Think First, Act Later, or Act First, Think Later: Does the Fraud Triangle Hold When Individuals are Impulsive?

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I. Introduction

The General Theory of Crime (Gottfredson and Hirschi, 1990) states that self-control is an important element that influences individuals' decision to commit fraud. However, this element does not mean that individuals with low levels of self-control will commit fraud when given the opportunity (Pratt, 2015), indicating that there are other factors that influence individuals' decision to commit fraud beyond their level of self-control. In interviews with convicted white-collar criminals, Cressey (1950, 1953) observed that the individuals rationalize their actions internally to reduce emotional discord. The fraud triangle theory (Albrecht, 1991) posits that individuals rationalize before the first fraudulent act. As impulsive individuals are thought to act without much deliberation (Collins, 2017), it is possible that impulsive individuals would not rationalize before committing fraud. In this study, I investigate whether the fraud triangle, specifically the attribute of rationalization, is applicable to impulsive individuals in the context of frauds perpetrated by a single individual.[1]

Impulsivity is a trait that influences individuals' behaviors throughout a multitude of situations and is associated with the ability to control actions and thoughts (Barratt, 1983). Hofmann, Rauch, and Gawronski (2007) state that every day, "people are tempted by their impulses, urges, and cravings." (p. 497) while others are perceived to be more virtuous, have more self-control, and are able to consistently ward off impulse temptations and keep their sights on long-term goals and standards. Some people give in to their impulse temptations more than others (Friese and Hofmann, 2009). In addition to acting without prior reflection or thought, impulsive individuals perceive time differently (Wittman and Paulus, 2008). Wittmann and Paulus (2008) find that individuals with high trait impulsivity overestimate the duration of time intervals in time judgment tasks. They also find that when compared to non-impulsive individuals, impulsive individuals choose to receive immediate, smaller rewards over delayed, greater rewards. In the context of fraud, impulsive individuals might be more inclined to engage in asset misappropriation fraud that has a smaller reward and a faster conversion to cash than non-impulsive individuals. I hypothesize that individuals' response time to fraud behavior, an indication of the presence (absence) of rationalization, will vary depending on their level of trait impulsivity.

The Reflective-Impulsive Model (RIM) (Strack and Deutsch, 2004) is a conceptual framework for the materialization of impulsive behavior that consists of reflective and impulsive mechanisms which jointly influence behavior. Based on this model, impulses are traced to an associative network from long-term memory. Once an object is encountered, affect that is associated with the object is immediately activated and these affect associations are precursors of impulsive behavior (Strack and Deutsch, 2004; Deutsch and Strack, 2008). The impulsive system activates behavior without much thought whereas the reflective system activates behavior after deliberation of a future state and evaluation of the probability with which the state will be accomplished through the behavior (Strack, Werth, and Deutsch, 2006). As there are two-systems in the RIM that can influence behavior, the specific system used to activate behavior that leads to the individuals' engagement in or resistance from a fraudulent act can differ between individuals based on varying levels of trait impulsivity and situational factors. I predict that individuals more strongly influenced by trait impulsivity will commit fraud by activating behavior through the impulsive system without much deliberation about the consequence and rationalization. This prediction will lead to shorter response times when the opportunity to commit fraud is present.

I examined individuals' fraud behavior (willingness to commit fraud and presence of rationalization) when precursors of fraud (pressure and opportunity) are present in the context of trait impulsivity and the RIM. I designed a 2x2x2

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[1] Fraudulent acts can be committed alone or in collusion with others. The ACFE's 2020 Report to the Nations report that 49% of the cases involve perpetrators working alone (ACFE 2020).

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simulation, collecting data from 306 participants.[2] In the simulation, participants had the opportunity to decide to misappropriate company assets via an expense reimbursement fraud for personal gain.[3] I hypothesize and find that unlike non-impulsive individuals, impulsive individuals spend less time when making decisions to engage in or refrain from fraud behavior when pressure is high compared to when pressure is low. Taking opportunity and pressure into consideration, impulsive individuals take less time than non-impulsive individuals when deciding to engage in or refrain from fraud behavior. This position demonstrates the impulsive individuals' lack of deliberation before making the decision to commit fraud, suggesting that the belief that pressure, opportunity, and rationalization must be present before a fraud is committed might not be true for impulsive individuals.

This study makes several contributions to extant literature. First, by examining whether the rationalization attribute of the fraud triangle applies to impulsive individuals, I build upon the existing forensic accounting and fraud examination literature by providing new insights into how personality affects individuals' willingness to commit fraud. Trompeter, Carpenter, Jones, and Riley (2014) calls for more empirical studies examining individuals' personality as it relates to economic crime. The findings also provide a foundation for future fraud models that encompass impulsive individuals. Second, by looking at the reflective and impulsive systems that influence the activation of fraud behavior, I respond to the call of Anand, Dacin, and Murphy (2015) to study the situations in which the fraudulent act occurs. Examining impulsivity and the conceptual framework through the RIM when fraud decisions are made also answers the call by Trompeter et al., (2014) to use personality traits to enhance our understanding of the interaction between situational and individual factors of the fraudulent act. Third, methods used to conceal the fraud act when frauds are premeditated versus unplanned should be different. Fraudsters can alter documents as they engage in the planned fraudulent act or engage in the fraudulent act first and execute a concealment plan by destroying or creating documents later to "cover their tracks". Knowledge of how impulsive individuals' thought processes differ from others before the fraud behavior can provide insights into fraud concealment methods and pave the way for more fraud concealment research.

The remainder of this study proceeds as follows: Section II provides a background review of the relevant literature and the development of hypotheses; Section III is a general outline of the research method and the experimental design of the study; Section IV provides results of the experimental study; and Section V includes a discussion and concluding remarks.

II. Background and Hypotheses Development

General Theory of Crime

The General Theory of Crime (Gottfredson and Hirschi, 1990) asserts that self-control is the crucial element in influencing individuals' decision to commit crime. Individuals with low self-control are thought to be more likely to commit crime compared to individuals with high self-control because they have a lower ability to resist reacting in accordance with their impulses (Mischel, Shoda, and Rodriguez, 1989; Pratt and Cullen, 2005). This perspective is consistent with the concept of reflective vs. impulsive acts and trait impulsivity for individuals that might commit fraud depending on the situation. The 10-80-10 Rule (most likely anecdotal) states that 10% of the population will never commit fraud, 10% of the population will definitely commit fraud given the opportunity (predators), and 80% of the population could choose to commit fraud depending on the situation (situational fraudsters) (AGA, 2019). Although prior research has shown that individuals with low self-control are more likely to commit fraud when compared to other individuals, when presented with the opportunity most will not commit fraud (Pratt, 2015). Pratt (2015) also finds that individuals who have the same level of self-control differ on their display of self-control variability- they could be deliberative in some situations and impulsive in others. This position is an indicator that beyond his/her level of self-control, there is more that affects an individual's decision to commit fraud especially when the individual belongs to the 80% of the population under the 10-80-10 Rule.

Fraud Models

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[2] The protocol for this study was approved by the Institutional Review Board at the author's university.
[3] A reviewer pointed out that fraudulent expense reimbursement is not asset misappropriation since asset misappropriation has nothing to do with making false statements. The reviewer is most likely using the misappropriation definition from Cornell Law School's Legal Information Institute (LII, 2021). However, the Association of Certified Fraud Examiners' (ACFE) classify expense reimbursement frauds as being under the asset misappropriation category (ACFE, 2020). Within the fraud examination and forensic accounting area, the ACFE's definition is the one that is widely known and it is the definition I am using.

Cressey (1953) posits that three attributes are necessary for individuals to commit fraud: (1) perceived unshareable need, (2) opportunity, and (3) rationalization (ACFE, 2021).[4] Perceived unshareable need is also commonly referred to as pressure in fraud literature. This theory is now commonly known as the "fraud triangle" (Albrecht, 1991), depicted in Figure 1, and subsequent models and studies of fraud such as the Fraud Scale, the M.I.C.E. acronym, the Fraud Diamond, the Fully Ascribed Meta-Model of White-Collar Crime, and the revised Fraud Triangle modify and build on Cressey's original idea (Albrecht, Howe, and Romney, 1984; Wolfe and Hermanson, 2004; Kranacher, Riley, and Wells, 2011; Dorminey, Fleming, Kranacher, and Riley, 2012; Boyle, DeZoort, Hermanson, and Wolfe, 2018; Crumbley and Ariail, 2020). The revised Fraud Triangle modified the rationalization attribute of the triangle, defining it as capability to include fraudsters' personal characteristics (Boyle et al., 2018). However, the ability to rationalize fraud remains a critical part of the capability attribute. All these fraud models establish that for solo, accidental fraudsters, the rationalization attribute must be present before fraud occurs. I am building on fraud investigation and forensic accounting literature by examining how the rationalization attribute applies to impulsive individuals. Gaining insight into individuals' thought process when the idea of committing fraud is planted will shed light on how impulsive individuals differ from non-impulsive individuals when making decisions to commit fraud. [See Figure 1, pg. 23]

Precursors of Fraud

According to fraud literature and what is commonly referred to as the fraud triangle, pressure to commit fraud can arise from having a "perceived unshareable financial need" to maintain fraudsters' image in society, or to have a better quality of life (ACFE, 2021; Dorminey et al., 2012). When financial pressure is high, individuals are more likely to commit fraud compared to individuals with low financial pressure. Opportunity is perceived as the ability to commit the act itself and the ability to conceal the act to prevent detection (Dorminey et al., 2012; Trompeter et al., 2014). When individuals' spot a weakness in the internal controls of a company, opportunity is thought to be present as there is a possibility to commit the act given weak or overlooked internal controls. The time taken to plan regarding this opportunity may depend on whether or not individuals are impulsive. Also, individuals' response to this internal control weakness would depend on the influence of the reflective/impulsive processing system. Fraud literature posits that for fraud to occur, pressure, opportunity, and rationalization have to be present (Albrecht, 1991). The third attribute, rationalization, is discussed next.

