, the CMD coefficient is negative and significant indicating that that a one-unit increase in CMD is associated with a 2.3% average *decrease* in similarity ($\beta_1 = 0.2323$, $p < 0.05$).

Technology Condition

The intercept coefficient represents the predicted log similarity for TC_0 (our control group) when all covariates are zero ($\beta_0 = 2.5463$, $p > 0.05$). Note that since we grand-mean centered all predictors prior to estimation, a value of zero corresponds to the mean values. Thus, at the mean value of CMD, there is no significant association between the control group and similarity. The remaining COND coefficients represent the change in similarity between each of the remaining technology condition groups and TC_0.

The TC_s coefficient is not significant ($\beta_2 = 0.6494$, $p > 0.05$) indicating no significant difference exists between the search condition and the control. The two remaining COND coefficients, however, are both positive and significant. The TC_{cp} coefficient is associated with a 246% increase ([100*($e^{1.2440}$−1)]) in similarity over the control condition ($\beta_3 = 1.2440$, $p < 0.01$).[3] Similarly, the TC_{cps} coefficient is associated with a 373% increase ([100*($e^{1.5544}$−1)]) in similarity over the control condition ($\beta_4 = 1.5544$, $p < 0.01$). Thus, overall, H2a is supported as the addition of the COND dummies results in a significant improvement in model performance over the previous model ($F = 4.14$, $p < 0.01$) and all coefficients are associated with an increase in document similarity.

As test of H2b, we conduct a Jonckheere-Terpstra test for ordered differences among classes. In the present case, H2b requires a test that the distribution of the document similarity across technology classes represents *ascending* class differences. Specifically, we test that for the four technology conditions, similarity will follow the trend $SI_{ctrl} < SI_s < SI_{cp} < SI_{cps}$. Test results support the hypothesized trend as a positive standardized J-T statistic supports a trend of ascending median values for document similarity across the ordered technology conditions. (Std. J-T = 5.53, $p < 0.001$).

Control Variables

Examination of the control variable coefficients reveals that none of the predictors is significantly associated with similarity. Recall that gender is effects-coded, thus the unweighted *average* effect of gender is not significant ($\beta_5 = 0.1665$, $p > 0.05$). While the TOE coefficient is positive and in conflict with our expectations regarding sign, the coefficient fails to achieve significance ($\beta_6 = 0.0180$, $p > 0.05$). Considering the positive correlation between WORDCNT and TOE, we expected a positive association between WORDCNT and similarity. Contrary to our expectations, however, the coefficient is negative although not significant ($\beta_7 = -0.0018$, $p > 0.05$). For participants well versed in the use of the technologies used in this study, we expected a positive association with similarity. While the TECHSAVY coefficient is positive, it also fails to achieve significance ($\beta_8 = 0.21005$, $p > 0.05$). Lastly, while age is often a significant predictor variable in studies of technology use and moral development, we find no effect of age on similarity in our data ($\beta_9 = 0.1763$, $p > 0.05$). Next, we examine the results from the estimation of our Eq. 2—our extended model.

[3] In a semi-logarithmic regression equation, the percentage impact of a dichotomous variable coefficient on the dependent variable is calculated as 100 (e^{β} − 1) (Halvorsen and Palmquist 1980).

Extended Regression Model Results

Column 4 of Table 3 shows the results from adding the CMD–COND interactions to the Eq. 1 model. The addition of the interactions results in a significant improvement in model performance over the Eq. 1 model ($F = 4.57$, $p < 0.01$) explaining over 30% of the variance in similarity ($R^2 = 30.12\%$). Thus, the interaction effect alone accounts for approximately 10% of the variance in similarity. Our purpose in the following paragraphs is to assess the relationship between the interaction terms and similarity. First, however, we will clarify differences in interpretation of our focal variables due to the inclusion of the interaction terms.

In the estimation of Eq. 2, the interpretation of the coefficient on CMD is now conditioned upon technology condition assignment (Friedrich 1982). Thus, unlike column 3, the CMD coefficient in column 4 reflects the effect of CMD on similarity when all COND dummy variables are zero; i.e., for the control group alone. Next, note that differences in COND coefficients between columns 3 and 4 reflect that a portion of the interaction variance was attributed to lower order items in the estimation of Eq. 1. As in Eq. 1, however, all COND dummies continue to reflect the estimated mean similarity difference between participants assigned to a true technology condition and participants assigned to the control condition when CMD equals the value of its sample mean. As the substantive interpretation of the COND coefficients is unchanged from the estimation of Eq. 2, the COND coefficients will not be discussed.

