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ABSTRACT

ERROR REPORTING: THE IMPACT OF ERROR BELIEF, REPORTING CONSEQUENCE, ERROR CONSEQUENCE, ERROR VISIBILITY, AND INDIVIDUAL DIFFERENCE VARIABLES

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Work errors can have severe consequences on the error committer, other employees, the organization, and other stakeholders. Reporting work errors to management, informally or formally, is imperative as it can help prevent error cascades, mitigate legal ramifications, facilitate individual and social learning, and reduce future error commission. Because reporting work errors can have positive outcomes for the individual, their work unit, and the organization, it is important to investigate the antecedents of error reporting. By using a policy-capturing design and taking a socioecological approach, this study empirically tested how organizational (e.g. error belief, reporting consequence), situational (e.g. error consequence, error visibility) and individual difference (e.g. locus of control, conscientiousness, and honesty-humility) variables influence the likelihood of individual error reporting. Hypothesis testing using hierarchical linear modeling demonstrated that high error visibility, low error consequence, and higher honesty-humility were associated with greater likelihood of reporting. Key insights, theoretical contributions, and practical contributions are discussed.
DEDICATION

To my mom, Liberty, and my tatay, Mel, how I wish that one day I can truly and fully grasp the sacrifices you made and the world that you put aside to move to Canada in search for a better future for me and my brothers. With that said, the sliver of it that I can fathom is a large part of what has kept me going during the most difficult times. You taught me to be resilient and to always strive for more – characteristics that I had to rely on to get me to through to the end of this journey. Your love for and faith in me have always been infinite and unconditional resources, both of which I vow to never take for granted.

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Introduction

In 2017, a cascade of work errors at the West Point wastewater treatment plant caused 15 million gallons of raw sewage to spill into the facility and its surrounding areas. As a result of the flooding, freshwater fish were threatened in Puget Sound, employees were injured, the treatment centre was shut down, and $25 million worth of infrastructure and equipment were damaged (Willmsen & Mapes, 2017). Due to the incident’s recent occurrence, a thorough investigation is still underway. However, Willmsen and Mapes’ investigation for the Seattle Times which included interviews with employees and examination of more than 7,000 documents, determined that, beyond reasons like equipment failures, lack of training, and faulty maintenance, errors in judgment and poor communication were the main causes of the disastrous event.

The West Point case demonstrates how work errors can have immense effects on many people at multiple levels (e.g., employees, the organization, the broader community and its members, and even future generations). In line with this perspective, Kumar and Raina (2017) reviewed error cascades in the medical profession and noted that between 48% and 54% of adverse medical events were the result of error chains, where identifying individual errors earlier in the process could have prevented the occurrence of aversive outcomes like incidents or injuries. Due to the potential for individual work errors to affect multiple stakeholders at different levels, work errors are the focus of this study.

More specifically, the purpose of this study was to investigate how organizational (e.g. error belief, reporting consequence), situational (e.g. error consequence, error visibility) and individual difference (e.g. locus of control, conscientiousness, and honesty-humility) variables influence the likelihood of individual error reporting. This study used a policy-capturing design
to examine how these variables are weighed when individuals make error reporting decisions. Undergraduate students were asked to read hypothetical scenarios with varying levels of antecedents and consequences associated with error reporting and asked to rate how likely they are to report the error in each situation.

With this thesis, I aimed to: (1) identify what errors are and discuss why error reporting is important, (2) identify major antecedents of error reporting from a socioecological perspective, (3) describe the policy-capturing methodology, (4) describe the results of hierarchical linear modeling, (5) interpret the findings, and (6) highlight key insights and contributions.

**Defining Errors**

Before delving into the specifics of the study, it is important to first define key, relevant terms. Frese and Keith (2015) define *errors* as unintentional deviations from established plans, procedures or feedback processing leading to a relevant work impact. A few aspects of this definition are notable. First, deviations from plans or procedures must be unintentional for the action or decision to be considered an error. An action that similarly deviates from the procedures or processes at work but is performed by the doer with intention is instead considered a *violation*. Second, errors can be identified based on their deviation from a known standard. Third, errors must cause the nonattainment of work goals or outcomes.

Aside from errors being different from *violations*, it has also been argued that accidents are fundamentally different from errors (van Dyck, 2009; Frese and Keith, 2015). While errors at work can and often do lead to accidents, this is not necessarily the case. There are other, more minor negative outcomes aside from accidents that can result from the occurrence of an error. These negative outcomes include time loss and financial costs, to name a few. In addition, errors can sometimes lead to positive outcomes such as gaining new information or innovation.
Furthermore, accidents can be conceptualized as adverse events at work that are not due to avoidable human factors (van Dyck, 2009). This is different from how errors are defined since errors can and often involve human factors (e.g., fatigue).

Although accidents, by definition, are fundamentally different from errors, a portion of the literature on accidents does not appear to distinguish between these two concepts in the same way. For instance, Christian, Bradley, Wallace, and Burke’s (2009) literature review on workplace accidents found that 60 out of 90 articles identified human-related factors (e.g., safety knowledge, safety motivation, job attitudes) as main predictors. Because accident research often covers work errors, this thesis includes findings from the accident literature despite the conceptual differences between the two terms.

Because error is not entirely synonymous with accident, organizations that are accident-free may not be error-free. Going beyond this, some researchers even believe that organizations cannot possibly be error-free. Through this lens, errors are viewed as inevitable due to several factors inherent in a workplace. These include organizational factors like the physical environment (e.g., increased likelihood of a chemical mix-up at a chemical factory with a disorganized storage) and organizational structure and processes (e.g., increased likelihood of medication being given twice when a hospital’s pre-surgery process involves transferring patients between several departments; Vaughan, 1999) as well as more individual-level factors (e.g., fatigue, lack of sleep; Edmondson, 2004). Not only are errors inevitable in theory, they do occur – and often – in reality. To put matters into perspective, in 2006, 19% of 18,676 Canadian nurses reported having given their patient the wrong type or dosage of medication within the past year (Statistics Canada, 2006) with some of these nurses reporting “frequent” occurrences of medication errors. Errors, therefore, are not only likely to occur, but do occur in work
organizations. These data are informative with respect to the occurrences of errors; however, they do not identify the frequency of error reporting, discussed next.

**Error Reporting**

**Error reporting in organizations.** Error reporting is defined as “the act of individuals communicating their errors to their managers or supervisors, either verbally or through formal error reporting systems” (Zhao & Olivera, 2006). Formal error reporting systems are processes that are put in place to facilitate error reporting. For example, the Canadian Medication Incident Reporting and Prevention System¹ (CMIRPS) encourages the submission of reports about harmful medical incidents (e.g., patient takes wrong drug and suffers a stroke), hazardous situations (e.g., mix up of drugs with names that look or sound alike such as Amoxicillin and Ampicillin), no-harm incidents (e.g., wrong drug dispensed but error was recognized by consumer after one dose taken), and near miss incidents (e.g., wrong drug dispensed but error was recognized by pharmacist before drug was given to consumer).

After the error committer files a report through the appropriate CMIRPS online channels, the larger CMIRPS database is reviewed to look for similar cases and identify any trends. Action plans and recommendations are made via bulletins, alerts, and stakeholder communication with a focus on developing measures for reducing the likelihood of error reoccurrence (CMIRPS, 2011). Formal systems like the CMIRPS are enforced at the federal level but other formal systems are enforced on smaller scales; that is, at provincial, even organizational, levels. It is, however, not always the case that such systems make error reporting the norm in organizations.

¹ The Canadian Medication Incident Reporting and Prevention System (CMIRPS) is a collaborative program developed by Health Canada, Canadian Institute for Health Information, Institute for Safe Medication Practices Canada, and Canadian Patient Safety Institute.
Barach and Small (2000) examined twelve of these reporting systems in industries and organizations in the U.S. and in Europe, including NASA and more generally, aviation, steel production, and nuclear industries. They found that only five of twelve systems enforced mandatory reporting of errors and accidents (i.e., British Airways air safety, British Airways special event search, US navy human factors failure, NASA, and US Federal nuclear regulatory control reporting systems). The remaining seven systems, while mandated and implemented by the federal government, deemed that reporting errors ranging from near-misses to serious incidents were only voluntary. With such processes being voluntary, it would not be surprising to find that work errors are not always reported.

In line with this notion, Zhao and Olivera (2006), in their literature review of factors influencing error handling, proposed that error reporting remains largely discretionary. To determine precisely how common error reporting is in some industries, Probst and Estrada (2010) recruited 425 employees from machinery manufacturing, utilities, ambulatory health services, paper manufacturing, and food services industries and asked them to discuss their experiences with accidents at work. They found that for every one accident reported within the organization, more than two went unreported. Of these employees, 54% indicated experiencing and failing to report an accident within the previous year.

The voluntary nature of formal reporting systems helps explain why error reporting is considered to be discretionary and why employees may be more likely to withhold than report. Within this discretionary perspective, it is important to consider the perceived consequences of reporting or not reporting errors from the committer’s point of view to determine the likelihood of reporting. These perceived consequences can be positive or negative, discussed next.
Consequences of error reporting. The consequences of reporting or not reporting can be discussed at two levels: individual and group/organization. Both levels will be reviewed with the purpose of clarifying the reasons for employee reporting behavior.

Individual level. Error reporting can have important consequences for the individual who committed the error. Specifically, reporting can have positive or negative, self-concept, learning, or legal consequences. In many cases, these outcomes will depend on the reporting systems and policies in organizations.

Self-concept. Error reporting can impact one’s self-concept (Zhao & Olivera, 2006). For instance, if a person’s self-concept revolves around being a high-performing worker who does not make mistakes, then refraining from admitting their errors can help to confirm this belief about oneself. Alternatively, if a person’s self-concept revolves around being a transparent and honest worker then reporting can confirm this belief about oneself. In this particular case, failing to report could cause tension between the employee’s behaviour and self-concept and such tension could lead to feelings of guilt and discomfort (Zhao & Olivera, 2006). Nonetheless, employees may still prefer to deal with feelings like guilt and discomfort than risk facing other outcomes like being reprimanded or losing their jobs. Overall, depending on the nature of the employee’s self-concept, the decision to report or not report errors can reinforce or challenge one’s self-concept and, in turn, potentially bring about undesired emotions.

Learning. Additionally, error reporting can impact individual learning. To better understand how errors in general can serve a learning purpose, we can view work behaviours and errors from a schema theory perspective (Axelrod, 1973). This theory posits that humans create mental models – maps or networks of ideas– about what decisions or actions are more likely to lead to which outcomes. A waiter might have a mental model about which sets of actions lead to
successfully ‘opening’ the restaurant at the beginning of a workday and a factory line worker might have a mental model about which steps to take to get the conveyor machine up and running. From this perspective, errors can serve as a feedback function, indicating that mental models are inadequate or have incorrect parts and that individuals need to change or add to them. For instance, a waiter who accidentally serves a dish with peanuts to a diner with peanut allergies will learn that they should add “inform diner about dishes that contain common allergens” to their mental model of how to take an order.

One thing to note is that this argument assumes that individuals learn from errors regardless of how they are handled (e.g., report or not report). Error reporting, however, can add to the learning benefits. If we perceive managers as coaches (Beattie et al., 2014), reporting errors and discussing what was learned from errors with managers allows them to confirm to the employee that their pre-error mental models were wrong or inadequate and that the post-error change that they made is correct. The manager can, therefore, remove doubts that an employee has about changing their mental model after committing an error; an advantage that can only be taken if the employee reports the error to the manager. However, it is also possible for managers to reprimand or fire the employee for reporting the error, which could prevent learning by the employee from occurring. Thus, reporting can have positive or negative learning consequences.

Legal. Beyond self-concept and learning consequences, there are potential legal implications associated with error reporting. The legal implications of reporting can be beneficial if the organization has a policy of legal immunity for employees who are able to report the incident (often within 10 days of its occurrence; Barach & Small, 2000). However, if the organization does not have a policy offering legal immunity for reporting, then employees are
not protected and open themselves to potential legal actions, judicial issues, malpractice suits, and public scrutiny.

The legal consequences of error reporting discussed here manifest at the individual level but they are largely influenced by decisions made and policies enforced by the organization. However, this is not the only path linking the consequences of error reporting to the wider organization; in fact, broader group/organization level consequences of error reporting have also been proposed.

**Group/organization level.** Similar to how error reporting can have different kinds of individual consequences, group/organizational consequences can be broken down into cascade prevention, learning benefits, legal benefits, and future error reduction.

**Cascade prevention.** As the West Point case at the beginning of this thesis demonstrates, failing to report errors when they occur can lead to a cascade of errors with large-scale consequences. This is consistent with the Swiss Cheese Model (SCM) of accidents (Reason, Hollnagel, & Paries, 2006). The SCM argues that large-scale accidents are a result of a series of synchronous errors or failures. What logically follows from this stance is that identifying and reporting any given errors or failures in this series can help prevent larger-scale accidents from occurring. It is, therefore, beneficial to the organization for individual employees to report their errors in order to make error cascades less likely.

**Learning.** Viewing this topic from a different perspective, Harteis, Bauer, and Gruber (2008) strongly encourage reporting errors so that other members of the organization can learn from them. This position assumes that information individuals learn from errors can and should be shared with peers. This is consistent with Bandura’s (1986) social cognitive theory, which assumes that humans can learn vicariously from the experiences of others. In other words,
employees can make appropriate adjustments to their mental models based on their co-worker’s experiences, without needing to make the error themselves. Reporting errors to managers can facilitate group discussion between the error committer and his or her immediate workgroup.