Justification: Rationalization vs. Neutralization

Dissonance occurs when individuals have to make decisions between two beliefs or actions that are not compatible (Brehm and Cohen, 1962; Festinger, 1962). According to Festinger (1962), dissonance is greatest when the two options hold equal appeal. The theory of cognitive dissonance states that when individuals have two cognitions that are inconsistent with the other, individuals will tend to seek consistency among the cognitions to eliminate the dissonance (Festinger, 1962). Prior research suggests that justification of the act can occur before or after the fraudulent act (Sykes and Matza, 1957; Snyder and Higgins, 1988; Schönbach, 1990; Fritsche, 2005; Dorminey et al., 2012). Rationalization and neutralization are terms used to describe individuals' efforts to reduce or eliminate dissonance. Rationalization is the need for the perpetrator to normalize the act, justify that the act is for a greater good, to reduce the emotional discord, and remain in their "moral comfort zone" (Cressey, 1953; Dorminey et al., 2012; Trompeter et al., 2014). Neutralization is defined as the process undertaken to reconsider deviant behavior as an act that is morally acceptable (Sykes and Matza, 1957).

Both terms are similar, however, the difference lies in the timing of the act. In the forensic accounting literature, Albrecht (1991) described rationalization as occurring before the first fraud act. This position is not in line with how the rationalization term is used in other areas. In the areas of social psychology and sociology, neutralization, a term that is rarely used in forensic accounting or fraud investigation literature, is thought to take place before individuals engage in norm-contradicting behavior (Fritsche, 2005); rationalization, on the other hand, is assumed to occur after the behavior that goes against social norm is executed to normalize the act (Sykes and Matza, 1957) and to maintain a sense of control (Snyder and Higgins, 1988; Schönbach, 1990). Throughout the rest of the study, I refer to neutralization as occurring before individuals make decisions to engage in norm-contradicting behavior and rationalization as occurring after the decision has

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[4] While Cressey uses the term "embezzlement" in his book, he goes into detail in the first chapter on the criteria for case selection for his interviews (Cressey, 1953). The crimes range from the legal definition of embezzlement to larceny, confidence game convictions, and forgery. I therefore use the term "fraud" when referring to Cressey's original work because most of the cases he looked at are frauds that fall under the Occupational Fraud and Abuse Classification System of the ACFE (ACFE, 2020).

been made. In the same vein, I will be using neutralization when referring to the rationalization attribute of the fraud triangle since the act of justification and dissonance reduction/elimination is thought to occur before an individual commits fraud.

Impulsivity

Impulsivity is defined as a "type of behavior characterized by a tendency to act impulsively or without prior reflection or thought" (Romer, Bentancourt, Giannetta, Brodsky, Farah, and Hurt, 2009; Collins, 2017). Every major system of personality, such as psychotism and sensation-seeking, has a component of trait impulsivity (Whiteside and Lynam, 2001). This trait can be described as the tendency to act upon feeling and temptation to obtain a reward (hedonic thrill) without much consideration for rules (Romer et al., 2009). Prior research on individual differences treat impulsivity as a multifaceted construct with dimensions like the inability to stop an action once a decision has been made, high sensitivity to immediate rewards, low tolerance for delayed rewards, and the lack of deliberation of consequences when responding to impulses (Whiteside and Lynam, 2001; Romer et al., 2009). Wittman and Paulus (2008) find that impulsive individuals perceive time differently from non-impulsive individuals. Impulsive individuals tend to perceive that a certain duration of time is longer than it is and discount the value of future rewards, for example, preferring a gain of $166 now (present value) over a gain of $482 10 years from now (future value of $166 at 11.25%), more than non-impulsive individuals who have more self-control (Wittmann and Paulus, 2008). This difference in time perception causes impulsive individuals to choose smaller, instant rewards ($0.01 every two seconds) more often over future rewards ($0.24 every 32 seconds) even though those future rewards may be greater (Wittmann and Paulus, 2008). An individual with high trait impulsivity should have problems with keeping impulses under control once the impulse is activated (Shamosh, Deyoung, Green, Reis, Johnson, Conway, Engle, Braver, and Gray, 2008). Therefore, impulses that are activated automatically in a particular situation should convert easily into behavior for individuals with high levels of trait impulsivity (Friese and Hofmann, 2009).

Impulses encourage the need for immediate gratification (Strack et al., 2006) and different individuals respond to the same set of impulses differently (Hofmann, Friese, and Wiers, 2008). In a fraud setting, most individuals have a positive association with money (i.e., it is better to have more money than what is currently owned) but when given the opportunity to steal, not everyone will engage in fraudulent behaviors. Given the opportunity to increase their financial position, impulsive individuals might "dive-in headfirst" compared to non-impulsive individuals. The time taken to act on the opportunity would be much less for impulsive individuals compared to non-impulsive individuals due to the lack of deliberation. This timing leads to the discussion on the thought process individuals go through when making decisions.

Reflective-Impulsive Model (RIM)

The RIM is a dual-process conceptual framework that "explains social behavior as a joint function of reflective and impulsive processes" (Strack and Deutsch, 2004, 220). Dual-processing models draw on the belief that individuals have memory systems that process information in fundamentally different ways (Alvarez and Squire, 1994; McClelland, McNaughton, and O'Reilly, 1995; Smith and DeCoster, 2000). On one hand there is the associative processing mode, which is based on knowledge that is accumulated from experiences and the use of that knowledge to process information quickly and automatically when similar situations occur. On the other hand, the rule-based processing mode incorporates symbolically represented rules structured by language and logic as the basis to processing decisions and occurs optionally when cognitive capacity and motivation are present (Smith and DeCoster, 2000). A psychology concept similar to the associative processing mode and the impulsive system under the RIM is heuristics, defined as "methods for arriving at satisfactory solutions with modest amounts of computation" (Simon, 1990, 11). Individuals use heuristics to reduce the cognitive load associated with decision making (Tversky and Kahneman, 1974). In contrast, need for cognition refers to individuals' tendency to participate in deep, engaging thoughts to understand and make sense of experiences (Cohen, Stotland, and Wolfe, 1955; Cacioppo and Petty, 1982; Cacioppo, Petty, and Kao, 1984). Individuals with a high need for cognition can be described as thinkers and, in the context of dual-processing models, would have the rule-based processing mode as their dominant processing system.

This dual-process RIM model assumes that behavior is controlled by the reflective and impulsive systems, each with the capability to run in parallel, interact with each other, and operate based on different principles. The impulsive system is always engaged in processing whereas the reflective system may be disengaged depending on cognitive capacity or levels of arousal. A stimulus enters the reflective system when intensity is great (Strack, Werth, and Deutsch, 2006). When this stimulus happens, the impulsive and reflective systems are running in parallel. The end point for both the reflective and impulsive system is the behavioral schemata that activates behavior (Strack and Deutsch, 2004). When

behavioral schemata from the impulsive and reflective systems are at odds, the behavior that is activated depends on the relative strength of the schemata activation. Figure 2 is a visual representation of the RIM adapted from Strack and Deutsch (2004). [See Figure 2, pg. 23]

In the fraud setting, most models assume when there is pressure, individuals consider the opportunity to commit the fraud, the ability to conceal the fraud, and will neutralize to justify the act. Using a dual systems model like the RIM, this model would translate into the use of the reflective system to fully consider the opportunity before the activation of behavioral schemata to commit or not to commit the fraudulent act. Just as some individuals might be tempted to commit fraud when they identify the opportunity, people are constantly tempted with impulses daily (Hofmann et al., 2007). Individuals face situations where their uninhibited impulses interfere with long-term goals, standards, or moral conflict (Bogg and Roberts, 2004; Tangney, Baumeister, and Boone, 2004; Carver, 2005). A process-oriented approach such as the RIM provides more information on when and why individual's decision to act based on impulse is determined by reflective and impulsive influences (Hofmann et al., 2008). Compared to individuals who are non-impulsive, impulses translate more readily into behavior through the impulsive system when individuals are impulsive (Friese and Hofmann, 2009).

Hypotheses Development

Together, research on the fraud triangle and the General Theory of Crime suggests that even when all three attributes are present for an individual, there is a possibility that s/he will commit fraud or vice versa. This research implies that there are other individual-level factors, such as individuals' cognitive processing system and trait impulsivity that are influencing the activation or inhibition of fraud behavior. The assumption that all attributes of the fraud triangle must be present before a fraudulent act can occur implies that the fraudulent act has to be premeditated. If so, the situational fraudster has conducted a comprehensive analysis of the situation before carrying out the fraudulent act, using the reflective system from the RIM to put together an action plan (Deutsch and Strack, 2008) and neutralizing any emotional discord to stay in their moral comfort zone for this new situation. On the other hand, impulsive individuals tend to act first when the impulse arises, using the impulsive system and considering whether the fraud can be detected or justifying their actions beforehand. Any emotional discord or justification for their actions would take place after, suggesting that impulsive individuals engage in rationalization, not neutralization.

All else equal, theory states that when the pressure to commit fraud is high due to the need for more financial resources, individuals will be more likely to engage in fraud behaviors than when financial pressure is low. Impulsive individuals in the high pressure condition will more readily engage in fraudulent behaviors than impulsive individuals in the low pressure condition. As such, impulsive individuals in the high pressure condition will take less time to arrive at their decision to engage in fraudulent behavior when compared to impulsive individuals in the low pressure condition. In contrast with impulsive individuals, non-impulsive individuals will deliberate more before arriving at their decision to engage in fraudulent behavior when pressure is high than when pressure is low. This deliberation leads to the following hypotheses:

H$_{1A}$: When pressure is high, impulsive individuals will take less time when deciding to engage in or refrain from fraud behaviors than when pressure is low.

H$_{1B}$: When pressure is high, non-impulsive individuals will take more time when deciding to engage in or refrain from fraud behaviors than when pressure is low.

Theory predicts that when the opportunity to commit fraud is high due to the low likelihood of detection, individuals will be more likely to engage in fraud behaviors. When the opportunity to commit fraud is low due to the high likelihood of detection, individuals will be less likely to engage in fraud behaviors. Opportunities to commit fraud are not readily available or apparent to individuals on a day-to-day basis. When the opportunity to commit fraud is high, impulsive individuals will take less time to deliberate on whether or not to take advantage of the opportunity compared to when the opportunity is low. On the other hand, non-impulsive individuals will spend more time when deciding to engage in fraud behaviors when opportunity is high than when it is low. This timing leads to the following hypotheses:

H$_{2A}$: When opportunity is high, impulsive individuals will take less time when deciding to engage in or refrain from fraud behaviors than when opportunity is low.