CMD–COND Interactions

Recall that the mean differences in similarity between the COND dummy variables (TC_s, TC_{cp}, and TC_{cps}) and the control condition (TC_0) are reflected in the COND dummy coefficients (β_2, β_3, and β_4). The interaction coefficients (β_{10-12}) reflect how these mean differences change given a one-unit increase in CMD. In support of H3, both interaction coefficients for the TC_s and TC_{cp} conditions are negative and significant. Thus, as compared to TC_0, respondents in these technology conditions experience a decrease in similarity of roughly 5 and 9%, respectively, per a one-unit increase in CMD ($\beta_{10} = -0.0520$, $p < 0.05$; $\beta_{11} = -0.0909$, $p < 0.01$) In contrast, the TC_{cps} coefficient is not significant indicating that changes in CMD for this group have trajectory similar to the control condition. Indeed, post hoc tests reveal that the TC_{cps} coefficient differs significantly from both the TC_s and TC_{cp} coefficients ($t = 2.49$, $p < 0.05$ and $t = 3.09$, $p < 0.01$, respectively).

As previously discussed, the addition of the interaction effects results in a significant improvement to the overall fit of model and thus lends support H3. Similarly, the interactions involving TC_s and TC_{cp} are negative and significant indicating an increase in CMD decreases similarity for both conditions. Lastly, as more formal test of H3, we implement an orthogonal planned contrast to assess the direction and strength of the average effect of the interactions. Specifically, we test the contrast $(\beta_{10} + \beta_{11} + \beta_{12})/3 = 0$. While the contrasts value is in the hypothesized direction (negative), it is not significant (-0.0293, $t = 1.16$, $p > 0.05$). Thus, on balance, we conclude H3 is partially supported for our data.

Robustness Analysis

The objective of the analysis presented in this section is to demonstrate that the general relationships among similarity, cognitive moral development, and technology condition exhibited in the regression model are robust across a range of similarity scenarios. As previously stated, there is no universal agreement as to what level of similarity constitutes misconduct. Thus, the analysis described in this section is designed to assess the relative likelihood of belonging to a similarity index group (a dichotomous conclusion) where the group membership is defined by similarity index scores that range from 0 to 50 by 5 point increments.[4] We estimate the following model for each similarity index score in that range:

$$\begin{aligned} \mathrm{GRMEMB}_{ij} = {} & \beta_0 + \beta_1\mathrm{CMD}_i + \beta_2\mathrm{TECH}_{ji} + \beta_3\mathrm{GENDER}_i \\ & + \beta_4\mathrm{TOE}_i + \beta_5\mathrm{WORDCNT}_i \\ & + \beta_6\mathrm{TECHSAVY}_i + \beta_7\mathrm{AGE}_i + \varepsilon_i. \end{aligned} \quad (3)$$

The dependent variable (GRMEMB_{ij}) is a dichotomy representing membership (or not) of respondent i in the current similarity index group j determined by the current cutoff value where j varies from 0 to 50 by 5. In addition, we make a conservative simplification of the technology conditions (TECH) by assigning all respondents not in the control group to single technology condition where “1” indicates membership in any of the technology conditions and “0” indicates otherwise. The remaining variables remain unchanged from Eq. 1.

The desired information from the estimation of this model is an assessment of the *likelihood* that a participant will belong to a similarity index group conditioned on their use of a principled moral reasoning and technology condition. We use logistic regression to estimate the relative risk of group membership for each of the similarity index groups (Zou 2004). Recall that by increasing the similarity cutoff required for membership, group membership is re-defined for each estimation. All else being equal, we expect CMD to be associated with the decreased likelihood of group membership as the similarity cutoffs increase. Conversely, as the similarity cutoffs increase, we expect membership in the technology condition to be associated with an increasing likelihood for group membership.

Relative Risk Results

The relative risk results from a logistic regression are show in Table 4. Successive columns show the results for each newly formed similarity index group. Column 1 represents the initial condition of the group formed by response documents having a similarity score of zero. To clarify, responses forming this group contain *no word* phrases that come from an identical phrase in the control document. The remaining columns represent the results for similarity index groups constructed using a 5-point increase in the similarity index cutoff from the prior group.