Beyond facilitating discussion within the work group, reporting errors to managers can lead to learning at the organizational level. Organizational learning (Jerez-Gomez, Lorente, & Valle-Cabrera, 2005) posits that knowledge acquired from an individual’s work experiences (e.g., with errors) can be consolidated into the organizational memory. That is, information learned by individuals when they commit errors can be integrated into an organization’s systems, practices, training, structures, or routines (Vera & Crossan, 2004) thereby facilitating transfer of learning from one person to current and future members of the organization, in or out of the error committer’s immediate workgroup.

Legal. Consequences of error reporting to the organization are not restricted to cascade prevention and learning, legal consequences have also been considered. An assumption held by many is that reporting errors opens doors for legal action but empirical evidence shows that perhaps the opposite is true: error reporting often has positive legal consequences. Kachalia and colleagues (2010) retrospectively analyzed liability claims and costs before and after implementing a medical error disclosure program that offered legal protection to reporters and found that the average monthly rate of new liability claims decreased from 7.03 to 4.52 per 100 000 patient encounters (rate ratio of 0.64, \( p = 0.025 \), 95% CI [0.44, 0.95]) and the average monthly rate of lawsuits decreased from 2.13 to 0.75 per 100 000 patient encounters (rate ratio of 0.35, \( p = 0.000 \), 95% CI [0.22, 0.58]). Furthermore, they found that the implementation of the medical error disclosure program was associated with decreases in cost rates for total liability, patient compensation, and non-compensation-related legal costs.
Error reduction. The benefits of reporting errors extend beyond health care. For instance, Nahrgang, Morgeson, and Hofmann’s (2011) meta-analysis of 179 studies on work safety with 203 independent samples ($N = 186,440$) from four primary industries including construction, health care, manufacturing/processing, and transportation demonstrated, among other key findings, that an organizational climate of open discussion about safety and errors is negatively related to number of employee accidents and injuries ($\beta = -0.19$, $p < 0.05$), further supporting the idea that error reporting can have positive consequences to the wider organization.

In summary, the theoretical and empirical research on individual-level consequences is mixed in terms of positive or negative consequences whereas research on group/organizational consequences tips the scale towards positive consequences. That is, there is more evidence showing that individual error reporting is beneficial to the work group and organization than evidence showing that it is detrimental. Nonetheless, across these levels (individual, group, organization), there are varying consequences that can follow from error reporting. Given the range of consequences associated with error reporting, it is important to understand the factors that contribute to error reporting. In other words, given its potential consequences and primarily voluntary nature, what factors support employee reporting of errors?

Antecedents of error reporting. To help with classifying factors that affect employee reporting of errors, it is helpful to first discuss how organizations, often complex and multifaceted by nature, can be parcelled out into constituent levels. Because various components working in synchrony are needed to make an organization function (e.g., policies and regulations, operational systems, individual employees, work groups, etc.), partitioning the organization into these smaller units when attempting to understand and break down the causes and contributors of complex work-related phenomena can be useful (Kast & Rosenzweig, 1972).
One manner in which organizational levels can be partitioned borrows principles from the socioecological framework, otherwise referred to as socioecological model and social-ecological model. Historically applied across many diverse contexts, the socioecological framework in essence emphasizes the importance of considering layers of contextual factors in understanding and explaining human behaviour, cognitions, affect, and development (e.g., Bronfenbrenner, 1994). Proponents of the socioecological framework reject the idea that sufficient explanations for human phenomenon can be found by focusing solely on individual-level factors, such as traits, other stable proclivities, and so forth. Instead, they argue that individuals are also influenced by factors in the immediate and distant environment. In line with this perspective, this section classifies the antecedents of error reporting based on contextual factors – specifically, organizational and situational – and individual-level factors that influence error reporting.

**Organizational factors.** Although several organizational factors have been linked to error reporting, including power hierarchy (Chiang & Pepper, 2006), quality of manager-subordinate relationships (Patrician & Brosch, 2009), and the availability and nature of reporting systems (Barach & Small, 2000), one of the most commonly investigated factors is organizational culture with respect to error reporting; thus, organizational culture is the primary focus of this section. Organizational culture refers to the pattern of basic assumptions about ways to think and feel about work situations that employees invent, discover, or develop through exposure to experiences within the organization (Schein, 1984). In other words, organizational culture captures shared beliefs by members of an organization about what types of cognitions and behaviours are to be expected. One type of organizational culture that is particularly relevant to this proposed study is error culture.
Error culture refers to the norms and values specifically surrounding work errors (Frese & Keith, 2015). There are explicit norms and values, which are based on formal statements by higher-level management and written rules in work manuals, guides, or books, as well as implicit norms and values, which are based on narratives in meetings, how employees are disciplined, and other subtler sources. Two types of error culture have been proposed: error management culture (EMC) and error aversion culture (EAC). Recent studies have referred to EMC as positive error culture and EAC as negative error culture (King & Beehr, 2017).

In line with this distinction, EAC is typically associated with negative work outcomes. EAC has been linked to more adverse manager-employee relations surrounding work errors. That is, there is more blaming and more punishment for errors of varying type in an EAC workplace (van Dyck et al., 2005). Furthermore, Zhao and Olivera (2006) reported that employees in organizations with blame-oriented cultures, like EAC, are more likely to consider reporting errors as risky due to concerns about impression management and job security.

Furthermore, Ock, Lim, Jo, and Lee (2017), in their literature review, identified negative culture around errors and safety as a key obstacle to disclosing errors at work in the medical profession along with fear of punishment and medical lawsuits, fear of a damaged professional reputation, fear of undermining patient trust, and complexity of the situation.

In contrast, EMC has been associated with more positive work outcomes. EMC has been linked to greater work accountability. Workers in teams with EMC are more willing to report mistakes and accidents (Gold et al., 2014) and are more accountable for personal and peer errors (Gronewold & Donle, 2011). The relationship between EMC and work safety has also been observed in previous studies, particularly in occupations where high-stress, high-risk work is inherent in workers’ routine duties. For example, EMC is related to greater engagement in
safety-promoting behaviours, including communication about safety, among construction workers (Cigularov et al., 2010) and miners (Casey & Krauss, 2013). Overall, then, it seems that positive error culture (EMC) is linked to more error reporting and negative error culture (EAC) is linked to less error reporting.

One feature that characterizes positive error culture includes positive beliefs about errors (Keith & Frese, 2011). When an organization has positive beliefs about errors, members generally believe that errors are inevitable and should be openly shared with one another for learning purposes (van Dyck, 2009). The idea that positive beliefs about errors lead to more reporting is supported by findings from the safety climate, knowledge sharing, and organizational silence literatures, discussed next.

A literature review of 18 published safety climate questionnaires by Flin, Mearns, O’Connor and Bryden (2000) found that open communication and accident reporting were common emergent themes of these questionnaires. Similarly, Clarke (2010) used meta-analytical techniques and found that safety behaviour, including open discussion about safety-related errors, partially mediated the relationship between safety climate and accidents and injuries on the job. This finding suggests that the adoption of more positive beliefs around errors are related to more engagement in safety behaviours, including error reporting. These findings from the safety climate literature, therefore, can be used to further support the idea that more positive beliefs about errors is linked to more error reporting.

Beyond safety climate, the body of research on knowledge sharing gives us insight into the link between beliefs about error and error reporting. In their meta-analysis of 46 studies (N=10,487) investigating antecedents of organizational knowledge sharing from disciplines ranging from accounting to social work, Witherspoon, Bergner, Cockrell and Stone (2013) found that
organizational culture characterized by open communication about positive and negative work experiences, including committed work errors, was a strong significant antecedent of knowledge sharing within organizations ($r_c = 0.429, p < .001, 95\% \text{ CI} [0.375, 0.483])$.

In a literature review on the flip side of knowledge sharing, *organizational silence*, which is the phenomenon of doing or saying very little in response to significant problems or issues within an organization, Henriksen and Dayton (2006) identified the “status quo trap” as an antecedent of *failure* to report errors. The “status quo trap” refers to the idea that if the general tendency within the workgroup or the organization is to stay silent about errors, then members of the workgroup or organization will be motivated to act in ways consistent with the status quo. This indicates that a broader, organizational culture marked by silence and concealment in the face of errors is likely to influence individuals to withhold from discussing their errors.

Findings in this section are drawn from different literatures (e.g., error culture, safety climate, knowledge sharing) but common among these findings is the notion that positive beliefs around errors are more conducive to error reporting than negative beliefs around errors. Therefore, I hypothesize that positive error beliefs are linked to more error reporting than negative error beliefs.

*H1*: Positive error belief (vs. negative error belief) will be associated with greater likelihood of error reporting.

Aside from positive beliefs about errors, another feature that characterizes positive error culture is the occurrence of positive personal consequences following discussing errors (Keith & Frese, 2011). In their literature review on error reporting in organizations, Zhao and Olivera (2006) proposed that employees weigh costs and benefits of reporting to the self, others, and the organization before they decide to report. Probst and Estrada (2010) found that the top three
reasons for under-reporting endorsed by participants were primarily focused on reporting consequences: *your group lost [team] points* (37.3%), *you were blamed for the incident* (23.9%), and *you were blamed for ending the company’s accident-free record* (21.7%). This suggests that employees who consider reporting as costlier to the self, the work group, and/or the organization are less likely to report errors.

Research supports the notion that personal costs of reporting are weighted more than work group or organization costs. For instance, Barach and Small (2000) proposed that employees are more likely to report an error when reporting is personally incentivized (e.g., little extra work, assurances of no reprisal, no income loss, reputation protection, etc.). Moreover, Russo, Buonocore, and Ferrara (2015) reviewed error reporting research to identify reasons for under-reporting and found that 8 of 15 common reasons pertained to personal costs (e.g., “It could be detrimental to my professional reputation,” “It would take too much time,” “My job or position could be at risk.”).

Vrbnjak and colleagues (2016) conducted a more recent systematic review of the literature and found that one of the major fears that employees had about reporting errors is that they could lose their position or job. These suggestions, taken together, indicate that employees are more likely to report errors when they believe that positive, rather than negative, experiences will follow reporting. Therefore, I hypothesize that there is a higher likelihood of error reporting when the consequence of reporting is positive than when it is negative.

*H2:* Positive reporting consequence (vs. negative reporting consequence) will be associated with greater likelihood of error reporting.

*Situational factors.* Beyond organizational factors, situational factors have also been considered in relation to error reporting. For instance, some evidence shows that prior experience
making work errors (Chiang et al., 2010) and disagreement between employees about a work situation and whether or not it constitutes an error (Patrician and Brosch, 2009) may be related to reporting decisions. Two situational factors, in particular, that have been actively linked to likelihood of error reporting, include error visibility and severity of error consequence.

Error visibility. Error visibility, or the extent to which an error is observed by others, is a dimension of the experience of committing errors that varies depending on the situation. Take for example a professor who wrongly defines a mathematical concept. The error itself is the same if he does it during his office hours in front of one student or if he does it in class in front of 200 students; what changes is its visibility. How does visibility affect error reporting? Zhao and Olivera (2006), in their discussion on thought processes that error committers engage in after the occurrence of an error, argued that the extent to and duration in which the error remains undiscoverable to the committer and/or other members of the organization influences the likelihood of reporting. They suggest that with latent, or less visible, errors, individuals may feel less motivated to take action following the error, including reporting it to one’s manager.

Similarly, Frese and Keith (2015), in their literature review, noted that individuals sometimes deny the occurrence of an error and, in turn, refrain from reporting. Furthermore, the lower the visibility of an error, the more likely the committer is able to deny its occurrence. That is, the fewer the number of people who witness the error, the easier it is for the individual to repudiate the occurrence of the error. Taken together, these perspectives suggest that error visibility may be related to error reporting. Therefore, I hypothesize that high error visibility will be associated with more error reporting than low error visibility.

H3: High (vs. low) error visibility will be associated with greater likelihood of error reporting.
Severity of error consequence. When comparing errors with bigger or smaller consequences, Frese and Keith (2015) suggest that people are more likely to learn from errors with potential major consequences than those with potential minor consequences. More severe errors may prompt error commiters to be more motivated to discuss errors because these types of errors signal that critical aspects of individual or organizational knowledge or processes are incorrect and need to be modified (Homsma et al., 2009). The authors theorized that more severe consequences lead to less confusion with interpreting errors, and less confusion about significance— all of which should increase the likelihood of reporting errors.

In contrast, Hajcak and Foti (2008) argued that people may feel threatened when they make errors with negative consequences and, as a result, can deny the error or become defensive about it. Furthermore, Han, LaMarra, and Vapiwala (2017) theorized that forecasting error – the tendency to overestimate the impact or duration of the negative consequences of failure and underestimate the abilities of those involved to cope and recover – can lead to error commiters inflating the damage of an error to a point that they deem the situation “irreparable”. The authors further suggested that forecasting error could be one of the main barriers to error disclosure in the medical profession.

A literature review by Zhao and Olivera (2006) noted that negative emotions felt after the error was made, including fear of consequences, act as a significant barrier to reporting. They stated that experiencing fear of consequences might make the costs of reporting more salient to the individual, making it less likely for them to report errors. In a more recent literature review, Vrbnjak and colleagues (2016) partitioned the concept of fear of consequences into fear of being blamed or perceived as a troublemaker, or viewed as incompetent; fear of losing status, honour or dignity; or fear of formal disciplinary action. They further posited that when error commiters
perceive greater personal consequences, they are less likely to report errors. It appears, then, that even though all kinds of errors are encouraged to be reported, errors with more severe potential negative consequences to the individual reporter are less likely to be reported. Therefore, I hypothesize that low error consequence will be associated with more error reporting than high error consequence.