H$_{2B}$: When opportunity is high, non-impulsive individuals will take more time when deciding to engage in or refrain from fraud behaviors than when opportunity is low.

Impulsive individuals are quick to act when making decisions, rationalizing their decision to engage in fraud behaviors after the act has taken place if the act contradicts with their personal beliefs. Consequently, the time taken to arrive at each decision to engage in fraud behavior is shorter than non-impulsive individuals, who will take more time to think about the decision because they need to neutralize any dissonance about the decision beforehand. This difference leads to the following hypothesis:

H₃: When precursors to fraud are present, impulsive individuals will choose to engage in or refrain from fraud behaviors in less time than non-impulsive individuals.

III. Experimental Design and Methods

Participants and Compensation

In this study I examine individuals' reaction given the opportunity to commit a reimbursement fraud. The 2020 ACFE Report to the Nations report that 76% of the perpetrators were employee-level or manager-level personnel and came from many business units (ACFE, 2020). As any individual working for a company may be in a position to submit reimbursements,[5] participants can be from any background making Amazon Mechanical Turk (MTurk) an appropriate platform to recruit participants. 426 individuals were recruited from MTurk to participate in Part One of this two-part study. The requirements listed for participation in this study on MTurk were (1) individuals had to be in the United States and (2) their MTurk approval rating had to be 98% and above.[6]

In Part One, participants completed the pre-simulation questions. All participants who completed Part One received a specific qualification which gave them access to Part Two of the study. This qualification prevented any MTurk workers from accessing the simulation description and link if they did not complete Part One. Seven days after Part One was completed, Part Two of the study was made available to the rest of the pre-qualified participants on MTurk. Follow-up emails were sent to remind participants about this opportunity. Participants were awarded with an additional bonus depending on the decisions they made during the simulation in Part Two. The average amount participants received from the study was $5. 306 participants completed both parts of the study. I tested the hypotheses using the 306 complete observations.[7] Table 1 presents the participant demographics of the 306 participants. [See Table 1, pg. 26]

Design

A 2 (within) x 2 (within) x2 (between) experiment was designed to involve a manipulation of the opportunity to commit fraud (within: high or low), the pressure to commit fraud (within: high or low), and trait impulsivity (between: high or low). Data were collected electronically via Qualtrics survey platform and MouselabWEB, a process tracing tool that was used to monitor the information acquisition process of individuals when they were making decisions in the simulation.

A description of the study was posted on MTurk and all individuals who met the two requirements set for the study were able to access the Qualtrics link to complete Part One. In Part One, participants completed a questionnaire consisting of several psychology scales. Participants were also asked to provide information regarding their age, gender, years of work experience, and indicate if they have had any interaction with internal auditors in the past.

In Part Two of the study, participants read the case instructions and were asked to assume that they were an employee of WebSmart, Inc., a marketing company, and their job required them to travel each period. The case study was adapted from Holderness, Negangard, and Sultan (2018). Participants had to correctly answer comprehension questions about the case before moving on to the simulation. They clicked on a link from Qualtrics to open a MouselabWEB webpage

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[5] Per the 2020 ACFE Report to the Nations, expense reimbursement fraud is ranked third in the list of most common fraud schemes under the asset misappropriation category (ACFE, 2020). The average duration of an expense reimbursement fraud is 24 months. I chose this duration as the setting for my study as most people have had experience with receiving a reimbursement and if they have not, they can easily grasp the concept.

[6] To ensure the integrity of the data, I followed recommendations outlined in Hunt and Scheetz (2019) by restricting the participation of MTurk workers to 98% approval rating and above. I also included attention check and manipulation check questions.

[7] Out of the 426 participants that received the qualification and invitation to complete Part Two, only 306 participants actually returned and completed the study. Follow-up emails were sent as reminders but one week, the study was closed on MTurk. Having a drop in participants from Part One to Part Two is anticipated as most, if not all, studies that are conducted over a period of time will have participants drop out over time. I accounted for this possibility by opening up Part One of the study to more participants so that end the end of the study, I would still have enough responses for statistical testing.

containing the simulation. The simulation in MouselabWEB lasted 10 periods. At the beginning of the simulation participants were given a small endowment of 25 Lira. In each period, participants had the opportunity to commit expense reimbursement fraud or not commit fraud at all. If they chose to commit fraud, they had the chance of adding an additional 10 Lira to their bank balance. They received a salary of 35 Lira for each period, and they could see their bank balance during each period in the simulation. Information about the household expenses (pressure) and the percentage of expense reimbursement requests selected for internal audit (opportunity) for the period were hidden behind MouselabWEB boxes. Participants could see what information the boxes contained but the specific values were only visible when they moused over those boxes. Figure 3 illustrates what the participants saw for the first period. In every period, there was a 20% chance that the internal audit personnel would detect the fraud. If a participant chose to commit fraud during any of the 10 periods and it was detected by the auditors, an additional 10 Lira was deducted from the participant's bank balance for each period fraud was discovered. At the end of 10 periods, participants were directed back to Qualtrics to complete the post-experiment questions.[8] Participants' bonus based on the simulation was determined by converting the number of Lira they had on their bank balance after 10 periods to dollars at the rate of $1 for every 15 Lira. [See Figure 3, pg. 24]

First Independent Variable: Precursors of Fraud—Pressure

Participants received a 35 Lira salary for each period they were employed and received information about their annual household expenses in one of the MouselabWEB boxes. At any point in time during the simulation participants were able to see the balance in their bank account. Annual household expenses could be higher or lower than their salary for the period. In periods of high pressure, household expenses were 40 Lira, which was five Lira higher than their 35 Lira salary. When pressure was low, their household expenses were 30 Lira. They were only able to view the amount of household expenses incurred when they moved their cursor over the specific household expenses box. In the simulation, it was possible for participant's bank balance to be negative. With a negative balance, participants were still able to move to the next round. The bank balance carried over from period to period.

Second Independent Variable: Precursors of Fraud—Opportunity

The participant's opportunity to successfully commit expense reimbursement fraud was related to the extent that the internal audit department examined reimbursement records. The participants were informed that the internal audit department has many responsibilities and does not examine every expense reimbursement disbursement. Each period, the extent of the internal audit of expense reimbursements was hidden behind a MouselabWEB box. To access the audit information, participants would have to move their cursor over the specific box. Participants were told that if the extent of the internal audit on expense reimbursement was 10%, it meant that there was a 10% probability that the fraud was going to be detected by the auditors. As operationalized in the simulation, when perceived opportunity to commit fraud is high, extent of the internal audit of expense reimbursement records was 10%. On the other hand, participants were told that when the perceived opportunity to commit fraud is low, the extent of the internal audit of expense reimbursement was 30%.

Third Independent Variable: Impulsivity

Trait impulsivity was measured with the 30-item Barratt Impulsiveness Scale (BIS) (Patton and Stanford, 1995). The Barratt Impulsiveness Scale (BIS) is the most widely used scale to measure trait impulsivity (Patton and Stanford, 1995; Barratt, Patton, and Stanford, 1975; Stanford, Mathias, Dougherty, Lake, Anderson, and Patton, 2009). Based on the BIS, a high score could be a result of relatively strong impulsive processes and/or relatively weak reflective processes (Barratt et al., 1975; Stanford et al., 2009). An individual with a high BIS score may have a personal challenge with keeping impulses under control once the impulse is activated (Shamosh et al., 2008). Participants completed this scale one week before participating in the simulation.

Reflective-Impulsive Thought Processes

Frederick (2005) created the Cognitive Reflection Test (CRT), a set of three questions intended to measure an individual's processing system preference and "assess individuals' ability to restrain an impulsive wrong answer in favor of a reflective right answer". As the CRT measures the reflective processing preference, Cueva, Iturbe-Ormaetxe, Mata-Pérez, Ponti, Sartarelli, Yu, and Zhukova (2016) adapted the CRT measure by defining the impulsive answers to the same

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[8] A pilot test was conducted with 25 participants to test Part Two and ensure that the case instructions were clear, the simulation paths worked well, and there were no other mechanical issues with the MouselabWEB pages.

questions from Frederick (2005) thereby creating the iCRT measure. Using the CRT questions, there are now two sets of possible answers: one set of answers (CRT) which indicate individuals prefer the reflective processing system, and another set which indicate individuals prefer the impulsive processing system (iCRT). Individuals whose dominant processing system is the impulsive system are more likely to be impulsive than individuals who prefer the reflective system.[9]

Dependent Variable: Decision to Commit Fraud

For each period in the simulation, participants were presented with two choices: (1) submit an inflated expense reimbursement request or (2) submit the expense reimbursement request without inflating it. On MouselabWEB, participants had two buttons representing the choices described above. For each period, participants were required to decide if they wanted to submit their reimbursement request as is or submit an inflated reimbursement request, knowing that if their inflated reimbursement request was not detected by the internal auditor they would gain financially from this decision. Participants were not able to move on to the next period of the simulation until they chose an option and clicked on the "submit" button. Participants' decision to commit fraud was recorded as a dummy variable in each period, with one indicating that they decided to inflate the reimbursement request and zero if otherwise. [10]

Dependent Variable: Time Taken to Make Decisions About Inflating Reimbursement

To test how much participants engage in any neutralization to justify their decisions to engage or refrain from committing fraud, the amount of time participants spent on the pressure box, the opportunity box, and the time spent hovering around the two decision buttons was recorded with MouselabWEB. The use of MouselabWEB enabled the recording of the amount of time participants spent on the information provided by capturing the movement of the cursor on the screen. To access the information, participants had to move the mouse pointer over the boxes on the screen with labels indicating what information was hidden beneath. When the pointer was over a specific box, the corresponding information was displayed. The time taken to make decisions about inflating reimbursement was obtained by adding up the time spent on the pressure box, the opportunity box, and the decision buttons before participants elected to submit their reimbursement requests. The more time participants spent on the information given, the more likely participants were engaging in neutralization. Impulsive individuals, with the tendency to activate behavior quickly, should not spend as much time as non-impulsive individuals when deciding to engage or refrain from fraud as they were not likely to engage in neutralization.