Consistent with expectations, the results in column 1 show that respondents demonstrating higher CMD are *more* likely to belong to Group_0—the group with no similarity. Specifically, higher CMD is associated with a modest 1.2% $[(e^{0.0119}-1)*100]$ *increase* in the “risk” or likelihood of belonging to this group (*RR*: 1.012, $p < 0.05$). The technology condition, however, is associated with a 36% *decrease* in the likelihood of belonging to this group (*RR*: 0.6365, $p < 0.05$). As the groups are formed by increasing the level of similarity, the results in column 1 are reversed. That is, the relative risk of group membership is decreasing for higher CMD and increasing for the technology group. This trend reaches its highest point for the 20% similarity group. For the group formed by respondents having a similarity index of 20% or higher, increased CMD values *decrease* the risk of belonging to this group by roughly 3% (*RR*: 0.9756, $p < 0.05$), while respondents in the technology condition are nearly 877% more likely to belong to this group than respondents in the control condition (*RR*: 9.7691, $p < 0.05$).

Interestingly, once we reach a group constructed of responses with a similarity index of 30 or higher, two observations can be made. First, CMD ceases to be a significant predictor of group membership. Second, there are *no* control group subjects remaining in this group. Thus, the relative risk for the technology condition cannot be assessed relative to the control. That is, of the 21 response documents having a similarity index of 30 or above (approximately 20% of all responses) *all* 21 were assigned to one of the technology conditions. We view this as strong evidence of the significant role of technology in enabling violation of the rules.

[4] We selected the 50 cutoff as a reasonable value where most people would feel a certain level of unease with integrity of the submission. Recall that a similarity index of 50 means that 50% of the content of response document is copied from the control document.

Table 4 Relative risk analysis

Variable	Description	Similarity index group 0	Similarity index group 5	Similarity index group 10	Similarity index group 15	Similarity index group 20	Similarity index group 25	Similarity index group 30
Intercept	Intercept	2.0772	−4.1771	−4.1771	−3.9757	−4.6377	−5.272	7.6307
		(3.8065)	(4.2113)	(4.2113)	(4.7946)	(5.1164)	(5.8733)	(9.3452)
CMD	Cognitive moral development	0.0119	−0.0203	−0.0203	−0.0216	−0.0247	−0.0275	−0.0125
		(0.0052)*	(0.0091)*	(0.0091)*	(0.0104)*	(0.0115)*	(0.0138)*	(0.0189)
TECH	Technology condition	−0.4517	0.8717	0.8717	0.7339	2.2792	2.124	−0.1689
		(0.1818)*	(0.4168)*	(0.4168)*	(0.4261)	(0.9904)*	(0.9936)*	(0.0888)
Gender	Gender	−0.0794	0.0614	0.0614	0.1065	0.0509	0.0773	0.265
		(0.0945)	(0.1042)	(0.1042)	(0.12)	(0.1304)	(0.148)	(0.1921)
TOE	Time on exercise	−0.0082	0.0057	0.0057	0.0044	0.0039	0.0085	0.0003
		(0.009)	(0.008)	(0.008)	(0.0096)	(0.0111)	(0.0105)	(0.022)
WORDCNT	Word count	0.0005	−0.001	−0.001	−0.0016	−0.0022	−0.0031	−0.0033
		(0.0006)	(0.0008)	(0.0008)	(0.0009)	(0.0011)*	(0.0012)**	(0.0016)*
TECHSAVY	Average IT literacy	−0.1211	0.1973	0.1973	0.2327	0.3239	0.3883	0.3696
		(0.0795)	(0.127)	(0.127)	(0.1543)	(0.169)	(0.2046)	(0.2706)
AGE	Age	−0.1316	0.1387	0.1387	0.1257	0.0696	0.1002	−0.4609
		(0.2079)	(0.2297)	(0.2297)	(0.2618)	(0.2933)	(0.3358)	(0.5145)
RR: MR	Increased risk from CMD on being in SI group	1.20%*	−2.01%*	−2.01%*	−2.14%*	−2.44%*	−2.71%*	−1.24%***
RR: TECH	Increased risk from TECH on being in SI group	−36.35%*	139.10%*	139.10%*	108.32%	876.89%*	736.45%	N/A

*, **, *** represent p-values < 0.05, < 0.01, and < 0.001, respectively. Dependent variable is dichotomy indicating membership in the similarity index group formed by the cutoff values 0 through 30. Continuous predictor variables are grand-mean centered. Gender is effects-coded. Similarity index groups are identical for cutoff values 5 and 10. $N = 105$