*H4:* Low (vs. high) error consequence will be associated with greater likelihood of error reporting.

**Individual factors.** Along with organizational and situational factors, individual factors also impact error reporting behaviour. For instance, Hannawa, Shigemoto, and Little (2016), in a vignette study, explored the idea that employees have different styles of disclosing errors, indicating that individual differences play an important role in error reporting. Furthermore, it has been proposed that individual characteristics explain, in part, why whistleblowers – employees that publically reveal information about misconduct or wrongdoing within organizations – feel compelled to report (Near & Miceli, 1985) despite the risk for harsh consequences. Two employee characteristics that have been investigated in connection with error reporting include locus of control and personality traits.

*Locus of control.* Locus of control, either internal or external, refers to the extent to which people feel they personally control outcomes of events (Rotter, 1966). When people have an internal locus of control, they tend to believe that they are in control and responsible over outcomes of events. In contrast, people who have an external locus of control tend to believe that forces external to them (e.g., fate, luck, other people) drive the outcomes of events. Christian and colleagues (2009) reviewed 90 articles on work safety and found that internal locus of control was significantly correlated with safety participation, involving discussing work errors,
hazards, and injuries ($M_{\rho} = .43, 95\% \text{ CI } [.34, .51], N=622$). Therefore, I hypothesize that individuals with internal locus of control are more likely than individuals with external locus of control to report errors.

**H5:** More internal locus of control (vs. more external locus of control) will be associated with greater likelihood of error reporting.

**Personality.** Compared to locus of control, less theoretical and empirical efforts have been directed at investigating personality traits as antecedents of error reporting. Nevertheless, predictions can be made about how personality is situated within this context if we consider error reporting as a logical extension of workplace ethical decision-making or workplace integrity. Lee and colleagues (2008) found that the honesty-humility factor of the HEXACO personality model, which measures one’s sincerity, modesty, and rule obedience, predicts scores on both an integrity test and a business ethical decision-making task, such that higher honesty-humility scores are associated with higher integrity scores ($\beta = .39, p < .001$) and more ethical decisions ($\beta = .49, p < .001$).

Beyond honesty-humility in the HEXACO personality model, Christian and colleagues (2009) found that only conscientiousness, which measures one’s propensity to follow norms for impulse control and be goal-directed, was consistently correlated with safety performance including discussing work errors, hazards, and injuries. Conscientiousness was weakly to moderately, but significantly, correlated with safety performance at $M_{\rho} = 0.18, 95\% \text{ CI } [.06, .28], N=1,317$. Taken together, these findings indicate that scores on honesty-humility and conscientiousness might impact the likelihood of error reporting. Therefore, I hypothesize that higher honesty-humility scores and higher conscientiousness scores will be associated with more error reporting.
H6: Higher scores (vs. lower scores) on honesty-humility will be associated with greater likelihood of error reporting.

H7: Higher scores (vs. lower scores) on conscientiousness will be associated with greater likelihood of error reporting.

The Present Study

The present study aimed to test hypotheses H1 to H7 using policy-capturing methodology. This methodology places participants at the center of hypothetical, yet realistic, situations in an attempt to elicit information about the patterns or “policies” used when making judgments or decisions (Karren & Barringer, 2002). Policy-capturing methodology was deemed appropriate for the present study for a number of reasons. First, error reporting can be described as an “effortful and deliberate decision process” (Zhao & Olivera, 2006) and policy-capturing methodology was specifically designed to capture such deliberate decision processes. Second, there are potential ethical concerns with finding the answers to these research questions within the parameters of a field study (e.g., promoting error occurrence at work, encouraging negative beliefs about errors in organizations, enforcing harsh reporting consequences); thus, policy-capturing methodology with a student sample is proposed to circumvent these challenges. Third, policy-capturing methodology allows researchers to precisely estimate how different pieces of information are weighed in decision-making and determine what is most influential to the decision-maker (Aiman-Smith, Scullen, & Barr, 2002). While researchers have attempted to differentially weigh the impact of error reporting antecedents in literature reviews (Frese & Keith, 2015; Zhao & Olivera, 2006), no study to date that I am aware of has attempted to investigate this process empirically.

Methodology
Methodological Design

This study used a within-subjects 2 (error belief) x 2 (reporting consequence) x 2 (error visibility) x 2 (error consequence) factorial design with 5 error exemplars/base scenario plots to sample from. The cues – error belief, reporting consequence, error visibility, and error consequence – were manipulated in the design of the scenarios.

Participants

Participants were recruited from the undergraduate business course participant pool of a southwestern Ontario university using SONA, the online study recruitment system. The study had one questionnaire package composed of the demographic items, scenarios, attention check items, manipulation check items, careful responding check items, and the individual difference scales on locus of control, honesty-humility, and conscientiousness (Appendix C). Participants were given course credit for participating in the study.

Because the scenarios are situated within a hypothetical restaurant, only students with a minimum of 6 months of experience working in the food and beverage service industry were asked to participate. Due to emerging issues associated with conducting traditional power analysis (e.g., Kelley, Maxwell, & Rausch, 2003), I conducted two Accuracy of Parameter Estimation (AIPE) analyses (Kelley & Maxwell, 2003) to estimate the sample size needed to ensure that we obtain confidence interval widths around our effect size of interest (i.e., regression coefficients) that are sufficiently narrow (i.e., not wider than the magnitude of the predicted effect size).

Because of the predicted multilevel nature of the data, two rounds of AIPE analysis were performed – one for Level 1 (within-subjects) and another for Level 2 (between-subjects). These
analyses were performed in R studio using the ss.aipe.reg.coef command from the MBESS package (Kelley, 2017).

For both rounds of AIPE analysis, I entered following the categories of input values into R as part of the ss.aipe.reg.coef command: 1) anticipated correlations between the independent variables; 2) anticipated correlations between each independent variable and the dependent variable (i.e., likelihood of error reporting); 3) the desired confidence interval width around the regression coefficients; and 4) the degree of certainty (i.e., degree of certainty that the obtained confidence interval will be sufficiently narrow).

For the Level 1 (within-subjects) AIPE analysis, I obtained an estimate of 3272 target number of individual ratings collected from each participant for a total of 205 participants (since each participant would be completing 16 study scenarios; 3272/16=205). I used an orthogonal design in the development of our scenarios and thus, the independent variables (i.e., error visibility, error consequence, error belief, and reporting consequence) are not correlated ($r=.00$). Due to a lack of published effect sizes that we could have used in this round of analysis, we assumed that each relationship between the independent variables and likelihood of reporting is weak ($r=.07$), following Bosco et al.’s (2015) correlational effect size benchmarks in the field of Industrial-Organizational Psychology. For desired confidence interval width, I specified a width of .07 so that the width would be no wider than the magnitude of the predicted effect size. The degree of certainty was set at 99% as per convention.

For the Level 2 (between-subjects) AIPE analysis, I obtained an estimate of 393 target number of participants. Based on past studies, we assumed a correlation of $r=.43$ between locus of control and likelihood of error reporting (Christian et al., 2009), $r=.39$ between honesty-humility and likelihood of error reporting (Lee et al., 2018), and $r=.18$ between
conscientiousness and likelihood of error reporting (Christian et al., 2009). For safer estimates, I assumed a weak correlation ($r=.07$) between all pairs of the independent variables (i.e., locus of control, honesty-humility, and conscientiousness). For desired confidence interval width, I specified a width of .18 so that the width would be no wider than the magnitude of the smallest predicted effect size. The degree of certainty was set at 99% as per convention.

This sample size determination analysis rendered sample size estimates for each of the two predicted levels of the multilevel study: 205 (Level 1) and 393 (Level 2). The decision was made to go with the more conservative estimate, 393 (Level 2) and efforts were made to recruit 420 participants, assuming that not some cases will need to be removed during data cleaning.

**Demographic Variables**

Participant gender, age, type of food and beverage job, and years of food and beverage work experience were measured and reported for descriptive purposes. Although past research has found non-significant relationships between demographic variables and reporting work errors (Mostafaei et al., 2014; Toruner and Uysal, 2012), mean differences in responding due to demographic differences were explored to confirm that these variables did not need to be added as fixed effects.

**Development of Scenarios**

To adhere to policy-capturing guidelines (Aiman-Smith et al., 2002; Karren and Baringer, 2002), a specific industry and work setting were chosen to make the scenarios as realistic as possible for the student sample. The restaurant was chosen as the lens through which the research hypotheses could be tested more broadly. This decision was made primarily because aspects of restaurant work and environment lend themselves to a wide range of error types. For instance, restaurant service work, due to its fast pace and high customer turnaround, is rarely closely
supervised by managers. Also, restaurant service work often has long chains of custody, whereby a single meal for a customer passes the hands of several workers (e.g., server, kitchen staff, bartender, food runner, and busser). Since lack of supervision and diffusion of responsibility make restaurant service work possibly more susceptible to errors, the restaurant setting was chosen as the background for the scenarios.

In an article listing best practices for designing studies that generalize, Highhouse (2009) strongly recommended researchers vary study stimuli that participants are exposed to, in order to simulate real life which, in turn, increases generalizability of the study. Therefore, developing a pool of error exemplars/base scenario plots was deemed important. To accomplish this goal, three graduate students in the Industrial-Organizational Psychology program at the University of Guelph with past restaurant work experience were interviewed about their experiences with personal or witnessed errors in the restaurant industry. They were asked one open-ended question, “Have you made an error or witnessed an error in a restaurant setting?” and prompted to speak freely about their experience. Their responses were used in the development of the error exemplars/base plot of the scenarios (see Appendix E for descriptions of five error exemplars/base scenario plots). These error exemplars were informally piloted, both in isolation and in combination with the cues and levels, in order to ensure that the exemplars are comparable in realism and how likely people are to report errors.

Four cues were developed to represent the antecedents that have been purported to influence error reporting: a) error belief, b) reporting consequence, c) error visibility, and d) error consequence (see Appendix F for a list of cues). The statements associated with the cue levels were set to an approximately equal length to reduce the likelihood of sentence length systematically contributing to error variance; that is, to minimize the probability that participants
prioritized the shorter cues over the longer cues or inferring the importance of certain cues based on sentence length.

The full pool of scenarios was created by combining the varying levels (2) of the cues (4) with different error exemplars (5) to generate the full pool of scenarios. Crossing the levels of each cue – 2 (error belief) x 2 (reporting consequence) x 2 (error visibility) x 2 (error consequence) – with each of the five error exemplars generated eighty possible scenarios. Of these eighty scenarios, only sixteen were shown to each participant. These sixteen scenarios were different for each participant and randomly chosen from the full pool of scenarios. The random selection process for choosing the sixteen study scenarios was carefully engineered to ensure that every set of sixteen study scenarios used in the study would have all possible cue and level combinations, adhering to full-factorial research design guidelines (Graham & Cable, 2001). However, not every error exemplar/base scenario plot was equally represented in each study set. See Appendix G for a full sample scenario.

After determining the unique sets of sixteen study scenarios, five scenarios with only the base plots and no information about the cues, were added to the beginning of each study set as practice scenarios. Providing practice scenarios to policy-capturing study participants gives them the opportunity to gradually learn the study process or task – a phenomenon called learning effect that could dilute results – with scenarios that will not be included in analyses (Aiman-Smith, Scullen, & Barr, 2002). Further, three scenarios from the study set were randomly selected and given to the participants as duplicates to test for within-person reliability and manipulation checks (Karren & Barringer, 2002). The scenarios were uploaded on Qualtrics and the presentation of the scenarios and cues within scenarios was randomized. Only one scenario was shown per page and a total of twenty-four scenarios, constituting the practice, study, and
duplicate scenarios, were displayed to the participants. The cues are discussed in more detail below.

Cues

Error belief. The error belief cue was designed to provide participants with information about the shared organizational belief surrounding the nature of errors in the scenarios. This cue has two levels, positive and negative error belief, and was analyzed as a categorical variable. For example, error belief was manipulated by directly stating either “At every meeting, the restaurant owner emphasizes how important it is for you and the other restaurant workers to understand that mistakes can often be avoided” (negative) or At every meeting, the restaurant owner emphasizes how important it is for you and the other restaurant workers to understand that mistakes are bound to happen” (positive).

Reporting consequence. The reporting consequence cue was designed to provide participants with information about the kind of consequence they are likely to face if they decide to report their error. This cue has two levels, positive and negative reporting consequence, and was analyzed as a categorical variable. For example, reporting consequence was manipulated by directly stating either “In the past month, you witnessed other servers getting publicly reprimanded in staff meetings for admitting their errors to your manager” (negative) or In the past month, you witnessed other servers getting publicly praised in staff meetings for admitting their errors to your manager” (positive).

Error visibility. The error visibility cue was designed to provide participants with information about how discoverable the errors in the scenarios are to others. This cue has two levels, high and low error visibility, and was analyzed as a categorical variable. Error visibility was manipulated by directly stating either “you take a moment to wonder if any of your co-
workers can figure out what happened, and you push the thought away, certain that no one can possibly identify you as the person who made the error” (low) and “you take a moment to wonder if any of your co-workers can figure out what happened, and you begin to worry, certain that some of your co-workers can definitely identify you as the person who made the error” (high).

**Error consequence.** The error consequence cue was designed to provide participants with information about the potential severity of error consequence in the scenarios. This cue has two levels, high and low error consequence, and was analyzed as a categorical variable. Error consequence was manipulated by directly stating either “the restaurant owner enforces a “three strikes and you’re fired” rule. Regardless of your decision, it is possible that the customer will complain to your manager. You currently have two strikes” (high) or “the restaurant owner enforces a “three strikes and you’re fired” rule. Regardless of your decision, it is possible that the customer will complain to your manager. You currently have zero strikes” (low).