Control Variables[11]

Participants answered questions from multiple scales to measure constructs that could affect their decisions in the simulation. To measure individuals' general risk-taking tendencies, the seven-item Risk Propensity Scale (Meertens and Lion, 2008) was used. The one-item Berlin Numeracy test (Cokely, Galesic, Schulz, Ghazal, and Garcia-Retamero, 2012) was used to measure risk literacy whereas the "Extreme" subscale questions from the Narcissism Spectrum Scale (NSS) (Malkin, 2015) was used to measure individuals' narcissistic tendencies.[12] The Berlin Numeracy test and part of the NSS were included as prior research finds that narcissism and risk literacy affect individuals' decision to commit fraud (Harrison, Summers, and Mennecke, 2018; Gonzalez and Kopp, 2017; Rijsenbilt and Commandeur 2013).

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[9] The CRT and iCRT are used for additional analyses, not as a main independent variable.

[10] *FRAUD_OCCURRENCE_PROPORTION*, a variable computed by adding up all the time a participant decided to steal then divided by the 10 periods in the simulation, was used as a dependent variable for sensitivity analysis. Results obtained using *FRAUD_OCCURRENCE_PROPORTION* is qualitatively similar to the dummy variable reported in the results section of the study when comparing between impulsive and non-impulsive individuals. Fraud amount was not used as a dependent variable as the amount of inflation is a constant 10 Lira each period and the outcome would be similar to the *FRAUD_OCCURRENCE_PROPORTION* variable.

[11] These variables were measured in Part 1 of the study one week before the simulation in Part Two was released to participants.

[12] The Narcissism Spectrum Scale (NSS) (Malkin, 2015) is a nine-item scale measuring three types of narcissism: echoism, healthy narcissism, and extreme narcissism. Echoism describes individuals who focus more on others at the expense of their own needs. Healthy narcissists are confident, capable of helping others and requesting for help. Extreme narcissists are manipulative, self-seeking, argumentative, and have fluctuating self-esteem. I only used the Extreme subscale questions from the NSS as that is the type of narcissism that is defined by the American Psychiatric Association's definition of narcissism, and it would add three additional questions to Part One. In using the NSS, I was also trying to cut down on the number of questions participants would have to respond to in Part One and did not want participants to suffer from survey fatigue. Using the more traditional narcissism scales would lead to having more questions and a similar outcome with categorizing individuals into the narcissist or non-narcissist categories.

In addition, I used the Social Value Orientation Slider Scale (Murphy, Ackermann, and Handgraaf, 2011) to measure the magnitude of concern individuals' have for others. Age is included as a control variable because trait impulsivity is expected to gradually decrease with age (Steinberg, Albert, Cauffman, Banich, Graham, and Woolard, 2008). Other control variables collected include gender, work experience, and prior interaction with internal auditors. For the ANCOVA analysis, control variables that had p-values more than 0.450 were removed. This result did not change the significance of the ANCOVA results.

IV. Results

Descriptive Statistics

As reported earlier, 306 participants completed both parts of the study. The data from participants who completed the entire study were used to test the hypotheses presented in this article. The simulation generated 3060 observation periods from the 306 participants for conducting empirical analysis.[13] Of the 3060 periods played in the simulation, participants chose to commit fraud during 1207 periods. Participants were notified that their decision to commit fraud was detected for 310 periods, which was 25.68% of all fraud occurrences. At a participant-level, 241 participants (78.76%) chose to commit fraud at least once during the simulation. Table 2 presents descriptive statistics on key variables, including those that were used to conduct statistical tests in the study. Figure 4 shows the breakdown of the number of periods participants decided to commit fraud. [See Table 2, pg. 26] [See Figure 4, pg. 24]

The Effect of Pressure on Individuals' Decision to Commit Fraud

Per theory, it is expected that individuals are more likely to commit fraud when financial pressure is high than when financial pressure is low (C. Albrecht, Kranacher, and S. Albrecht, 2008). A Chi-Square test (untabulated) examining if this position holds true for this study provides marginal support for the theory, indicating that individuals are more likely to decide to inflate reimbursement requests when the financial pressure is high compared to when financial pressure is low (χ^2(1, N=3060)=3.559, p=0.059). Hypothesis 1A posits that when pressure is high, impulsive individuals will take less time when deciding to engage or refrain from fraudulent behavior than when pressure is low. To test this hypothesis, I split the continuous *IMPULSIVITY* variable at the median to get two conditions: high impulsivity and low impulsivity. Examining only observations when *IMPULSIVITY* is high, an untabulated t-test of *PRESSURE* (high vs. low) and time taken to arrive at decision (*DECISION_TIME)* suggests that impulsive individuals take less time to make decisions about committing fraud in periods of high pressure than in periods of low pressure (t=1.490, p=0.068, one-tailed).

Hypothesis 1B predicts that when pressure is high, non-impulsive individuals will take more time when deciding to engage in or refrain from fraud behaviors than when pressure is low. Examining observations when *IMPULSIVITY* is low, an untabulated t-test with the same variables as in Hypothesis 1A, non-impulsive individuals spend more time deliberating about inflating reimbursement requests when pressure is high compared to when pressure is low (t=1.741, p=0.041, one-tailed). This theory suggests that non-impulsive individuals react differently to impulsive individuals when pressure is high.

To reduce the likelihood that the marginally significant result obtained from the t-tests to examine Hypotheses 1A and 1B above are driven by the low amounts of *DECISION_TIME* when the participants focus only on their bank balance and nothing else, I exclude 842 observations of participants in periods where they only looked at their bank balance as a robustness check. Untabulated results of the t-tests excluding the 842 observations yielded qualitatively similar results to the earlier t-tests. Impulsive individuals take less time to make decisions to commit fraud or refrain from it when pressure is high than when pressure is low (t=1.829, p=0.034, one-tailed). On the other hand, non-impulsive individuals take more time when deciding to commit fraud or refrain from it when pressure is high compared to when pressure is low (t=1.750, p=0.040, one-tailed). Hypothesis 1A and 1B are supported.

The Effect of Opportunity on Individuals' Decision to Commit Fraud

Theory dictates that individuals are more likely to choose to commit fraud when the opportunity to commit fraud is high than when the opportunity to commit fraud is low (Albrecht, Kranacher, and Albrecht, 2008). I conducted a Chi-Square test (untabulated) to examine if this theory is true for this study and find that when the opportunity to commit fraud is high, individuals are more likely to commit fraud than when the opportunity to commit fraud is low (χ^2(1, N=3060)=211.254,

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[13] The simulation lasted for 10 periods for each participant.

p<0.001). Hypothesis 2A predicts that when opportunity is high, impulsive individuals will take less time when deciding to engage in or refrain from fraud behaviors than when opportunity is low. Testing for this hypothesis is similar to Hypothesis 1A, with the *IMPULSIVITY* variable split at the median and the *DECISION_TIME* variable as the variable of interest. Results from an untabulated t-test with *OPPORTUNITY* divided into high versus low suggests that there is no statistical difference in the time taken to decide to commit fraud when opportunity is high for impulsive individuals compared to when opportunity is low (t=0.543, p=0.294, one-tailed).

Hypothesis 2B predicts that when opportunity is high, non-impulsive individuals will take more time when deciding to engage in or refrain from fraud behaviors than when opportunity is low. Utilizing the same testing methods as in Hypothesis 2A, but with observations from non-impulsive individuals only, it is marginally significant that when opportunity is high, non-impulsive individuals spend more time deliberating on whether or not to engage in the fraud act compared to when opportunity is low (t=1.552, p=0.061, one-tailed, untabulated). Taken together, results indicates that non-impulsive individuals are affected more by the opportunity attribute of the fraud triangle than impulsive individuals.

As a robustness check, I exclude the same 842 observations of participants in periods where they only look at their bank balance to reduce the likelihood that the results obtained from the t-tests to examine Hypotheses 2A and 2B above are driven by the low amounts of *DECISION_TIME*. Untabulated results of the t-tests excluding the 842 observations yielded qualitatively similar results to the earlier t-tests. There is no significant difference in the time taken to make decisions to commit fraud or refrain from it when opportunity is high than when opportunity is low for impulsive individuals (t=0.373, p=0.355, one-tailed). Conversely, non-impulsive individuals take more time when deciding to commit fraud or refrain from it when opportunity is high compared to when opportunity is low (t=1.647, p=0.050, one-tailed). Hypothesis 2A is not supported whereas Hypothesis 2B is supported.

The Effect of Pressure, Opportunity, and Impulsivity on Individuals' Decision to Commit Fraud

Hypothesis 3 predicts that when precursors to fraud are present, impulsive individuals will choose to engage or refrain from fraud behaviors in less time than non-impulsive individuals. A *PRESSURE* (high vs. low) x *OPPORTUNITY* (high vs. low) x *IMPULSIVITY* (continuous) ANCOVA was used to test Hypothesis 3. There is a marginally significant three-way interaction between *PRESSURE, OPPORTUNITY,* and *IMPULSIVITY* (F (50,2837) = 1.260, p=0.052, one-tailed). Results are summarized in Table 3. To conduct simple effects tests and to graph the results, the *IMPULSIVITY* variable was split at the median. Analysis of Figure 5 and Figure 6 suggests that individuals react differently when *OPPORTUNITY* is low compared to when *OPPORTUNITY* is high. When *OPPORTUNITY* is low, impulsive and non-impulsive individuals are not impacted by *PRESSURE* and do not differ much in the amount of time taken to decide to commit fraud or refrain from it. A simple effects test confirms that there is no significant difference in the amount of time individuals take to decide to commit fraud or refrain from it when *PRESSURE* is high versus low (Impulsive individuals: p=0.331, one-tailed; Non-impulsive individuals: p=0.350, one-tailed).