Discussion

We believe our study provides evidence of an additional and significant contributing factor to workplace misconduct—computer technology commonly used to improve workplace productivity. The research presented here explores the relationship between cognitive moral development, productivity features of information technology and ethical misconduct. To summarize our results, we conclude that *both* cognitive moral development and the level of technology at one's disposal have a significant role to play in explaining our measure of misconduct (i.e., document similarity). In support of H1, we find that the use of a more principled moral reasoning schema (i.e., CMD) is negatively associated with document similarity. Respondents who employ more principled moral reasoning are associated with roughly a 2.3% *decrease* in similarity scores. In support of H2a, technology condition is shown to add significant explanatory power to our model. The positive coefficients on each of the technology condition dummy variables are consistent with the idea that increased levels of technological capability are associated with increased levels of misconduct. Depending on the level of technology, increases in similarity scores over a control group are shown to exceed 370%. In support of H2b, we find that as the technical capabilities that are available increase there is a corresponding increase in the level of observed misconduct. Lastly, we found partial support for H3. There seems to be a moderate negative effect of an individual's CMD on document similarity.

As a robustness test, we conducted a series of hazard analyses designed to assess the relative likelihood of belonging to a similarity index group where the group membership is defined by attaining a predefined level of similarity index scores. Consistent with our regression analysis, our results support our claim that higher levels of CMD are associated with the increased likelihood of belonging to the similarity group where document similarity is zero. Likewise, higher levels of CMD result in an approximately 3% decrease in the likelihood of belonging to the similarity group where document similarity is nonzero. Conversely, respondents assigned to any of our technology conditions are less likely to belong to the similarity group where document similarity is zero and up to 8 times more likely to belong to similarity groups where document similarity is non-zero.

Our study also examines the effects of an individual's cognitive moral development on a computer-based task. Our results support the notion that moral development has a role to play in this new and still evolving context. Thus, our findings add additional support to the extant literature supporting a link between CMD and moral behavior. Given the near ubiquitous presence of technology in the workplace, this finding is important as research shows CMD is an ongoing, lifelong, teachable "skill" (King and Mayhew 2002) hence instruction aimed at advancing moral development should be able to be successfully be adapted to accommodate thinking about the role of technology. Moreover, as previously discussed, the pace of technological development suggests a flexible or adaptive approach to moral instruction needs to be taken. Such an approach must embrace the inevitable evolution of technology by focusing on developing enduring moral reasoning "skills"—skills that can be applied and adapted in new and unforeseen contexts.

Using a research design that randomly assigned subjects in one of four unique technology conditions, this study is the first to assess the role of a technology context as a facilitator of misconduct in an experimental setting. Interestingly, one implication of our findings is that a comprehensive understanding of how these unethical behaviors are facilitated by technology may aid in the development of technology to combat future abuses (Lessig 2000). As a particularly relevant example, both of the software tools used to calculate our measure of misconduct (document similarity) were authored in response to increases in the occurrences of academic plagiarism and the authors desire to curtail this type of behavior (e.g., see Bloomfield 2010). Anecdotal evidence indicating awareness of role of technology as a facilitator of various types of workplace misconduct is evidenced by an increasing number of popular press articles (e.g., see Malachowski 2005; Needleman 2010) and subjective research studies (e.g., see Anandarajan 2002; Lim 2002) exploring the topic.

It is commonly understood that individuals' perceptions of moral and immoral actions are influenced by situational factors (Jones 1991; Treviño et al. 2006). The PSI perspective suggests that individual and situational factors combine to affect the likelihood of ethical misconduct. Ours is the first study to explore the combined effects of CMD (as the individual factor), technology condition (as the situational factor) and their interaction in a computer-based task. Our study provides support for the interaction between technological tools and individuals' CMD. Research on ethical leadership often concludes that it is critical for organizations to ensure that persons of dubious moral character are not placed in positions of authority over other employees (Edmondson 2010; Resick et al. 2006). Our results suggest that the influence of moral character on behavior varies significantly even on basic computer-aided work tasks. Employees with relatively low moral character may indeed be more likely to break rules in this context as well.

Practical Implications

With the findings offered from this study, we hope the moral hazard facilitated by technologies can be minimized in the workplace by providing a better understanding of employees' tendencies when placed in situations with technology enhanced work tools. If managers are provided the knowledge that certain IT productivity tools can have an unwanted effect on employees' behavior, then new monitoring devices could be designed to control for unethical use of those computer tools. The Brookings Institution has recently recommended that companies devise methods to better monitor employees' behavior with new technologies in the workplace. The idea is that if employees are aware they are being watched and the integrity of their work is being tracked, they will be less likely to violate rules (Graham et al. 2002). Indeed, it may be recommended that companies install similarity measuring software on their employees' computers to identify when this sort of ethical misconduct occurs.