**Dependent Variable**

After reading the scenarios, the participants were asked to rate how likely they are to report their own error to their manager using an eleven-point Likert scale item, ranging from 0 = “I am extremely sure that I would not report the error” to 10 = “I am extremely sure that I would report the error” Additionally, they were asked to rate how likely other people are to report their error to the manager in each situation, using the same eleven-point Likert scale. In an article that lists best practices for developing self-report measures in research, Schwarz (1999) raised concerns about social desirability responding and discussed strategies to circumvent these concerns. One strategy involves asking participants to report on how others think or behave. As such, participants will have an outlet for responses to the scenarios they believe people, in
general, would have (other-ratings) and an outlet for what they would do personally (self-ratings) with a lower risk of muddling these two ways of answering the dependent variable item.

**Individual Difference Variables**

**Locus of control.** Participants’ general locus of control was measured using the Locus of Control of Behaviour Scale (LCBS; Craig, Franklin, & Andrews, 1984). A sample item from the LCBS scale is “In my case, maintaining control over my problems is due mostly to luck.” The scale consists of 17 items, all of which have a 6 point Likert scale ranging from 1 = “*strongly disagree*” to 6 = “*strongly agree*” (See Appendix C).

**Honesty-humility.** Participants’ honesty-humility was measured using the HEXACO honesty-humility scale (Ashton & Lee, 2009). A sample item from the honesty-humility scale is “If I knew that I could never get caught, I would be willing to steal a million dollars.” The scale consists of 10 items, all of which have a 5 point Likert scale ranging from 1 = “*strongly disagree*” to 5 = “*strongly agree*” (See Appendix C).

**Conscientiousness.** Participants’ conscientiousness was measured using the HEXACO conscientiousness scale (Ashton & Lee, 2009). A sample of a reverse-scored item from the conscientiousness scale is “I make decisions based on the feeling of the moment rather than on careful thought.” The scale consists of 10 items, all of which have a 5 point Likert scale ranging from 1 = “*strongly disagree*” to 5 = “*strongly agree*” (See Appendix C).

**Attention and Manipulation Checks**

After the practice scenarios and study scenarios, participants were asked five questions to measure how well they attended to the scenarios. These attention check questions were as follows:
In the scenario where the customer received the wrong dish, what was wrong with the dish? A) Nuts present, customer stated nut allergy; B) Food had pork, customer stated religious restriction, C) Gluten present, customer asked for gluten-free, D) Missing side item.

In the scenario where the wrong amount was paid by the customer, which of the following is true? A) Bottles of wine added to the bill, instead of glasses of wine, B) Glasses of wine added to the bill, instead of bottles of wine, C) Beer added to the bill, instead of wine, D) Wine added to the bill, instead of beer.

In the scenario where the server forgot to put in an order, which of the following is true? A) Server forgot to put in order for appetizers, B) Server forgot to put in one of the entrée orders, C) Server forgot to put in all orders, D) Server forgot to put in the drink orders.

In the scenario where the customer and his wife were on an anniversary date, which of the following is true? A) Server dropped a dish on the floor, B) Server spilled hot coffee on the table, C) Server spilled beer on the regular customer, D) Server spilled wine on the customer’s wife.

In the scenario where there is confusion about a reservation, which of the following is true? A) Server forgot to book the reservation, B) Server booked the reservation but under the wrong name, C) Server booked the reservation but under the wrong time, D) Server booked the reservation but under the wrong date.

Which factors in the scenarios did you consider when making your decision? Please select all that apply. A) How the workplace views errors, B) How the manager treated servers who admitted errors in the past, C) How the error could affect you, regardless of your decision to report, D) How likely it was that your error would be discovered, E)
How your manager confronted you about the error, F) How your co-workers confronted you about the error, G) How you were treated when you admitted your error in the past, H) None of the above.

The participants were also asked to rate the following questions from 0 = “Not at all” to 10 = “Extremely” following the presentation of the duplicate scenarios to check the study manipulations:

To what degree do you perceive the belief about errors in this scenario as negative?
To what degree do you perceive the belief about errors in this scenario as positive?
To what degree is reporting on the error costly in this scenario?
To what degree is reporting on the error beneficial in these scenarios?
To what degree will the error have negative consequences (outside of reporting) in this scenario?
To what degree is the error discoverable to others?
To what degree is this scenario realistic?

Additional Items

To explore the likelihood that past personal experiences dictate participants’ decisions in the study, participants were asked the following question: “Did you have any prior experience with situations similar or related to the scenarios in this study that influenced your decision? (Yes or No) If so, what was it?” Because the aim of this study is to determine how the cues and individual factors specified in this paper influence error reporting, the responses to the dependent variable scale of participants who answered Yes to this question were explored and compared to those who answered No.
To increase the likelihood of honest responding, the true purpose of the study was hidden from the participants in the beginning. Instead, they were informed that the study was about the prevalence of errors at work and the kinds of actions that are taken following errors. Without this minor deception, the socially desirable response would be to report the error in most, if not all, situations, regardless of the cues and their levels. Shifting the focus of the study onto prevalence of errors hopefully changed what would be considered the socially desirable response. In this case, it is posited that being honest about what action the participant would take in each situation would be the more socially desirable response. To remain consistent with the cover story, the following questions were added to the end of the study, each with a rating scale from 0 (Never) to 11 (Daily):

Recall the scenarios about the food allergy and the forgotten table. How often were food order errors made by yourself or your co-workers when you worked in the food and beverage industry?

Recall the scenario about the wrongly entered drink order. How often were drink order errors made by yourself or your co-workers when you worked in the food and beverage industry?

Recall the scenario about the forgotten reservation. How often were reservation errors made by yourself or your co-workers when you worked in the food and beverage industry?

Recall the scenario about the spilled drink. How often were food or beverage handling errors made by yourself or your co-workers when you worked in the food and beverage industry?
In addition, participants were asked the following questions to check for careful responding:

We recognize that this study had a lot of information to process. We hope that you paid careful attention and answered truthfully. Please answer from 1 (Not at all) to 7 (Extremely): To what extent do your answers reflect honestly what you would have done in those situations?

In your honest opinion, should we use your data for analyses? Yes, No, Unsure.

To answer this question, please choose option number four, “agree.”

Choose the first option – “strongly disagree” – in answering this question.

To respond to this question, please choose option number five, “strongly agree.”

Please answer this question by choosing option number two, “disagree.”

In response to this question, please choose option number three, “neutral.”

**Procedure**

For the online experiment, a posting for the study was added to the SONA study list. Upon clicking the link, participants were directed to a Qualtrics-powered browser window where they were shown a detailed consent form (see Appendix B). Only participants who were eligible and agreed to participate were taken to the next page of the Qualtrics window where they were asked to complete the demographics questionnaire. Following demographics, they were presented with more detailed instructions (see Appendix D). Then, they were shown 5 practice scenarios, which were clearly labeled “PRACTICE” at the top of the screen. Following the practice set, they were shown the 16 study scenarios and 3 duplicate scenarios. After, they were asked to complete the locus of control, honesty-humility, and conscientiousness scales as well as the attention check, manipulation check, and additional items. Participants then read a short
debrief form (see Appendix H) and were provided contact information of the primary investigators.

**Data Analysis Prep**

**Data Preparation**

**Data cleaning.** Upon reaching the last date of data collection, I exported the dataset from the Qualtrics server in its raw form. A total of 408 individuals participated in the study. In preparation for data analysis, I took steps to exclude participants using several criteria. The first round of screening concerned the consent of participants. First, I removed cases ($N=6$) where participants did not give consent on the first page of the survey. That is, they clicked ‘No’ instead of ‘Yes’ on the consent form. Second, I removed cases ($N=7$) where the participants gave consent but did not start the scenarios. Lastly, I removed cases ($N=7$) where participants completed the study but decided to withdraw their consent at the end. That is, they clicked ‘No’ instead of ‘Yes’ in the section of the debriefing form that asks participants about consenting to have their data included in the study.

The second round of screening concerned the minimum 6 months of food and beverage work experience that I determined was necessary for the participants to have in order to appropriately and deeply adopt the role of the protagonist in the scenarios. First, I removed cases ($N=44$) where participants indicated not having any food and beverage work experience. Second, I removed cases ($N=19$) where participants indicated having less than 6 months of food and beverage work experience to ensure that the scenarios would be meaningful and relevant to them.

The final round of screening concerned the extent to which the participants paid attention to the study and carefully responded. One manner in which I determined this was by
interspersing careful responding questions within the individual difference variable measures (e.g., “Please answer this question by choosing option number two, “disagree”). The idea is that participants who failed to choose the right option are either not paying as much attention to the study in that moment or not carefully responding. Therefore, I removed cases (N=2) where participants failed three or more out of five careful responding questions. The rationale for including individuals who answered at least three of the careful responding questions correctly is for leniency towards the participants because these careful responding questions were placed at the end of the survey and thus, fatigue could also cause some participants to fail these questions.

Another implement that I put in place for capturing careful responding was the inclusion of attention check items. These were knowledge-based questions that asked about aspects of the scenario base plots (e.g., “In the scenario where the customer received the wrong dish, what was wrong with the dish? A) Nuts present, customer stated nut allergy; B) Food had pork, customer stated religious restriction, C) Gluten present, customer asked for gluten-free, D) Missing side item.”). Because the scenario base plots repeated between three to five times for any given block of scenarios, I removed cases (N=168) where the participants failed even one attention check item.

After these rounds of screening, we removed a total of 253 participants. See Figure 1 for data cleaning proportions. The remaining 155 participants who passed all of the screening rounds were included in the analysis. It is important to note that this final sample of 155 participants does not meet the desired sample size, a minimum of 393 participants, as determined through AIPE sample size analysis. This reduced sample size was largely a result of a high number of participants (N=170) being screened out for failing the attention checks and careful responding questions. A major consequence of having a sample that does not satisfy the minimum sample
size rendered by AIPE analysis is an increased likelihood of obtaining parameter estimates with confidence intervals that are too wide. As such, there can be an issue of imprecision with the results. Congruent with this possibility, the results included some parameter estimates with wider than desired confidence intervals, discussed in the next section. Cautionary notifications are attached to each of these results, bringing attention to their imprecise nature.

**Data Formatting and Coding**

**Transforming the dataset from wide to long.** After cleaning the dataset, I took steps to modify the dataset and adopt the formatting required for generalizability analysis and hierarchical linear modeling. The first formatting step I took involved transforming the data from its wide format, where each participant had their own row and their responses to each scenario were vertically arranged across the columns, to a long format, where each participant had sixteen rows and the responses to each scenario were vertically arranged across the rows.

**Coding.** As part of the long format of the dataset, a column was needed for the base plots and codes were created for each type, which were *overcharge*, *wine spill on customer’s wife*, *nut allergy*, *forgotten order*, and *missed reservation* (1 to 5, correspondingly). In addition, a column was needed for the cue combinations and codes were created for each of the sixteen unique combinations (1 to 16). Columns were created for each of the study cues, which are error belief, reporting consequence, error visibility and error consequence. For each cue, a code of -0.5 or +0.5 was assigned to the levels. A code of -0.5 was assigned to the negative or low level and a code of +0.5 was assigned to the positive or high level of the cues, depending on the cues’ operationalization. Contrast coding (i.e., -0.5 and +0.5), otherwise known as effects coding, was used instead of dummy coding (i.e., 0 and 1) because contrast coding allows for the cue variables to be centered around the grand mean (Singmann & Kellen, in press).
According to the authors, orthogonal sum-to-zero contrasts, like the contrast coding applied here, are a more reasonable option than treatment contrasts, like in dummy coding. The benefit of centering around the grand mean is that it renders the intercept term meaningful. That is, when contrast coding is used, the intercept becomes the mean of all group means. Contrast coding, specifically in this study, enabled me to estimate the likelihood of reporting when the levels of each cue variable are averaged. In contrast, dummy coding would have resulted in an intercept that represented the likelihood of reporting when the cue variables were set to the level that was assigned a code of ‘0’. The intercept would have then been an estimate of likelihood of reporting in a specific configuration of the cues— that is, when error belief is negative, reporting consequence is negative, error visibility is low, and error consequence is high— instead of being a reasonable indicator of the mean likelihood of reporting.

In addition to the coding of base plots, cue combinations, and cue variables, the Level 2 predictors were also transformed to allow for better interpretation of the parameter estimates. The Level 2 predictors, which were locus of control, conscientiousness, and honesty-humility, were grand mean centered by subtracting the mean of all participants from each participant’s scale score. Because a score of ‘0’ on the original scales would reflect an absence of the trait, mean-centering enabled me to have a more meaningful value for when these predictors are set at ‘0’. That is, the intercept term when one of these mean-centered predictors is fixed at ‘0’ reflects the likelihood of error reporting at the average level of this predictor.

**Determining equivalence of base plots.** Following the coding process, I needed to justify treating the five base plots equivalently. The original decision to vary the base plots emerged from a desire to vary the stimuli exposed to participants. To ensure that the different base plots were simply varied stimuli and can be treated equivalently, I ran generalizability
analysis using the g study R command from the gtheory package (Moore, 2016) in R. Generalizability analysis was the statistical technique chosen to unpack the variance components because of the unbalanced matching of base plots to cue combinations (e.g., Bloch & Norman, 2012). Specifically, I determined how much of the variance in the likelihood of reporting ratings was driven by differences between the raters, differences between the cue combinations, and differences between the base plots. The variance components returned by the g study command indicate that differences between the base plots accounted for a small proportion of the variance in the likelihood of reporting ratings (1.1%) compared to the other sources (participant: 26.5%, cue combination: 16%, block: 0%, and residual: 56.4%). Based on this information, I concluded that the base plots can be treated equivalently.