Impulsive and non-impulsive individuals react differently when *OPPORTUNITY* is high. Figure 5 indicates that when *OPPORTUNITY* to commit fraud is high, impulsive individuals spend less time reaching a decision when *PRESSURE* is high, but they take a longer time deliberating when *PRESSURE* is low. Even though it seems the difference between time taken when *PRESSURE* is high and when *PRESSURE* is low is great, simple effects tests indicate that there is no significant difference in the time taken to arrive at a decision (p=0.126, one-tailed) for impulsive individuals. Figure 6 depicts the time taken to decision as longer when *PRESSURE* is high compared to when *PRESSURE* is low. A Simple effects test for non-impulsive individuals when *OPPORTUNITY* is high confirms that the difference between time taken to arrive at a decision is significantly higher when *PRESSURE* is high than when *PRESSURE* is low (p=0.022, one-tailed). From the two figures, the results suggest that impulsive individuals take less time to make decisions when *PRESSURE* and *OPPORTUNITY* are both high compared to non-impulsive individuals.[14] Hypothesis 3 is supported. [See Table 3, pg. 28] [See Figure 5, pg. 25] [See Figure 6, pg. 25]

Additional Analyses

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[14] Untabulated t-tests for when *OPPORTUNITY* and *PRESSURE* are both high also yield statistically significant results (t=2.0295, p=0.018, one-tailed). Impulsive individuals take less time to arrive at a decision compared to non-impulsive individuals (average of 2906ms compared to 3799ms).

Dividing participants into impulsive versus non-impulsive groups using the *IMPULSIVITY* variable, a Chi-Square test demonstrates that there is no significant difference in the decision to submit inflated reimbursement requests between the two groups χ^2(1, N=3060)=2.169 (*p*=0.141). These findings indicate that any differences found between impulsive and non-impulsive variables are not driven by one group stealing more or less than the other.

For Hypothesis 1 the focus was centered on impulsive and non-impulsive individuals' reaction when pressure is different in the simulation. Instead of focusing on the groups along the impulsive-only or non-impulsive only categories, I also examine the difference in reaction between impulsive and non-impulsive individuals when there are differences in pressure. Additional analyses were conducted to determine if there is a difference between *DECISION_TIME* and *IMPULSIVITY* when *PRESSURE* is low/high. T-tests (untabulated) suggest that when *PRESSURE* is high, impulsive individuals spend significantly less time on decision making than non-impulsive individuals (t=2.459, *p*=0.007, one-tailed). However, when *PRESSURE* is low, the average time taken to make decisions between impulsive and non-impulsive individuals is not significantly different (t=0.662, *p*=0.264, one-tailed). A test of process variables exploring the influence of pressure (*PRESSURE_INFLUENCE)* on their decision to commit fraud suggests that impulsive individuals are more influenced by *PRESSURE* compared to non-impulsive individuals (t=0.726, *p*=0.062, one-tailed).

Some other process variables collected at the end of the simulation were *REMORSE,* which recorded participants' remorse over making decisions related to submitting inflated reimbursements, and *DIFFICULT_DECISION*, a variable that captured the emotional difficulty participants faced when deciding to inflate reimbursements. Both variables were measured on a one to seven scale, with seven being very difficult for *DIFFICULT_DECISION* and strongly agree about feeling remorse for submitting inflated reimbursement requests for *REMORSE*. An untabulated t-test of *DIFFICULT_DECISION* demonstrates that non-impulsive individuals found it significantly more difficult to submit inflated reimbursements than impulsive individuals (*p*=0.043, two-tailed). Non-impulsive individuals provided a higher rating for the *REMORSE* variable (*p*=0<0.01, two-tailed, untabulated), suggesting that immediately after the simulation, they already felt more remorseful over their decisions compared to impulsive individuals. Taken altogether, non-impulsive individuals seem to be neutralizing the decision during the simulation, taking a much longer time to arrive at a decision each period when compared to impulsive individuals. Even then, non-impulsive individuals were more likely to still struggle emotionally regarding their decision immediately after the simulation than impulsive individuals.

V. Conclusion

The purpose of this study is to examine whether fraud triangle attributes of pressure, opportunity, and neutralization hold for impulsive individuals. Using a 2 x 2 x 2 experiment, I investigated the impact of individuals' impulsivity on their decisions to commit fraud when precursors to fraud behavior are present. First, I hypothesize and find that impulsive individuals spend less time deliberating when making decisions to commit a fraud act when pressure is high compared to when pressure is low. The opposite is true for non-impulsive individuals—they spend more time deliberating when pressure is high compared to when pressure is low. Second, I hypothesize, but do not obtain any statistical difference between the time taken to make decisions for impulsive individuals when opportunity to commit fraud is high than when it is low. Results stipulate that non-impulsive individuals take more time in arriving at a decision to commit fraud or refrain from it when opportunity is high rather than when opportunity is low. Third, I hypothesize and observe that when precursors to fraud are present, impulsive individuals will choose to engage or refrain from fraud behaviors in less time than non-impulsive individuals.

These results provide new insight into the impact of pressure, opportunity, and impulsivity on decisions to commit fraud. More importantly, the results contribute to the white-collar crime literature and show that the fraud triangle does not apply to impulsive individuals as they bypass neutralization when making decisions to commit fraud. Through the perspective of the RIM, the results show that impulsive individuals are more likely to use the impulsive processing system without engaging the reflective processing system. Non-impulsive individuals, more likely to use the reflective processing system, also report having more difficulty when deciding to engage in fraud behavior. This theory suggests that they were using the reflective processing system to reduce any emotional discord before making the decision. As a whole, results indicate that non-impulsive individuals take more time to make fraud decisions, suggesting that they may engage in neutralization before deciding to commit fraud whereas impulsive individuals bypass the neutralization attribute of the fraud triangle when reaching the decision to commit fraud or refrain from it.

This article is subject to a few limitations. The manipulated pressure condition in this simulation did not mirror the multitude of pressures individuals face in everyday life. The threat of fraud detection in the simulation was also not of the same magnitude as it would be if fraud was detected by internal auditors of companies (e.g., termination). The minimal consequence to the participants when the fraud was detected meant that participants could have been bolder and decided to commit fraud at a higher rate than they probably would have in a different situation. Another limitation of this study is the results are not generalizable to collusive frauds and predators as the research focuses on solo frauds perpetrated by situational fraudsters.

Knowledge of the lack of neutralization for impulsive individuals is potentially crucial for research in the fraud area as well as for practitioners. There are many ways for individuals to conceal a fraud act after it has occurred. This study is important to future research as individuals who jump on the opportunity to commit fraud would use different methods to conceal it after the fact than individuals who take time to deliberate and make the decision carefully. Without more understanding of the neutralization attribute of the fraud triangle, it is difficult to further study the attributes from the triangle of fraud action (Dorminey et al., 2012) as concealment could be driven by neutralization and opportunity.

Another avenue for future research is related to methods to reduce the influence of individuals' impulsive tendencies when they are tempted to react to their impulses in the presence of an opportunity to commit fraud. Prior work in psychology finds that working memory training and attentional bias modification training helps to stifle the impulsive tendency, encourages individuals to detach their focus on unhealthy stimuli, and increase the strength of the reflective process to help individuals keep to their health goals (Fadardi and Cox, 2009; Houben, Wiers, and Jansen, 2011; Koningsbruggen, Veling, Stroebe, and Aarts, 2014). Perhaps in a work setting where internal control weaknesses lead to opportunities to commit fraud, repeated interactions with internal auditors could temper individuals' impulses to commit fraud. This study considered prior internal audit experience in the statistical model, but I did not include prior audit experience within the experiment as a variable. Future research could look into interventions that reduce individuals' impulse to commit fraud when pressure and opportunity are present.

Recent research by Huber (2017) has challenged the validity the fraud triangle in a theoretical article. Consistent with fraud triangle theory, results from the study indicate that individuals commit fraud at a higher rate when financial pressure is high and when opportunity to commit fraud without detection is high. While my study suggests that the fraud triangle may not apply to impulsive individuals as they do not seem to engage in neutralization prior to engaging in the fraud act, more empirical research needs to be done on all attributes of the fraud triangle before having more discussions on the validity of the fraud triangle.

Figure 1: The Fraud Triangle (Albrecht, 1991)

Figure 2: The Reflective-Impulsive Model (Adapted from Strack and Deutsch, 2004)
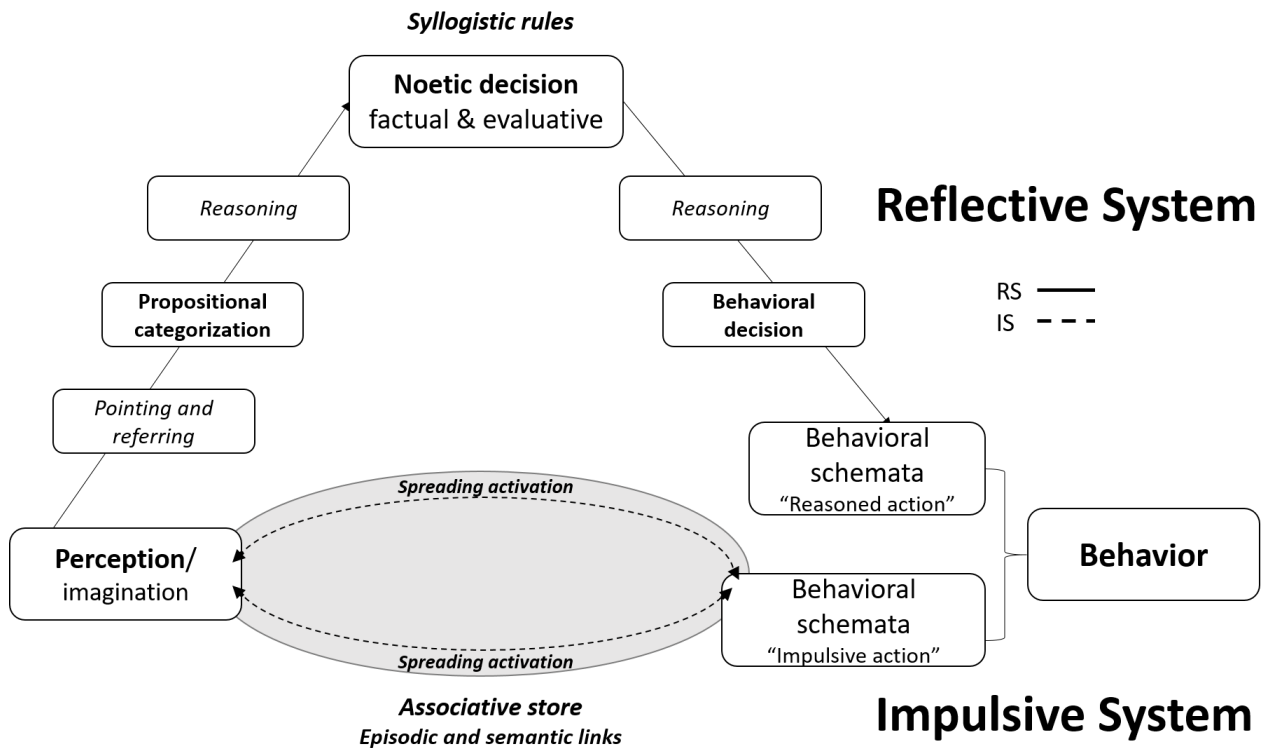
Figure 3: An Example of the MouselabWEB Simulation

Period 1
Bank Balance: 25 Lira   Salary: 35 Lira

Your household expenses and the internal auditors expense reimbursement verification extent is available below. Do you choose to inflate your expense reimbursement request for this period?

| Household Expenses for this Period | % of Expense Reimbursement Requests Selected for Internal Audit |

Choice Buttons
Button A: Yes, I would like to submit an inflated expense reimbursement request.