For organizations, another implication of our findings linking technology to misconduct are related to ethics training, workplace and job design, and the possible adoption of software designed to monitor and thus deter some types of technology-enabled misconduct. As previously mentioned, it is imperative the ethics training incorporate considerations for technology. Not only should such training endeavor to instill enduring moral reasoning skills, where possible, training must also provide clearly defined consequences for violations. Where possible, office design should encourage compliance with standard acceptable use policies for technology by creating workspaces that are "transparent" or open in nature so as to encourage cooperation and discourage technology abetted production deviance. Interestingly, many organizations are moving to adopt technology tools to combat this technology problem as evidenced by the burgeoning market for monitoring software (IDC 2005). While such tools are likely to have some success, there is evidence that such monitoring may be counterproductive causing resentment and dissatisfaction among employees (Meckbach 1998).

Future Work, Limitations and Conclusions

Recent research on moral judgment concludes that such judgment is driven by schema activation. "If schemas are more likely to be triggered under certain circumstances, it is possible that work settings depress the triggering of moral judgment processes" (Treviño et al. 2006, p. 956). As we know, modern work settings are characterized by technological advances designed to improve productivity and accuracy. Future thinking in this area should acknowledge the possibility that technology can actually act as a "depressor" or inhibitor of the activation of moral schemas.

Future research should also examine the extent to which deviance with technology tools is due to ethical impulse (see Moore and Lowenstein 2004). Our study assumes a more methodical, rational "ethical calculus perspective" on ethical decision-making (Treviño 1986), which assumes a step process toward cognitive processing. However, it is possible that what we discovered in our study was due to a more automatic process related to impulse. Perhaps our participants had been in similar situations before with the work tasks, and merely matched their current situation with a prototype (Kish-Gephart et al. 2010). With this explanation, "employees would default to a more automatic type of processing unless something in the situation, such as novelty" causes a more systematic and active processing (p. 22). Furthermore, to the extent that certain unethical behaviors are more automatic, future research should examine how individuals might engage in impulse control. For example, Tice et al. (2007) found that undergraduates were more likely to cheat after completing an earlier activity that required high amounts of self-control. This is consistent with the conception of ego depletion described by Baumeister and colleagues (see Baumeister et al. 2000, 2007; Baumeister and Vohs 2004). This research posits that self-control is a limited resource that can be reduced or partially exhausted in the short term after it is used. Therefore, certain characteristics of an organizational or task environment may "test" an employee's ability or motivation to engage in highly calculative ethical processing. Similarly, Hofmann et al. (2009) theorized that some high self-control trait individuals appear to be better at impulse control than others, suggesting that individual differences related to self-regulation may contribute to researchers' understanding of how to prevent the more impulsive types of unethical behavior (Kish-Gephart et al. 2010).

Despite the unique experimental design of our study, we must acknowledge its limitations. We realize that by using first-year business majors as our sample, we have exposed our study to limited external validity. We must consider if we would get similar results if we had used a different pool of subjects either from another university, or if we examined the general public. While one might assume that similar rates of misconduct would be generalizable as the technologies we discuss are commonplace, we acknowledge that we cannot make a definitive conclusion. We suggest that the generalizability of the results obtained from our sample should be verified on other populations. Relatedly, a field experiment designed to understand the influence of technology in an actual workplace setting should be pursued. While our experiment does objectively measure misconduct, research shows that there are often differences between a person's theoretical moral reasoning and the moral reasoning in an actual work setting (Weber and Gillespie 1998). By observing actual behaviors, it is quite possible that different conclusions could be reached regarding the relationship CMD and technology.

Future researchers should be aware that research designed to monitor or assess ethical behavior is subject to a social desirability bias—a frequent problem in ethics research (O'Fallon and Butterfield 2005). Indeed, when designing the data collection for our study, one of the motives for choosing 1st semester freshman students was to mitigate the chance that subjects would have formed strong social identifications that might significantly influence results. However, without proper controls, we cannot confirm our success or failure in this. Lastly, our study viewed only a single aspect of misconduct. While that was purposeful in our research design, it would be interesting and perhaps important to examine the facilitation effects of technology on other types of misconduct.

In conclusion, we believe our study provides important insights into the effects of productivity enhancing technologies on ethical behavior. The presence of such technologies is unavoidable and is only expected to broaden in the years to come. Organizations can ill afford to ignore the significant influence technology tools have on employee conduct. Given the importance of technology in the workplace and an increased focus on preventing misconduct, we expect that research into the relationship between individual cognitive and technological factors to increase. We hope that our study will guide future research seeking to understand the nexus of individual cognition and technology.

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