Reversing the randomization of scenarios. After completing the coding and centering process and determining that the base plots can be treated equivalently, the next step was to reverse the randomization of the scenarios. Within each of the five blocks of scenarios, fourteen of sixteen cue combinations were randomized in order to minimize the possibility that the order in which the unique cue combinations were presented had an influence on the likelihood of reporting ratings. To reverse cue randomization, I referred to the ordering of cue combinations of the first block and rearranged the columns of subsequent blocks to match the order in the first block. I followed a similar procedure to reverse scenario randomization by using the order of scenarios in the first block as a referent point. The reversal of randomization was the final step taken to prepare the dataset for analysis.

Data Analysis and Results
Descriptives and Correlations

Descriptive statistics and correlations are presented in Table 1. Participants reported having some experience working in the food and beverage industry \((M=1.88\text{ years}, SD=1.56)\), with some participants having worked as a restaurant server \((M=.31\text{ years}, SD=.68)\). Of the participants, 87 were female, 68 were male, and none self-identified with other gender classifications. An independent samples t-test was conducted to examine if gender differences influenced the likelihood of error reporting and determined that male participants did not significantly differ in their likelihood of error reporting ratings compared to female participants \((t(2281.8)=-.92, p>.05)\). On average, the participants were 20.07 years old \((SD=1.03)\). Participants, on average, had scores for locus of control that reflected more internal locus of control \((M=2.64, SD=.47)\). Participants, on average, had scores for conscientiousness that reflected higher conscientiousness \((M=3.68, SD=.53)\). Participants, on average, had scores for honesty-humility that reflected average honesty-humility \((M=3.01, SD=.52)\). The likelihood of error reporting ratings was, on average, slightly reflective of greater likelihood of reporting \((M=5.68, SD=2.98)\).

Manipulation Checks

As one of the procedures for ensuring readiness of my data for hypothesis testing, I conducted manipulation check analysis. It was important to check the manipulations to determine the extent to which the participants perceived the levels of the cues in a manner that was intended. Several paired t-tests were conducted to check the manipulations. For error belief, the participants’ perceptions of how negative the error belief significantly differed between the negative error belief condition and the positive error belief condition \((t(154)=2.07, p<.05)\). Similarly, the participants’ perceptions of how positive the error belief significantly differed
between the negative error belief condition and the positive error belief condition ($t(154) = -2.70$, $p < .01$). For reporting consequence, the participants’ perceptions of how negative the reporting consequence significantly differed between the negative reporting consequence condition and the positive reporting consequence condition ($t(154) = 2.96$, $p < .01$). Similarly, the participants’ perceptions of how positive the reporting consequence significantly differed between the negative reporting consequence condition and the positive reporting consequence condition ($t(154) = -3.10$, $p < .01$). For error visibility, the participants’ perceptions of how high the error visibility significantly differed between the high error visibility condition and the low error visibility condition ($t(154) = 2.05$, $p < .05$). For error consequence, the participants’ perceptions of how high the error consequence significantly differed between the high error consequence condition and the low error consequence condition ($t(154) = 3.04$, $p < .01$). See Table 2 for means and standard deviations of ratings on manipulation check items.

**Determine Appropriateness of Hierarchical Linear Modeling**

To determine how appropriate hierarchical linear modeling was for testing the hypotheses, I used the `lm` R command from the stats package (R Core Team, 2018) and specified a null linear model with likelihood of reporting errors as the outcome and no predictors, only a fixed intercept term. Then, I used the `lmer` R command from the lme4 package (Bates, Mächler, Bolker, & Walker, 2015) to specify a linear random effects model with likelihood of reporting errors as the outcome and no predictors but instead of a fixed intercept, I allowed the intercept to vary by participant. The linear random effects model returned an intercept variance (i.e., between-participant variance) of 1.51 and residual variance of 2.56. Based on these results, the intra-class correlation of the null random effects model was $ICC(1,1) = .25$. and this non-zero correlation suggests that observations within individuals (i.e., each individual’s likelihood of
reporting ratings across different levels of cues) are more similar than observations between individuals.

To further determine if the intercept variance (i.e., between group variance) is sufficient enough for hierarchical linear modeling, I followed steps of checking intercept variance suggested by Bliese (2016) which consists of comparing the –2 log likelihood values (i.e., deviance) between the specified models. The deviance of the linear random effects null model (12018.48) was smaller than the deviance of the linear null model (12457.62), further suggesting the appropriateness of hierarchical linear modeling. As such, a random effects model with participant as a random effect was used in hypothesis testing.

Assumptions Testing

After determining that hierarchical linear modeling was an appropriate technique for analyzing my data, I used the lmer command from the lme4 package (Bates et al., 2015) to specify the hypothesized model in the R environment. The hypothesized model was a random effects model where likelihood of reporting errors was regressed onto the separate cues (i.e., error belief, reporting consequence, error visibility, and error consequence) and onto the separate mean-centered individual difference variables (i.e., locus of control, conscientiousness, and honesty-humility), allowing for the intercept term to vary between participants.

Prior to running this hypothesized model, three assumptions were tested. These assumptions include linearity of residuals, normality of residuals, and homoscedasticity of residuals. The residuals of the model were graphed, see Figure 2 for these graphs. The graphs were then examined to determine if the assumptions were met. Two assumptions, linearity of residuals and normality of residuals, were satisfied. The graph for homoscedasticity of residuals, which plotted residuals of the model against the predicted values, was difficult to interpret.
Specifically, the data points of the graph clustered around parallel straight lines. These parallel straight lines were the result of using an 11-point Likert scale to measure likelihood of reporting, where each rating for each scenario was recorded as a discrete integer. This is a common phenomenon when using Likert-type items with discrete values for measuring dependent variables (e.g., Searle, 1988). In such cases, some researchers decide to transform the dependent variable so that the residuals can approximate homoscedasticity.

I opted out of transforming the data because the presence of parallel straight lines does not necessarily mean there is presence of heteroscedasticity. Furthermore, some researchers still recommend the use of linear mixed effects modeling (i.e., hierarchical linear modeling) for cases where the dependent variable is measured with a Likert-scale (e.g., Kizach, 2014; Norman, 2010). Lastly, there is evidence of the robustness of parameter estimates when hierarchical linear modeling with some caution mostly around interpreting standard errors in situations when assumptions are violated (e.g., Maas & Hox, 2004; Darandari, 2004). Therefore, based on this set of information, I concluded that it was acceptable to continue with hypothesis testing.

**Hypothesis Testing**

In order to test my hypothesis, I first compared the hypothesized model (Model 1) that I formulated for assumptions testing with the no-predictor-intercept-only random effects model (Null Model). Specifically, I used the anova R command from the stats package (R Core Team, 2018) to run a Likelihood Ratio Test to compare between the null model and the hypothesized model; a very common method for linear mixed model comparison recommended by some researchers (e.g., Faraway, 2016; Winter, 2013; Singmann & Kellen, in press). To ensure that the anova R command worked properly, there were two considerations that I had to make (Singmann & Kellen, in press). First, the models had to be formulated with the full maximum likelihood
estimator instead of the restricted maximum likelihood. That is, in R, I had to enter the argument `REML=FALSE` into the lmer model formulas. Second, I had to ensure that one of the models being compared must only be a reduced version of the other model (i.e., the encompassing model; Singmann & Kellen, in press). As such, I had to keep the random effects parts consistent between the two models, with only fixed effects being deleted from the encompassing model (i.e., the hypothesized model) in order to make up the reduced version of the model (i.e., the null model).

The Likelihood Ratio Test via the anova command showed a significant difference between the two models, \( \chi^2(7)=38.14, p<.001 \). Furthermore, the Akaike Information Criterion (AIC), an estimator of the relative quality of a model, decreased by 24.00 from the null model to the hypothesized model (Model 1). In addition, the deviance of the model (i.e., -2 times log-likelihood ratio), another estimator of the relative quality of a model, decreased by 38.00 from the null model to the hypothesized model (Model 1). These results indicate that the hypothesized model showed a better fit than the null model. It is important to note, however, that the pseudo-\( R^2 \), which is the percentage of variance in the outcome that is explained by the model, only increased slightly from pseudo-\( R^2 = .30 \) of the null model to pseudo-\( R^2 = .31 \) of the hypothesized model. In addition, the Bayesian Information Criterion (BIC), another estimator of relative quality of a model, increased by 16.00 from the null model to the hypothesized model. With that said, some researchers caution against the use of BIC to assess goodness of fit because of undue penalties for model complexity (e.g., Maindonald & Braun, 2010). Therefore, I concluded with some caution that between the null model and the hypothesized model, the hypothesized model had better fit.
After determining that the hypothesized model was better than the null model at fitting my sample data, I examined the parameter estimates of the hypothesized model to test my hypotheses. Furthermore, I used the sjt.lmer R command from the sjPlot package (Lüdecke, 2018) to retrieve p-values for each parameter estimate and confidence intervals around the estimates. See Table 3 for the results of the null model and hypothesized model.

Error belief was not significantly associated with likelihood of error reporting ($\beta_u = .20, 95\% \text{ CI } [-.01, .40], p > .05$); thus, Hypothesis 1 was not supported. Reporting consequence was not significantly associated with likelihood of error reporting ($\beta_u = .13, 95\% \text{ CI } [-.07, .34], p > .05$); thus, Hypothesis 2 was not supported. Error visibility was significantly positively associated with likelihood of error reporting ($\beta_u = .45, 95\% \text{ CI } [.25, .65], p < .001$), such that high (vs. low) error visibility was related to greater likelihood of error reporting; thus, Hypothesis 3 was supported. The width of the confidence interval surrounding the parameter estimate for error visibility was fairly narrow (i.e., the width is no larger than the size of the estimate itself) and as a result, this estimate can be confidently interpreted. Error consequence was significantly negatively related to likelihood of error reporting ($\beta_u = -.25, 95\% \text{ CI } [-.46, -.05], p < .05$), such that low (vs. high) error consequence was related to greater likelihood of error reporting; thus, Hypothesis 4 was supported. However, the confidence interval around the parameter estimate for error consequence was quite wide (i.e., the width is larger than the size of the estimate itself) and as a result, this estimate needs to be interpreted with caution.

Locus of control was not significantly associated with likelihood of error reporting, ($\beta_u = .50, 95\% \text{ CI } [-.07, 1.08], p > .05$); thus, Hypothesis 5 was not supported. Honesty-humility was significantly positively associated with likelihood of error reporting ($\beta_u = .56, 95\% \text{ CI } [.07, 1.06], p < .05$), such that higher honesty-humility scores are related to greater likelihood of
reporting; thus, Hypothesis 6 was supported. However, the confidence interval around the parameter estimate for honesty-humility was very wide (i.e., the width is substantially larger than the size of the estimate itself) and as a result, this estimate needs to be interpreted with caution. Conscientiousness was not significantly associated with likelihood of error reporting, ($\beta_u = .15$, 95% CI [-.37, .67], $p > .05$); thus, Hypothesis 7 was not supported.

### Exploratory Analysis

Following hypothesis testing, I conducted exploratory analysis to explore if other models can fit the sample data better than the hypothesized model. For exploratory analysis, I had to identify the *maximal random effects model justified by the sample data* (Jaeger, Graff, Croft, & Pontillo, 2011). Identification of this maximal random effects model involves starting with the most complex random effects model structure possible given the nature and structure of collected data then removing the most complex random effects terms, while holding the fixed effects part of the model constant, until a version of the model converges successfully using the `lmer` command in R.

Participant as a random effect, which was included in the hypothesized model, was also considered here. Another random effect that I included in exploratory analysis was scenario base plot. Because each individual scenario that the participants were shown were composed of one out of five base plots randomly paired with a unique cue level combination, it is possible that participant responses were affected by base plot-specific idiosyncrasies. In my hypothesized testing, I assumed that the base plots were equivalent based on the results of the generalizability analysis to remain consistent with my pre-registered plan of analysis. Here, I allowed it to be a random effect with the thought that it could reveal something special or unique about any given base plot that might have influenced likelihood of error reporting, regardless of the cues and
individual difference variables. Because each participant gave multiple responses to scenarios that differed in cue levels but had the same base plot, there is a possibility that responses associated with same base plots are more highly correlated (i.e., clustered) with one another than responses across different base plots. Specifying base plot as a random effect allowed me to test and estimate the extent of this clustering.

To determine the statistical need for base plot as a random effect, I specified a linear random effects model (Model 3) with likelihood of reporting errors as the outcome and no predictors and I allowed the intercept to vary by participant and by base plot. The linear random effects model returned an intercept variance (i.e., between-participant variance) for rater of 1.51, an intercept variance for base plot of .39, and residual variance of 2.55. Based on these results, the intra-class correlation for participant was \( ICC(1,1) = 0.23 \) and the intra-class correlation for base plot was \( ICC(1,1) = .02 \), and even though it is very small, this non-zero correlation suggests that observations related to the same base plot might be slightly more similar than observations between base plots. Furthermore, comparing the \( -2 \) log likelihood values (i.e., deviance) between this null random effects model and a no predictor, fixed intercept null linear model shows that the null random effects model with participant and base plot as random effects has a deviance value (11974.9) that was smaller than that of the no predictor, fixed intercept linear null model (12457.62). As such, a random effects model with both participant and base plot as random effects was used in exploratory analysis.