Button B: No, I would like to submit the expense reimbursement request as is.

Figure 4: Frequency of the Number of Periods Participants Chose to Commit Fraud During the Simulation (Out of 10 Periods)

Frequency of the Number of Periods Participants Chose to Commit Fraud During the Simulation (Out of 10 Periods)
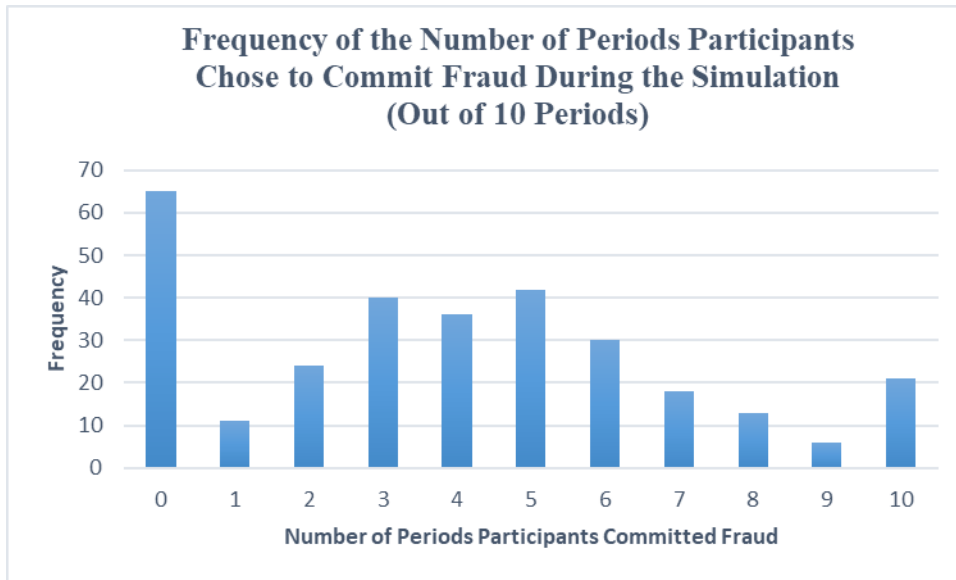
Figure 5: Graph of Estimated Marginal Means of Time Taken to Make Decision for Impulsive Individuals
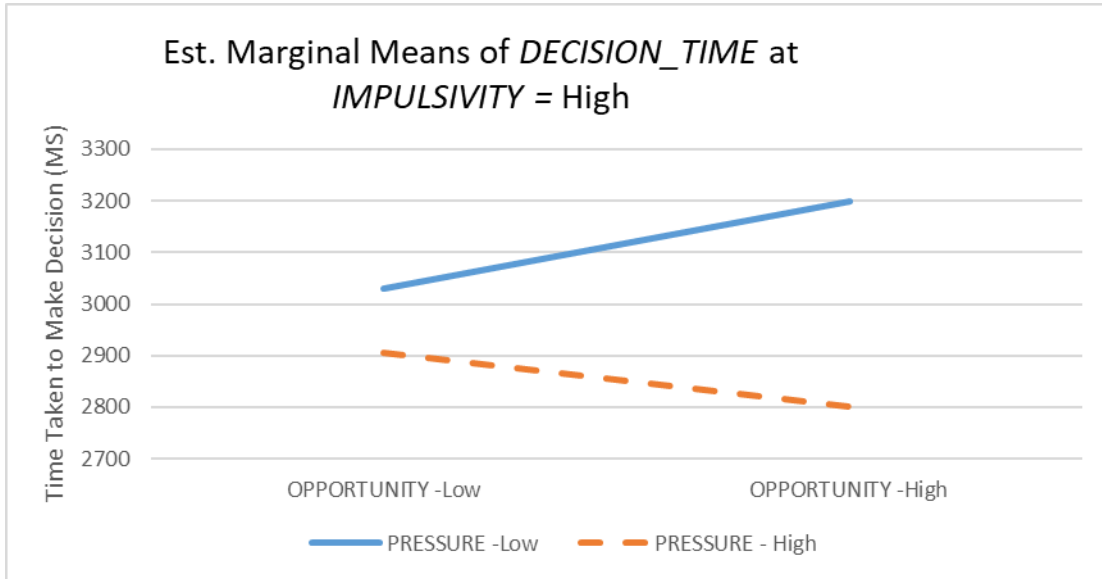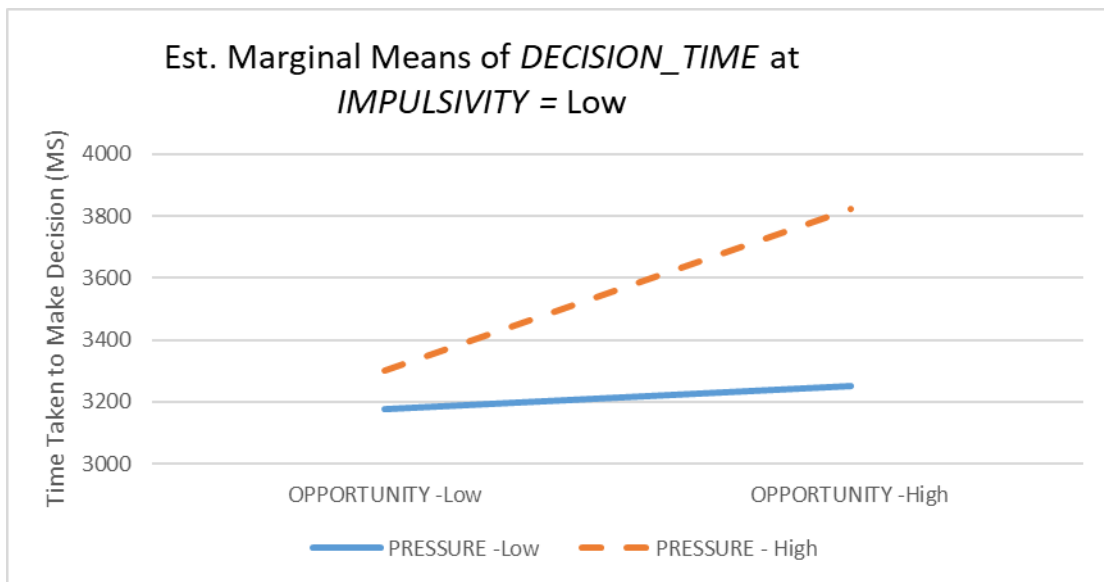

Figure 6: Graph of Estimated Marginal Means of Time Taken to Make Decision for Non-Impulsive Individuals

Table 1. Participant Demographics

		Number	_Percent_
Gender	Female	198	65%
	Male	108	35%
	n	306	100%
Interacted with Internal Auditors	Yes	115	38%
	No	191	62%
	n	306	100%

	_n_	_Mean_	_(S.D.)_
Age	306	36.88	(10.510)
Years of Work Experience	306	15.98	(10.303)

Table 2. Descriptive Statistics

	Number	_Percent_
Periods Played (N)	3060	100%
Periods when Fraud Occurred	1207	39.44%
Periods when Fraud was Detected	310	10.13%

Number of Times Participants Chose to Commit Fraud During the Simulation (Out of 10 Periods)

Zero	65	21.24%
One Time	11	3.59%
Two Times	24	7.84%
Three Times	40	13.07%
Four Times	36	11.76%
Five Times	42	13.73%
Six Times	30	9.80%
Seven Times	18	5.88%
Eight Times	13	4.25%
Nine Times	6	1.96%
Ten Times	21	6.86%
Total Number of Participants in Simulation	**306**	**100%**

Variables	_n_	_Minimum_	_Maximum_	_Mean_	_Median_	_Std Error_
OPPORTUNITY_MS	3060	0	69987	839.94	566.5	33.85
PRESSURE_MS	3060	0	50388	1494.18	599.5	53.29
INFLATION_CHOICE_MS	3060	1	56693	897.57	505.5	32.44
DECISION_TIME	3060	1	72963	3231.7	2010.0	83.12
BEGINNING_BALANCE_LIRA	3060	-15	140	38.03	35.0	0.36
FRAUD_OCCURRENCE_PROPORTION	306	0	1	0.39	0.4	0.00
REMORSE	306	1	7	4.84	5.0	0.03
BANK_BALANCE_INFLUENCE	306	1	7	3.66	4.0	0.04
PRESSURE_INFLUENCE	306	1	7	3.35	3.0	0.03
OPPORTUNITY_INFLUENCE	306	1	7	4.53	5.0	0.04
PERCEIVED_OPPORTUNITY	306	1	7	4.03	4.0	0.03
DIFFICULT_DECISION	306	1	7	4.67	5.0	0.02
IMPULSIVITY	306	31	109	57.71	57.0	0.21
NARCISSISM	306	3	15	8.6	8.0	0.05
RISK_PROPENSITY	306	7	52	24.57	23.5	0.18

Variable Definitions:

*OPPORTUNITY_MS***:** Amount of time participants spent on the opportunity box.