Next in the process of identifying the maximal random effects model justified by sample data, I determined the appropriate random effects structure starting point. Often, the most complicated random effects models have random effect terms with both a varying intercept and varying slope. Given the nature of my data, the most complicated random effects model structure
can have varying intercept and varying slopes for participant and base plot. However, the varying slopes for both participant and base plot can only be for the cues (i.e., error belief, reporting consequence, error visibility, and error consequence) and not the individual difference variables (i.e., locus of control, conscientiousness, and honesty-humility). The reason for this caveat is because only one score for each of these three variables is associated with each participant and none of these scores are associated with the base plots; thus, the slopes of these variables cannot vary by participant or by base plot.

Based on the caveat and information above, the most reasonable random effects structure starting point is with base plot and participant as random effects, each with a varying intercept term and varying slopes for the cues. I attempted to run a model with this maximal random effects structure using the lmer command in R but it did not converge successfully. I then proceeded to remove random effects terms in a logical and hierarchical manner. Specifically, I removed random effect interaction terms for base plot first – because base plot had lower intercept variance compared to participant – and then random effect interaction terms for participant. Because the resulting model still failed to converge successfully, I then removed the varying slope terms for base plot and varying slope terms for participant, consecutively. The resulting model had a varying intercept for participant and a varying intercept for base plot. This model converged successfully, thus revealing the maximal random effects model justified by the sample data (Jaeger et al., 2011).

As is typical for this procedure, the fixed effects part of the models used in the process were maximally complex (i.e., all ways of interactions among the fixed variables permitted) and kept constant. Following this procedure, I further specified the fixed effects part of the model. Because the nature of the scenarios forced the participants to view the levels of the four cues in
conjunction with one another, I specified that all four-way interactions between the cues are allowed; a strategy referred to as configural cue processing analysis that is common in policy-capturing methodology (e.g., Kristof-Brown, Jansen, & Colbert, 2002; Hitt & Barr, 1989). However, I did not specify interactions between the individual difference variables and cross-level interactions due to a lack of rationale for predicting such interactions.

Following the specification of the exploratory model (Model 4), I ran the model in R, see Table 4 for the full results. Reporting consequence was significantly negatively associated with likelihood of error reporting ($\beta_u = -.58$, 95% CI [-1.14, -.02], $p < .05$), such that negative (vs. positive) reporting consequence related to greater likelihood of error reporting. However, the width of the confidence interval surrounding the parameter estimate for reporting consequence was very wide (i.e., the width is larger than the size of the estimate itself) and as a result, this estimate needs to be interpreted with caution. Error consequence was significantly negatively related to likelihood of error reporting ($\beta_u = -.72$, 95% CI [-1.29, -.15], $p < .05$), such that low (vs. high) error consequence was related to greater likelihood of error reporting. However, the confidence interval around the parameter estimate for error consequence was quite wide (i.e., the width is larger than the size of the estimate itself) and as a result, this estimate needs to be interpreted with caution. Honesty-humility was significantly positively related to likelihood of error reporting ($\beta_u = .56$, 95% CI [.07, 1.06], $p < .05$), such that higher scores on honesty-humility were related to greater likelihood of error reporting. However, the confidence interval around the parameter estimate for error consequence was quite wide (i.e., the width is larger than the size of the estimate itself) and as a result, this estimate needs to be interpreted with caution.

Of the possible interactions between the cues, three were significant. The two-way interaction of error belief and reporting consequence was significant ($\beta_u = 1.47$, 95% CI [.65,
and the two-way interaction of error belief and error consequence was significant ($\beta_u = .98$, 95% CI [.13, 1.83], $p<.05$). It is important to note, however, that the width of the confidence intervals for these two interactions were both larger than the respective estimates. In addition, a visual inspection of the plotted interactions revealed imperceptible differences. As such, these findings need to be interpreted with high caution.

The three-way interaction of error belief, reporting consequence, and error consequence was significant ($\beta_u = -2.09$, 95% CI [-3.28, -.90], $p<.001$). The width of the confidence interval around this estimate was smaller than the size of the estimate itself and a visual check of the plotted interaction revealed perceptible differences. Therefore, this result can be interpreted with some confidence.

**Discussion**

**Hypothesis Testing**

The hypothesis test revealed mixed findings across the hypotheses. The cues, error belief and reporting consequence were not found to be directly related to likelihood of error reporting. As such, hypothesis 1 and hypothesis 2 were not supported. This pattern of results is not consistent with my hypotheses but there are plausible explanations for these findings. For error belief, it is possible that the error belief manipulation was not strong enough to generate the results that I hypothesized. That is, the statements for the negative and positive error belief conditions may not have worked as intended. Although manipulation checks showed statistical differences between the conditions in the direction I intended, the mean ratings between the two levels for how positive and negative the error belief indicated that the statements could have been worded more strongly, such that scores could have been closer to the “Extremely” end of the scale. In particular, despite participants viewing the error belief in the
positive error belief condition as being relatively more positive than the negative error belief condition, mean ratings for how positive the error belief was in the scenario suggested that participants viewed the positive error belief condition as only slightly positive. These indicate that the error belief manipulation could have been clearer and stronger.

Beyond this methodological issue, it is also conceivable that some participants viewed a workplace that views errors positively as a workplace that would not see errors as a big deal. Within the same vein, Vaughan (1999) described a process referred to as normalization of deviance whereby individuals or groups tolerate a line of action that deviates from standard protocol or policies until this lower standard becomes accepted as normal. She further suggested that errors can be normalized to the point that they are seen by employees as routine or nonremarkable. Following this line of thinking, some participants might have perceived a workplace that holds positive beliefs about errors as a workplace that views errors as routine and nonremarkable. Thus, these participants might have been less likely to report errors in the positive error belief conditions, contradictory to what I expected, possibly explaining the nonsignificant parameter estimate of error belief.

Similar to what I proposed about the error belief manipulation, it is also possible that the reporting consequence manipulation was not strong enough to generate the expected results. That is, the statements associated with negative and positive reporting consequence may not have worked as intended. Despite the manipulation checks demonstrating statistical differences between the levels in the intended direction, the mean ratings between the two levels for how positive and negative the reporting consequence implied that the statements could have been worded more strongly; in turn, possibly driving the scores closer to the “Extremely” end of the scale. As such, the manner in which reporting consequence was manipulated in this study might
have contributed to the finding of a nonsignificant relationship between reporting consequence and likelihood of error reporting.

In addition to this methodological consideration, it is plausible that participants reacted to the reporting consequence levels in a manner that was unexpected, leading to the unsupported hypothesis. Specifically, participants might have perceived the positive reporting consequence situation (i.e., others being praised at a staff meeting for being forthcoming about errors) as an example of a positive reporting consequence and an event that could be embarrassing or uncomfortable to go through in front of their co-workers, simultaneously. Perhaps it can be embarrassing or uncomfortable for an individual who committed an error to have their error announced to co-workers who did not commit errors. Consistent with this angle, Luffarelli, Goncalves, and Stamatogiannakis (2016) found that in situations where social comparisons are activated, even positive feedback can sometimes lead individuals to compare their performance to the average performance of the team. This social comparison can negatively affect self-perceived competence especially if the individuals feel that their performance is not better than the average performance of the group. It is possible that praise from the manager for coming forward with the error might not be able to overshadow this feeling of lower self-perceived competence. Thus, it might have been the case that both the positive and negative reporting consequence conditions influenced the likelihood of reporting in the same direction, which would explain the nonsignificant parameter estimate for reporting consequence.

An alternative explanation for finding that, despite what was expected, positive error belief and positive reporting consequence were not significantly related to greater likelihood of error reporting is centered on the ease with which participants can imagine themselves interacting with these conditions. With error belief and reporting consequence, the extent to
which individuals can imagine levels of these conditions are partially dependent on their past experiences working for organizations. In contrast, the other two variables, error visibility and error consequence, are less dependent on the context of work. That is, people experience errors in other domains and worry about getting caught by others (i.e., error visibility) and getting in trouble for their errors (i.e., error consequence) even in these non-work contexts. Participants would have more past experiences across various domains to draw from and, in turn, be better able to deeply imagine how they would feel and what they would do when they are dealing with errors that are more or less visible and personally risky. As such, participants’ ability to imagine error visibility and error consequence may come with greater ease than their ability to imagine error belief and reporting consequence. In turn, the effects of error belief and reporting consequence might have been weakened by this cognitive process.

Although error belief and reporting consequence were not linked to likelihood of error reporting, error visibility was strongly linked to likelihood of error reporting. That is, high error visibility was linked to greater likelihood of error reporting. Thus, hypothesis 3 was supported. Furthermore, error visibility was the best predictor of likelihood of error reporting both in terms of significance (i.e., lowest p-value) and size of confidence intervals (i.e., tightest intervals). This is consistent with research on employee surveillance that suggests that employees tend to behave in ways that are more in line with what an organization expects of employees when they are observed (e.g., Ball, 2010). It is possible that participants perceived that reporting the error was the behaviour that was expected of them by the organization. As such, in situations where the error was more visible to other members of the organization, this behaviour of reporting the error was more likely to occur. From a slightly different angle, Frese and Keith (2015) proposed that people are less able to deny the occurrence of an error when an error is more visible to others.
That is, individuals might be better able to convince themselves that the error never occurred or that its impact is less serious when there are no witnesses. The exact processes driving this relationship notwithstanding, it appears that people are less inclined to report errors when they believe the error was not witnessed by others.

Similarly, error consequence was linked to likelihood of error reporting. That is, low error consequence was linked to greater likelihood of error reporting. As such, hypothesis 4 was supported. One potential explanation behind this result is that when greater personal consequence is attached to the commission of an error, people experience high levels of negative emotions including fear over personal repercussions. Fear can have a debilitating effect on the person feeling those emotions, and as a result, can lead to inaction. This line of reasoning is supported by the conclusions of a recent literature review of medication errors and near misses with nurses by Vrbnjak et al. (2016). The authors suggested that the experience of fear in the context of errors is often about how the committer is perceived by others (e.g., being seen as incompetent or a troublemaker) and/or how they are punished (e.g., formal disciplinary action). This perspective was further expanded upon by Zhao and Olivera (2006). Specifically, Zhao and Olivera suggested that negative emotions like fear or worry can make the costs of bringing attention to their error more salient and thus, lead them to be less likely to report.

Of the individual difference variables, only honesty-humility was significantly associated with likelihood of error reporting. Across the different levels of the cues and across different scenarios, people with higher scores on honesty-humility were more likely to report errors. Thus, hypothesis 6 was supported. As proposed by Crigger (2004), failing to report errors can be framed as an act of dishonesty and signify a lack of humility. Further, Crigger stated that “being honest and humble enough to be willing to disclose the mistake” is an ethical response to the
commission of an error. Continuing this notion that honesty-humility levels are associated with ethical and moral conduct, Cohen and colleagues (2014) identified high levels of honesty-humility as a distinguishing feature of high moral character in a series of diary and survey studies. In addition, Lee, Ashton, and de Vries (2005) found that the addition of the honesty-humility dimension rendered the HEXACO personality model a significantly better predictor of scores on an integrity test (i.e., 14% more variance accounted for) than a personality model without the honesty-humility dimension. Following this line of reasoning, it is not surprising to have found that higher scores on honesty-humility were related to greater likelihood of error reporting.

In contrast, locus of control and conscientiousness were found to be non-significantly related to likelihood of error reporting. Thus, hypotheses 5 and 7 were not supported. Although this pattern of findings is inconsistent with my predictions, there are plausible explanations that could justify the lack of significant results. For one, the variability within the scores on both the locus of control and conscientiousness scales was quite low. Participants, on average, had scores that suggested slightly more internal locus of control and higher levels of conscientiousness. As such, it is possible that there was not enough variability to properly estimate the relationship between these two variables and likelihood of error reporting.

Beyond this statistical consideration, I predicted that participants with more internal locus of control would be likely to report errors, regardless of the cues, because they tend to feel more responsible for errors and thus, feel greater motivation to confess their wrongdoing; consistent with Riek’s (2010) propositions. Recent research from the relationship transgressions literature, however, suggests that this pattern may not always occur. Specifically, Knight (2018) found that individuals who feel personally responsible for transgressions, such as those with more internal
locus of control, were most likely to apologize for committing the transgression when they also felt guilty and viewed their actions as unintentional. However, in the event that individuals felt that they were the cause of an event but did not believe that their actions warranted negative sanctions, they engaged in reasoned justification. These individuals were more likely to defend their behaviour than to apologize for their behaviour. It appears, then, that there are factors that impact when internal locus of control is associated with greater likelihood of reporting errors. As such, these competing processes might explain why I found a nonsignificant relationship between locus of control and likelihood of error reporting.

For conscientiousness, I predicted that individuals with higher scores on conscientiousness would be more likely to report errors, regardless of the cues, because their tendencies to be careful, thorough, responsible, organized, planful, and/or dependable would motivate them to follow protocol and report their error to the manager. Paradoxically, it is also possible that some of the individuals with high scores on conscientiousness react in the opposite way. Some individuals may actually be less likely to report errors based on a belief that they should have completed the work tasks correctly the first time around. In agreement with this perspective, Carter and colleagues (2016) found a curvilinear relationship between conscientiousness and well-being, such that substantially higher scores on conscientiousness were associated with higher scores on the five-factor obsessive-compulsive inventory. In particular, higher scores on conscientiousness were closely tied with high punctiliousness, doggedness, and ruminative deliberation; all of which could cause an individual to have high levels of negative emotions about having committed an error. As mentioned previously, the experience of negative emotions after committing an error could prevent individuals from feeling able to report their error (e.g., Vrbnjak et al., 2016; Zhao & Olivera, 2006). If these competing
processes were indeed both at play in this study, it could partially explain the nonsignificant relationship between conscientiousness and likelihood of error reporting.