PRESSURE_MS: Amount of time participants spent on the pressure box.

INFLATION_CHOICE_MS: Amount of time participants spent on the inflate/do not inflate boxes.

DECISION_TIME: Total time participants took to arrive at the inflate/do not inflate reimbursement decision.

BEGINNING_BALANCE_LIRA: The beginning bank balance participants had for each period.

FRAUD_OCCURRENCE_PROPORTION: The number of times participants decided to inflate reimbursements out of the 10 periods in the simulation.

REMORSE: Continuous variable from a post-simulation question on participants' feelings of remorse for submitting inflated reimbursement requests.

BANK_BALANCE_INFLUENCE: Continuous variable from a post-simulation question on the influence of the beginning balance on the decision to submit inflated reimbursement requests.

PRESSURE_INFLUENCE: Continuous variable from a post-simulation question on the influence of financial pressure on the decision to submit inflated reimbursement requests.

OPPORTUNITY_INFLUENCE: Continuous variable from a post-simulation question on the influence of opportunity on the decision to submit inflated reimbursement requests.

PERCEIVED_OPPORTUNITY: Continuous variable from a post-simulation question on participants' perception of the opportunity to inflate reimbursements without detection.

DIFFICULT_DECISION: Continuous variable from a post-simulation question on how difficult it was for participants to decide to submit inflated reimbursements.

IMPULSIVITY: Continuous variable from participants' response to the Barratt Impulsiveness Scale.

NARCISSISM: Continuous variable from participants' response to the Extreme factor of the Narcissism Spectrum Scale.

RISK_PROPENSITY: Continuous variable from participants' response to the Risk Propensity Scale.

Table 3. ANCOVA Results

Model: Dependent variable: *DECISION_TIME* (Adjusted R^2=0.124)

Source	DF	Sum of Squares	Mean Square	F value	P
Model	222	12110000000	54567906	2.946	<0.001
Error	2837	52550000000	18524014		
Corrected Total	3059	64670000000			

Source	DF	Sum of Squares	Mean Square	F value	P
ID	1	256628023	256628023	13.854	<0.001
PERIOD	1	4362936356	4362936356	235.529	<0.001
NARCISSIM	1	25302521	25302521	1.366	0.243
AGE	1	202666209	202666209	10.941	0.001
GENDER	1	68009389	68009389	3.671	0.055
INTERNAL_AUDIT_EXPERIENCE	1	160605989	160605989	8.670	0.003
SOCIAL_VALUE_ORIENTATION	1	132071344	132071344	7.130	0.008
CAUGHT_BY_AUDITORS	1	251388622	251388622	13.571	<0.001
PRESSURE	1	66989010	66989010	3.616	0.057
OPPORTUNITY	1	19672559	19672559	1.062	0.303
IMPULSIVITY	54	2689594578	49807307	2.689	<0.001
*PRESSURE*OPPORTUNITY*[b]	1	24247662	24247662	1.309	0.127
*IMPULSIVITY*PRESSURE*[b]	53	1297819063	24487152	1.322	0.030
*IMPULSIVITY*OPPORTUNITY*[b]	53	1477144357	27870648	1.505	0.005
*IMPULSIVITY*PRESSURE*OPPORTUNITY*[b]	50	1167212308	23344246	1.260	0.052

Simple effects:

	DF	Sum of Squares	Mean Square	F value	P
IMPULSIVITY is High					
Simple effect of *PRESSURE* under *OPPORTUNITY*-Low[b]	1	3671836	3671836	0.191	0.331
Simple effect of *PRESSURE* under *OPPORTUNITY*-High[b]	1	25212068	25212068	1.310	0.126
IMPULSIVITY is Low					
Simple effect of *PRESSURE* under *OPPORTUNITY*-Low[b]	1	2848855	2848855	0.148	0.350
Simple effect of *PRESSURE* under *OPPORTUNITY*-High[b]	1	78684333	78684333	4.089	0.022

[b] The hypothesis tests are one-tailed tests therefore the interaction p-values have been halved.

Variable Definitions:
PRESSURE: Binary variable indicating the financial pressure condition (1= high, 0=low).
OPPORTUNITY: Binary variable indicating the opportunity condition (1= high, 0=low).
IMPULSIVITY: Continuous variable from participants' response to the Barratt Impulsiveness Scale.
NARCISSISM: Continuous variable from participants' response to the Extreme factor of the Narcissism Spectrum Scale.
*ID***:** Categorical variable to identify participants for each simulation period.
PERIOD: Identifies the results for the specific period out of the 10 simulation periods.
AGE: Continuous variable indicating participants' age.
GENDER: Categorical variable indicating participants' gender.
INTERNAL_AUDIT_EXPERIENCE: Categorical variable indicating participants' experience with internal auditors (1= yes, 0 = no).
SOCIAL_VALUE_ORIENTATION: Categorical variable from participants' response to the Social Value Orientation Slider Scale.
CAUGHT_BY_AUDITORS: Categorical variable indicating whether or not participants who decided to submit inflated reimbursements
    had the fraud detected for the period (1=caught, 0= not caught).

Appendix: Research Study Materials

Barratt Impulsiveness Scale

Instructions: People differ in the ways they act and think in different situations. This Scale is a test to measure some of the ways in which you act and think. Read each statement and select the statement that is appropriate on the right side. Do not spend too much time on any statement. Answer quickly and honestly.

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always/Always

1. I plan tasks carefully.
2. I do things without thinking.
3. I make-up my mind quickly.
4. I am happy-go-lucky.
5. I don't "pay attention".
6. I have "racing" thoughts.
7. I plan trips well ahead of time.
8. I am self-controlled.
9. I concentrate easily.
10. I save regularly.
11. I "squirm" at plays or lectures.
12. I am a careful thinker.
13. I plan for job security.
14. I say things without thinking.
15. I like to think about complex problems.
16. I change jobs.
17. I act "on impulse".
18. I get easily bored when solving thought problems.
19. I act on the spur of the moment.
20. I am a steady thinker.
21. I change residences.
22. I buy things on impulse.
23. I can only think about one thing at a time.
24. I change hobbies.
25. I spend or charge more than I earn.
26. I often have extraneous thoughts when thinking.
27. I am more interested in the present than the future.
28. I am restless at the theater or lectures.
29. I like puzzles.
30. I am future oriented.

Narcissism Spectrum Scale (Extreme subscale only)

On a scale of 1 (strongly disagree) to 5 (strongly agree), indicate how much you agree or disagree with each item.

1. I secretly believe I'm better than most people.
2. Obstacles rarely slow me down.
3. I'm great at a lot of things compared to most people.

Risk Propensity Scale

Instructions: Please indicate the extent to which you agree or disagree with the following statement by choosing the option you prefer (1=totally disagree, 9=totally agree). Please do not think too long before answering; usually your first inclination is also the best one.
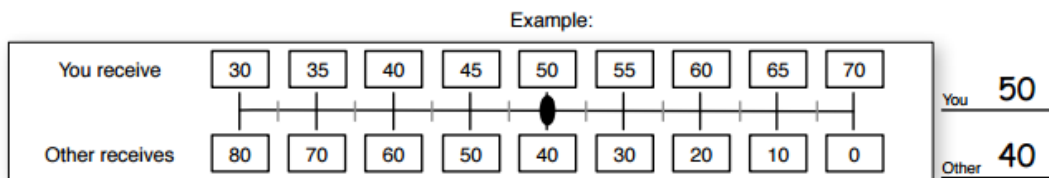
1. Safety first.

2. I do not take risks with my health.
3. I prefer to avoid risks.
4. I take risks regularly.
5. I really dislike not knowing what is going to happen.
6. I usually view risks as a challenge.
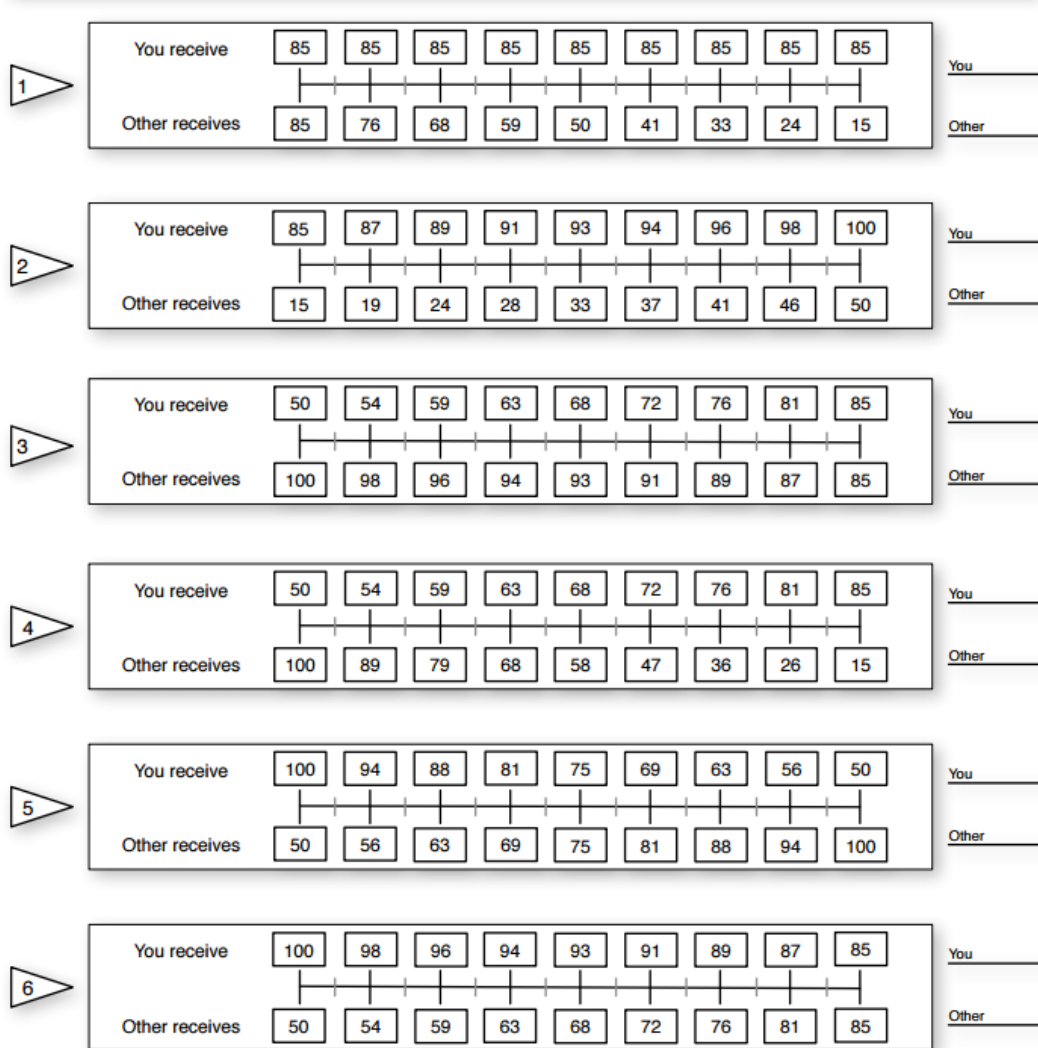7. I view myself as a ….. (1=risk avoider, 9=risk seeker).