**Exploratory Analysis**

To test all possible interactions between the cues, which is a common policy-capturing practice referred to as configural cue processing analysis (e.g., Kristof-Brown, Jansen, & Colbert, 2002; Hitt & Barr, 1989), I ran an exploratory model with up to four-way interactions specified. The exploratory model revealed interesting results. Of the individual difference variables, honesty-humility was found to be significantly related to likelihood of error reporting, such that high scores on honesty-humility were associated with greater likelihood of error reporting; a result that was also found in hypothesis testing. Of the cues, only reporting consequence and error consequence were significantly related to likelihood of error reporting. This is partially different from what I found with the hypothesized model. However, both of these variables were also involved in statistically significant interaction pairings. When there are statistically significant interactions, it makes little sense to interpret the unconditional main effects of their constitutive first-order variable; especially because the presence of interaction suggests that the effect is multiplicative and, thus, conditional upon levels of each constitutive first-order variable (Brambor, Clark, & Golder, 2006).

The interactions that were statistically significant include a two-way interaction of error belief and reporting consequence, a two-way interaction of error belief and error consequence, and a three-way interaction of error belief, reporting consequence, and error consequence. Taken at face value, these results would indicate the following insights, respectively: (1) when reporting consequence is high, positive (vs. low) error belief has a larger influence on error reporting than when reporting consequence is low, (2) similarly, when error consequence is high, positive (vs.
low) error belief has a larger influence on error reporting than when error consequence is low, and (3) in the condition where error belief is negative, when error consequence is high, positive (vs. low) reporting consequence has a positive effect on error reporting whereas when error consequence is low, positive (vs. low) reporting consequence has a negative effect on error reporting; and interestingly enough, the starting points and direction of the three-way interaction of error belief, error consequence, and reporting consequence flip around entirely when error belief is positive.

Before further interpretation can be done, it is important to first evaluate the legitimacy of these results; this involves making several considerations. First, the analysis that generated these results was exploratory. The model formula and the results that resulted thereafter were driven by the sample data, the desire to include all possible random effects (i.e., participant and base plot), and the need to follow best policy-capturing practices (i.e., configural cue processing analysis); but not driven by theoretical and empirical conclusions from the literature. The lack of theoretical and empirical support behind these interactions made it more difficult to be confident in the results of the exploratory analysis. As Aguinis and Gottfredson (2010) proposed in their article on best practices for conducting moderated multiple regressions, having a strong rationale for why the interaction should exist is a critical part of accurately estimating interaction effects.

Second, while it is safe to state that the random effects structure applied to the exploratory model was the best structure for the sample data, it is difficult to conclude that this random effects structure was the best structure for investigating these constructs and estimating their relationships. Identifying the maximal random effects model justified by the sample data involved trying six random effects structures before finally reducing the structure enough that it converged successfully. Although this is typical in this process, it does not rule out the
possibility that one of the more complex structures that failed to converge might have been the best structure to estimate the relationships between the constructs of this study. For instance, neither the base plot nor participant random effects had random slopes because the formulas with random slopes would not converge. However, a random effects model with by-participant varying slopes for cues would have made sense in the context of this study. Allowing the slopes of the cues to vary by participant implies that the strength of the effect of the cues on likelihood of reporting error would differ across participants. Fixing the slopes, in contrast, implies that the strength of the effect of the cues on likelihood of reporting error remains constant across participants. Because each person brings their own idiosyncratic differences to each situation, hypothetical or not, there would be reason to believe that each person would be affected at varying degrees by the cue manipulations. Additionally, a random effects model with random slopes is considered by some researchers as the ideal structure (e.g., Barr et al., 2013). As such, even though I closely followed the steps for identifying the maximal random effects structure justified by the sample data, it is still possible that a more complex and appropriate structure (i.e., with varying slopes) might have led to differences in the returned parameter estimates and standard errors.

Third, the confidence intervals surrounding the coefficients for the interaction terms were quite wide, indicating imprecise parameter estimates. The widths of the confidence intervals around the coefficient for the interaction of error belief and error consequence, the interaction of error belief and reporting consequence, and error belief, reporting consequence, and error consequence were 1.14, 1.73, and 1.14 times larger than the magnitude of the estimate itself, respectively. This suggests that the parameter estimates were less precise (Cumming, 2012).
Such undesirable confidence intervals are consistent with a sample that does not satisfy the minimum sample size estimated through AIPE analysis.

Consequently, these exploratory findings must be approached and interpreted with high caution. Finding and interpreting interaction effects in ideal statistical situations are already difficult tasks (e.g., Aguinis & Gottfredson, 2010); attempting to interpret findings under these circumstances is especially difficult and can even lead to misleading interpretations. Therefore, more weight was assigned to the results of the hypothesized model when generating conclusions in this study.

**General Discussion**

A very quick comparison between the hypothesized and exploratory models is sufficient to render a feeling of unclarity, even confusion, about the takeaways of this study. This is partly due to the three issues discussed above surrounding the legitimacy of the exploratory results. Nonetheless, some consistencies emerged between the hypothesized and exploratory models. For one, honesty-humility was a significant predictor of likelihood of error reporting in both models, suggesting that individuals who score higher on honesty-humility are more likely to report their errors than individuals who score lower on honesty-humility. Similarly, error consequence was a significant predictor of likelihood of error reporting in both models, suggesting that situations where the personal consequence of the error to the committer is lower are associated with greater likelihood of reporting the error. Additionally, it was surprising to see that error visibility, which was the strongest predictor of likelihood of error reporting in the hypothesized model, did not have a significant additive or multiplicative effect in the exploratory model. The base plot as a random effect, which was present in the random effects structure of the exploratory model but absent in the hypothesized model, can be ruled out as an explanation for this for the following
reasons. One, the intercept variance of base plot was very small, suggesting that its addition to the model as a varying-intercept random effect did not have much of an influence. Two, the estimates for error visibility were largely comparable (hypothesized model: $\beta_u = .45$, and exploratory model: $\beta_u = .52$). Thus, the difference between the models in the significance of the relationship between error visibility and likelihood of error reporting is not likely due to the difference in the random effects structure between the models.

One plausible explanation for this surprising finding regarding error visibility is that in the exploratory model where all possible interactions between the cues were explored, the main effect of error visibility was no longer as prominent as the combined effects of the other cues. However, the issues outlined above about the exploratory model render it difficult to make a conclusion as strong as this with great confidence. Interestingly enough, the confidence interval for error visibility relative to the magnitude of the coefficient was slightly tighter than that of reporting consequence, suggesting that the coefficient for error visibility was slightly more precise. This is in spite of the fact that reporting consequence was found to be significantly related to likelihood of error reporting whereas error visibility was not. Furthermore, with a 95% confidence interval of [-.04 to 1.08], error visibility only slightly went over the ‘0’ point and thus, closely approached significance. Taken together, these considerations prevent me from ruling out with confidence the effect of error visibility that was found in the hypothesized model based on the absence of a main effect in the exploratory model. To reiterate an earlier point, the results of the hypothesized model should be weighted more heavily than the results of the exploratory model due to aforementioned statistical and conceptual issues concerning exploratory analysis.
A conclusion that can be safely made after comparing the hypothesized and exploratory models, despite the differences between the two models, is that likelihood of error reporting is probably not influenced solely by individual difference variables, by situational factors, or by organizational factors. In both models, main effects were found among the cues and individual difference variables. Thus, when deciding to report or not report their own errors, participants appeared to draw from their own traits as well as cues in their environment to make their decision.

**Theoretical Contributions**

One of the theoretical contributions of this study is the application of the socioecological framework to the error reporting phenomenon. Consistent with the socioecological perspective, the results generated by the hypothesized model and the exploratory model support the idea that likelihood of error reporting by individual employees are impacted by individual-level and contextual factors. Additionally, this study contributes to the literature on error reporting. Specifically, it offers three novel and important contributions. For one, it is one of the first studies to use a policy-capturing design to empirically contrast the levels of different antecedents of error reporting to determine how they influence error reporting, comparatively. Many of the studies on error reporting are field studies, theory papers, or case studies. The few experimental studies that have relied on scenarios employed a between-person design and as a result, these studies were not able to capture within-person effects of error reporting antecedents. Second, by using the restaurant, and the food and beverage industry more generally, as the lens through which to examine work errors, this study introduces a novel industry and work context to the error reporting literature. Despite the nature of food and beverage work (e.g., long chains of custody, fast-paced environment) that makes errors likely to occur, this industry is rarely
explored. Common work contexts and industries studied in error reporting research include construction, mining, medicine, IT, and business. As such, by choosing the food and beverage industry, the boundaries of error reporting research have been extended by this study. Third, the decision to focus on errors that are more ordinary sets this study apart from the average study in the error reporting literature. The kinds of errors typically discussed in this body of research are errors that have severely hurt others or have the potential to do so. For instance, patient errors in medicine are often the focus of error reporting articles. By focusing on more mundane errors, this study tests the boundary conditions of the patterns of findings prevalent in the literature.

Besides theoretical contributions to the error reporting literature, some parallels can be drawn between the conclusions of this study and theoretical propositions from the moral psychology literature. In fact, the idea that deciding whether or not to report errors can be viewed as a moral or ethical decision has been previously discussed (e.g., Wilkinson, 2001). The notion that likelihood of error reporting is impacted by individual and situational factors aligns well with the theory of the moral self (e.g., Blasi, 1983). This theory posits that people have moral selfhoods, which can be divided into *who a person is* (less relevant to this study) and *how a person acts* (more relevant to this study). As suggested in a literature review by Jennings, Mitchell, and Hannah (2015), individual factors and situational factors act as antecedents of the moral self. That is, according to the authors, people’s moral identities and behaviours are dependent on situational factors (e.g., workplace attitudes and perceptions) and individual factors (e.g., individual traits). This perspective of having internal and external contributors to moral decision making is in line with research on moral courage (e.g., Sekerka & Bagozzi, 2007). Moral courage is defined as the desire and ability to do what is “good” in the face of an ethical dilemma. Sekerka and Bagozzi proposed that people’s desire and decision to act with moral
courage in ethical situations are influenced by internal attributes (e.g., felt self-efficacy) and external factors (e.g., group norms). Therefore, it appears that conclusions from this study is consistent with insights from the moral psychology literature.

**Practical Implications**

Above and beyond theoretical contributions, this study also offers key practical insights for organizations. For one, based on the results of this study, organizations may be able to encourage error reporting among their employees by making errors more visible in the workplace. This is consistent with one of the strategies recommended by Nolan (2000) for reducing errors and improving safety at work. Ways in which errors can be made more visible include encouraging more interdependent work (e.g., checking one another’s work) or training employees to be more cognizant of others’ actions when they are on the job. It is important, however, to frame initiatives for increasing error visibility at work in a positive way, by emphasizing how increasing visibility could allow errors to be detected and corrected earlier instead of emphasizing how increasing visibility could facilitate negative work behaviours like gossiping or tattling.

That being said, it is important for me to add that ethical considerations must be made when developing programs for increasing error visibility in the workplace. Specifically, issues surrounding ethics may arise if managers consider technological solutions for monitoring employee activity (e.g., closed-circuit surveillance, body cameras in policing). Managers considering technological solutions for increasing visibility should be aware of concerns from the employee’s perspective about fairness and privacy. If technological options were to be adopted, managers should carefully determine how monitoring will be performed. Making the captured image less clear in quality, having the images less frequently updated, giving
employees knowledge of who is accessing the images, giving employees some control over when they are monitored, and giving employees justification for means and ends of monitoring were found to be linked to lower perceptions of privacy invasion and greater perceptions of fairness among employees (Zweig and Webster, 2002). However, due to these concerns regarding ethics, I would recommend that organizations first consider less invasive ways to increase error visibility in the workplace if these options are available before considering more invasive, technological solutions.

Second, phrasing instructions or requests for reporting work errors using language that would appeal to individuals who score higher on honesty-humility might increase the average rates of reporting. Making salient that reporting errors can be one situation in which these individuals can exercise honesty-humility might be an effective way to encourage more reporting from this group of individuals. This is consistent with the interactionist principle of trait activation proposed by Tett and Guteran (2000) that suggests that traits are latent and become activated in specific situations. A particular situation elicits the relevant traits when viable responses to the situation are thematically connected to the trait. In the context of this study, a situation where an employee has to decide whether or not to report their own work error to their superior is relevant to the trait of honesty-humility and acts as a “press” for individuals to express their standing on this trait. As such, managers who craft instructions or requests for reporting work errors using language that may appeal to those who possess greater honesty-humility are making trait-relevant cues from situations of error reporting more salient, essentially allowing these messages to act as a “facilitator” of the expression of honesty-humility (Tett & Burnett, 2003). One potential drawback that could follow from this line of reasoning is that individuals with lower levels of honesty-humility who are exposed to instructions for error
reporting that make salient the potential for expressing honesty-humility might be even more discouraged from reporting errors than if they were exposed to a set of instructions with different framing and emphasis. However, I would argue that it is unlikely that such phrasing would actively discourage those who are lower on honesty-humility from reporting errors; especially if other parts of the managers’ instructions emphasize aspects that would be universally persuasive to varying kinds of individuals (e.g., extrinsic rewards). In essence, this approach with its dual emphasis would be making more salient the trait relevance (which might appeal to those with high scores on honesty-humility) and the strength (which might appeal to various individuals including those who score low on honesty-humility) of the error reporting situation within instructions from upper management in a manner that might facilitate error reporting (Tett & Burnett, 2003). With that said, in thinking about the two specific practical recommendations above, it is important to also keep in mind the statistical issues discussed in the previous sections, pertaining to the discrepancies between the hypothesized and exploratory models as well as the widths of the confidence interval surrounding the point estimates in the models.