Social Value Orientation

Instructions: In this task you have been randomly paired with another person, whom we will refer to as the other. This other person is someone you do not know and will remain mutually anonymous. All of your choices are completely confidential. You will be making a series of decisions about allocating resources between you and this other person. For each of the following questions, please indicate the distribution you prefer most by marking the respective position along the midline. You can only make one mark for each question.

Your decisions will yield money for both yourself and the other person. In the example below, a person has chosen to distribute money so that he/she receives 50 dollars, while the anonymous other person receives 40 dollars.

There are no right or wrong answers, this is all about personal preference. After you have made your decision, write the resulting distribution of money on the spaces on the right. As you can see, your choices will influence both the amount of money you receive as well as the amount of money the other receives.

Example:

| You receive | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | You | 50 |
| Other receives | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 | 0 | Other | 40 |

1

| You receive | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | You _____ |
| Other receives | 85 | 76 | 68 | 59 | 50 | 41 | 33 | 24 | 15 | Other _____ |

2

| You receive | 85 | 87 | 89 | 91 | 93 | 94 | 96 | 98 | 100 | You _____ |
| Other receives | 15 | 19 | 24 | 28 | 33 | 37 | 41 | 46 | 50 | Other _____ |

3

| You receive | 50 | 54 | 59 | 63 | 68 | 72 | 76 | 81 | 85 | You _____ |
| Other receives | 100 | 98 | 96 | 94 | 93 | 91 | 89 | 87 | 85 | Other _____ |

4

| You receive | 50 | 54 | 59 | 63 | 68 | 72 | 76 | 81 | 85 | You _____ |
| Other receives | 100 | 89 | 79 | 68 | 58 | 47 | 36 | 26 | 15 | Other _____ |

5

| You receive | 100 | 94 | 88 | 81 | 75 | 69 | 63 | 56 | 50 | You _____ |
| Other receives | 50 | 56 | 63 | 69 | 75 | 81 | 88 | 94 | 100 | Other _____ |

6

| You receive | 100 | 98 | 96 | 94 | 93 | 91 | 89 | 87 | 85 | You _____ |
| Other receives | 50 | 54 | 59 | 63 | 68 | 72 | 76 | 81 | 85 | Other _____ |

Cognitive Reflection Test (CRT)

Instructions: Below are three items that vary in difficulty. Answer as many as you can.

(1) A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball.
How much does the ball cost? _____ cents
(2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take
100 machines to make 100 widgets? _____ minutes
(3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size.
If it takes 48 days for the patch to cover the entire lake, how long would it
take for the patch to cover half of the lake? _____ days
CRT Answer: (1) 5   (2) 5   (3) 47
iCRT Answer: (1) 10 (2) 100   (3) 24

Berlin Numeracy Test (Single-item median format)

Instructions: Please answer the question below. Do not use a calculator.

1. Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? (Please indicate the probability in percent). _____% Answer: 25%.

Demographic Questions

1. Age
2. Gender
3. Years of Work Experience
4. During your work experience, have you interacted with internal auditors?

Simulation Instructions

WebSmart, Inc. is a marketing company that provides marketing strategies and consulting for its clients.

For this simulation, please assume that you are an employee of WebSmart, and that your job requires you to travel to meet with clients each period.

This simulation will last for multiple periods. At the beginning, you have 25 Lira in your bank balance. You will receive a salary of 35 Lira per period if you remain employed by WebSmart, Inc. As your job requires you to travel, you have expense reimbursement requests to submit to WebSmart's Accounting Department every period.

With the expense reimbursements, you have the opportunity every time you submit a reimbursement to provide the Accounting Department with the right expense amount or to inflate the reimbursement by 10 Lira. For example, if the amount you spent on travel for the period is 200 Lira, you would submit 200 Lira as the amount for reimbursement. If you choose to inflate the reimbursement, you would submit 210 Lira as the amount for reimbursement. The additional 10 Lira would then go towards paying for your household expenses or to your bank balance. In other words, inflating the reimbursement would increase your financial position.

WebSmart, Inc. has internal auditors who are tasked with ensuring that the company's internal controls are working well. Each period, the internal auditors will select a portion of the expense reimbursement requests to verify the expense amounts and documentation provided by the employees. In periods of high opportunity to inflate reimbursement, the internal auditors will verify 10% of expense reimbursement requests. This means that there is a 10% chance that any inflated expense reimbursement requests will be detected. In periods of low opportunity to inflate reimbursement, the internal auditors will verify 30% of expense reimbursements requests. The chance of detection in periods of low opportunity is 30%.

Audit Procedures

If you submit an inflated expense reimbursement request and the internal auditors did not detect the inflated request, 10 Lira will be added to increase your financial position. However, if you decide to submit an inflated expense reimbursement request and the internal auditors detect it, you will be penalized and have 10 Lira deducted from your bank balance after household expenses are considered.

Each period will proceed as follows:

1. You will see your bank balance, the opportunity to inflate reimbursement requests, and your household expenses for the period. Too see the information, move your cursor to the corresponding boxes during the simulation.
2. Knowing that you will receive 35 Lira each period as salary, you will decide whether to inflate your expense reimbursement request or submit the expense reimbursement request as is. If you decide not to inflate your expense reimbursement request, your Bank Balance for the next period= Bank Balance for the current period + Salary - Household Expenses for this period.
3. The internal auditors will verify the reimbursement requests at the end of the period. If you decided to inflate the expense reimbursement request, you would learn if the internal auditors detected the reimbursement inflation.
a) If the internal auditors do not detect the inflated reimbursement request, your Bank Balance for the next period= Bank Balance for this period + Salary- Household Expenses +10 Lira
b) If the internal auditors detect the inflated reimbursement request, your Bank Balance for the next period= Bank Balance for this period +Salary- Household Expenses -10 Lira
4. You will then move on to the next period in the simulation.
At the conclusion of this simulation, you will be compensated based upon the Lira you have in the bank. The conversion rate is 15 Lira to $1. For example, 75 Lira are worth $5.

Case Comprehension Questions

1. What is your salary per period?
   - 10 Lira
   - 15 Lira
   - 20 Lira
   - 25 Lira
   - 30 Lira
   - 35 Lira
2. How many Lira will you have at the beginning of the simulation?
   - 10 Lira
   - 15 Lira
   - 20 Lira
   - 25 Lira
   - 30 Lira
   - 35 Lira
3. Your current bank balance is 10 Lira and your household expense for this period is 40 Lira. Assume that you decide to inflate your expense reimbursement request. How many Lira will you have on your bank balance if the internal auditors did not notice the inflated request?
   - 10 Lira
   - 15 Lira
   - 20 Lira
   - 25 Lira
   - 30 Lira
   - 35 Lira
4. Your current bank balance is 25 Lira and your household expense for this period is 30 Lira. Assume that you decide to inflate your expense reimbursement request. How many Lira will you have on your bank balance if the internal auditors detected that the expense reimbursement request is inflated?
   - 10 Lira
   - 15 Lira
   - 20 Lira
   - 25 Lira
   - 30 Lira
   - 35 Lira

MouselabWEB Simulation

Period n

Bank Balance: _____   Salary: 35 Lira

Your household expenses and the internal auditors expense reimbursement verification extent is available below. Do you choose to inflate your expense reimbursement request for this period?

Household Expenses for this Period	% of Expense Reimbursement Requests Selected for Internal Audit

<u>Choice Buttons</u>

Button A: Yes, I would like to submit an inflated expense reimbursement request.

Button B: No, I would like to submit the expense reimbursement request as is.

If participants chose Button A and the auditors detected the inflated reimbursement

This period, the internal auditors selected your expense reimbursement request as part of their internal audit and the inflated amount was discovered. 10 Lira will be deducted from your bank balance in the next period.

If participants chose Button A but the auditors did not detect the inflated reimbursement

This period, the internal auditors did not select your expense reimbursement request as part of their internal audit. Consequently, the inflated amount was not discovered. 10 Lira will be added to your bank balance in the next period.

If participants chose Button B, they moved to the next period.

Post-Simulation Questions

1. How difficult was the decision to inflate reimbursements for you? (Not difficult-Very difficult, 7-point scale)
2. I feel bad about submitting inflated reimbursement requests during the simulation. (Strongly disagree- Strongly agree, 7-point scale)
3. The perceived opportunity to inflate expense reimbursement requests without detection in the simulation is (Very low-Very high, 7-point scale)
4. How much did the household expense listed influence your decision to inflate or not to inflate the expense reimbursement request? (Minimum influence-Maximum influence, 7-point scale)
5. How much did the percentage of expense reimbursement request selected for internal audit listed influence your decision to inflate or not to inflate the expense reimbursement request? (Minimum influence-Maximum influence, 7-point scale)
6. How much did your displayed bank balance influence your decision to inflate or not to inflate the expense reimbursement request? (Minimum influence-Maximum influence, 7-point scale)

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