A third, more general recommendation I can make based on this study is for organizations to be aware of how different levels of the larger system (e.g., employee-level, situation-level, organization-level) can each contribute to likelihood of reporting errors. This phenomenon and its contributors cannot be reduced to any specific level in the system. As such, adopting a socioecological perspective on work errors might be beneficial for organizations to identify at what point or level they can intervene to encourage more error reporting at work. Lastly, I encourage organizations to consider the importance of error reporting and educate their employees accordingly. As covered in the beginning of this thesis, error reporting can have a
multitude of positive effects in learning, legal, and self-concept domains and can prevent
cascades and future errors from occurring.

**Limitations and Future Directions**

Consistent with the cautionary theme that is present throughout this section, I would like
to reiterate at this point the importance of interpreting the findings of this study with its
limitations in mind. Some of these limitations have been discussed already but it is worth
summarizing these points again in this section. First, the size of the sample ($N=155$) was smaller
than the estimated sample size needed, as determined with Accuracy in Parameter Estimation. As
such, the reduced sample size ($N=155$) resulted in a maximal random effects structure that might
not have been complex enough to accurately estimate the relationships between the constructs of
interest. Furthermore, the reduced sample size also contributed to some parameter estimates
having wider than desired confidence intervals, affecting the precision of the parameter
estimates. Thus, future replications with a larger sample that would satisfy the minimum sample
size estimated through sample size analyses and allow more complex random effects structures
might be valuable. Second, more than half of the participants were removed, albeit for reasons
not necessarily related to the design of the study (e.g., participants who selected ‘No’ to the
question asking for their consent to participate but then completed the survey anyway).
Nonetheless, it is important to consider why such a high proportion of participants were
excluded. Perhaps the study was too difficult or taxing for some participants, resulting in some
participants failing the attention check items. Future replications can consider how the exclusion
rate can be reduced. Third, aspects of the policy-capturing design (e.g., hypothetical scenarios,
orthogonal cues) might have made the study less generalizable to real-life situations. Although I
applied various measures to make the study more realistic to the participants (e.g., applying an
eligibility requirement of 6 months food and beverage work experience), the high-risk nature of real-life work errors and the decision-making process involved is very difficult to capture in a scenario study, impacting the generalizability of this study. Future work might consider other strategies or designs for better capturing the high-risk nature of work errors. Fourth, the application of the socioecological framework to this thesis specified the organization as the most distant contextual layer. This decision was made because the restaurant was only used as the lens through which error reporting was examined; that is, no specific conclusions unique to the food and beverage industry were being made. However, the socioecological framework can have various applications in the organizational sciences. For instance, other researchers have specified the industry or field in which the organization was situated as the most distant contextual layer (e.g., Trist, 1977). Future studies might consider specifying industry factors as the most distal contextual layer, especially if generating industry-level conclusions were desired by the researcher.

More generally, because this study is one of the first to use a policy-capturing design to determine the relative influence of different antecedents on error reporting, researchers might consider conducting replications. Several replications would be beneficial for increasing confidence in the conclusions that can be generated from this kind of study. Such replications can be exact replications; however, conceptual replications would also be an option to consider. Conceptual replications would involve changes to the aspects of the study design, such as the scenario content and the operationalization of the cue levels, while keeping the constructs constant. This kind of replication allows for estimating how robust the findings are in the face of methodological changes.
Conclusion

With its policy-capturing approach, this study is the first study of this kind to empirically vary antecedents of error reporting to determine which factors are prioritized in these decisions. Theoretically, this study uses a socioecological approach and furthers researchers’ understanding of why and when more ordinary work errors are reported in a novel context – the food and beverage industry. Practically, this study offers managers and human resource practitioners key insights on possible ways in which error reporting can be encouraged in the workplace and the importance of doing so. This study also highlighted some statistical considerations to make when using the hierarchical linear modeling technique and conducting exploratory analysis. Generally, this study, when pinned alongside hundreds of other studies on work errors, provides researchers and practitioners with a more comprehensive understanding of error reporting at work.
References


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Figures and Tables

Data cleaning proportions

*Figure 1.* Data cleaning proportions.
Figure 2. Residual error plots of hypothesized model for assumptions testing.
TABLE 1. Means, standard deviations, and correlations with confidence intervals

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total years food and beverage work</td>
<td>1.88</td>
<td>1.56</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Years of experience as a restaurant server</td>
<td>0.31</td>
<td>0.68</td>
<td>0.49**</td>
<td>[0.46, 0.52]</td>
<td>0.49**</td>
<td>[0.46, 0.52]</td>
<td>0.49**</td>
<td>[0.46, 0.52]</td>
<td>0.49**</td>
</tr>
<tr>
<td>Years of experience in non-server roles in food and beverage industry</td>
<td>1.57</td>
<td>1.37</td>
<td>0.90**</td>
<td>[0.89, 0.91]</td>
<td>0.06**</td>
<td>[0.02, 0.10]</td>
<td>0.06**</td>
<td>[0.02, 0.10]</td>
<td>0.06**</td>
</tr>
<tr>
<td>Age</td>
<td>20.06</td>
<td>1.03</td>
<td>-0.04*</td>
<td>[0.08, 0.00]</td>
<td>-0.14**</td>
<td>[0.15, 0.22]</td>
<td>-0.14**</td>
<td>[0.15, 0.22]</td>
<td>-0.14**</td>
</tr>
<tr>
<td>Locus of control</td>
<td>2.64</td>
<td>0.47</td>
<td>-0.02</td>
<td>[0.06, 0.02]</td>
<td>-0.11**</td>
<td>[0.02, 0.14]</td>
<td>-0.11**</td>
<td>[0.02, 0.14]</td>
<td>-0.11**</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>3.68</td>
<td>0.53</td>
<td>-0.16**</td>
<td>[0.19, 0.12]</td>
<td>-0.01</td>
<td>[0.05, 0.03]</td>
<td>-0.17**</td>
<td>[0.21, 0.13]</td>
<td>-0.01</td>
</tr>
<tr>
<td>Honesty-humility</td>
<td>3.01</td>
<td>0.52</td>
<td>0.01</td>
<td>[0.03, 0.05]</td>
<td>0.00</td>
<td>[0.04, 0.04]</td>
<td>-0.02</td>
<td>[0.05, 0.02]</td>
<td>-0.02</td>
</tr>
<tr>
<td>Likelihood of reporting error</td>
<td>5.68</td>
<td>2.98</td>
<td>0.03</td>
<td>[0.01, 0.07]</td>
<td>0.03</td>
<td>[0.01, 0.07]</td>
<td>0.02</td>
<td>[0.02, 0.06]</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Note. M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. 

8. Likelihood of reporting error
7. Honesty-humility
6. Conscientiousness
5. Locus of control
4. Age
3. Years of experience as a restaurant server
2. Years of experience and beverage work
1. Total years food and beverage work

Mean, standard deviations, and correlations with confidence intervals
Table 2.  
*Means and standard deviations of ratings on manipulation check items for two duplicate scenarios with the levels of each cue cross-balanced.*

<table>
<thead>
<tr>
<th>Manipulation Check Item</th>
<th>Manipulation Check Scenario 1</th>
<th>Manipulation Check Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what degree do you perceive the error belief in these scenarios as negative?</td>
<td>6.41 2.32</td>
<td>5.83 2.55</td>
</tr>
<tr>
<td>To what degree do you perceive the belief about errors in this scenario as positive?</td>
<td>2.74 2.31</td>
<td>3.40 2.73</td>
</tr>
<tr>
<td>To what degree is reporting on the error costly in this scenario?</td>
<td>5.90 3.06</td>
<td>4.81 2.78</td>
</tr>
<tr>
<td>To what degree is reporting on the error beneficial in this scenario?</td>
<td>4.39 2.86</td>
<td>5.37 2.90</td>
</tr>
<tr>
<td>To what degree will the error have negative consequences (outside of reporting) in this scenario?</td>
<td>6.16 2.71</td>
<td>5.21 2.61</td>
</tr>
<tr>
<td>To what degree is the error discoverable to others?</td>
<td>5.66 2.81</td>
<td>4.94 3.05</td>
</tr>
</tbody>
</table>

*Note:*  
*M* and *SD* are used to represent mean and standard deviation, respectively. Manipulation Check Scenario 1 conditions: negative error belief, negative reporting consequence, high error visibility, and high error consequence. Manipulation Check Scenario 2 conditions: positive error belief, positive reporting consequence, low error visibility, and low error consequence.
Table 3.

*Fixed and random effects and model fit of hypothesized model, in comparison to null model.*

<table>
<thead>
<tr>
<th></th>
<th>Null Model&lt;sup&gt;a&lt;/sup&gt; (Model 1)</th>
<th>Hypothesized Model&lt;sup&gt;b&lt;/sup&gt; (Model 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta_u$&lt;sup&gt;c&lt;/sup&gt; 95% CI&lt;sup&gt;d&lt;/sup&gt;</td>
<td>$\beta_u$&lt;sup&gt;c&lt;/sup&gt; 95% CI&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Fixed Parts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Intercept)</td>
<td>5.68 *** 5.42 – 5.93</td>
<td>5.42 *** 5.09 – 5.74</td>
</tr>
<tr>
<td>Error Belief</td>
<td>0.20 -0.01 – 0.40</td>
<td></td>
</tr>
<tr>
<td>Reporting Consequence</td>
<td>0.13 -0.07 – 0.34</td>
<td></td>
</tr>
<tr>
<td>Error Visibility</td>
<td>0.45 *** 0.25 – 0.65</td>
<td></td>
</tr>
<tr>
<td>Error Consequence</td>
<td>-0.25 * -0.46 – 0.05</td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>0.50 -0.07 – 1.08</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.15 -0.37 – 0.67</td>
<td></td>
</tr>
<tr>
<td>Honesty-Humility</td>
<td>0.56 * 0.07 – 1.06</td>
<td></td>
</tr>
<tr>
<td><strong>Random Parts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2$&lt;sup&gt;e&lt;/sup&gt;</td>
<td>6.630</td>
<td>6.545</td>
</tr>
<tr>
<td>$\tau_{00, Rater}$&lt;sup&gt;f&lt;/sup&gt;</td>
<td>2.263</td>
<td>2.137</td>
</tr>
<tr>
<td>$N_{Rater}$</td>
<td>155</td>
<td>155</td>
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<tr>
<td>ICC&lt;sub&gt;Rater&lt;/sub&gt;</td>
<td>0.254</td>
<td>0.246</td>
</tr>
<tr>
<td><strong>Model Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>2480</td>
<td>2480</td>
</tr>
<tr>
<td>$R^2$&lt;sup&gt;h&lt;/sup&gt;</td>
<td>.301</td>
<td>.309</td>
</tr>
<tr>
<td>AIC&lt;sup&gt;i&lt;/sup&gt;</td>
<td>12024.476</td>
<td>12000.338</td>
</tr>
<tr>
<td>BIC&lt;sup&gt;j&lt;/sup&gt;</td>
<td>12041.9</td>
<td>12058.5</td>
</tr>
<tr>
<td>Deviance&lt;sup&gt;k&lt;/sup&gt;</td>
<td>12018.476</td>
<td>11980.338</td>
</tr>
</tbody>
</table>

Note: N= 155

<sup>a</sup>Null random effects model with a participant as a random effect and no predictors

<sup>b</sup>Hypothesized model with cues and individual difference variables as fixed effects
and participant as a varying-intercept random effect
\(^c\) Unstandardized parameter estimate
\(^d\) 95\% confidence interval surrounding parameter estimate
\(^e\) Residual variance
\(^f\) Intercept variance
\(^g\) Rater intraclass correlation
\(^h\) Percentage of variance in the dependent variable explained by model
\(^i\) Akaike Information Criterion index of goodness-of-fit
\(^j\) Bayesian Information Criterion index of goodness-of-fit
\(^k\) Deviance index of goodness-of-fit

* indicates \(p < .05\)  ** indicates \(p < .01\)  *** indicates \(p < .001\)
### Table 4.
*Fixed and random effects and model fit of exploratory model, in comparison to null model.*

<table>
<thead>
<tr>
<th>Fixed Parts</th>
<th>Null Model&lt;sup&gt;a&lt;/sup&gt; (Model 3)</th>
<th>Exploratory Model&lt;sup&gt;b&lt;/sup&gt; (Model 4)</th>
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<tr>
<td>(Intercept)</td>
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<tr>
<td>Error Belief</td>
<td>-0.51</td>
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</tr>
<tr>
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<td>-1.14 – -0.02</td>
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<tr>
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<td>-0.04 – 1.08</td>
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<tr>
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<tr>
<td>Honesty-Humility</td>
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<tr>
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<td>1.47 ***</td>
<td>0.65 – 2.29</td>
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<td>-1.93 – 0.33</td>
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Error Belief X Reporting  
Consequence X Error  
Consequence
-2.09 *** -3.28 – -0.90

Error Belief X Error  
Visibility X Error  
Consequence
0.13 -1.04 – 1.29

Reporting Consequence X  
Error Visibility X Error  
Consequence
0.98 -0.18 – 2.14

Error Belief X Reporting  
Consequence X Error  
Visibility X Error  
Consequence
0.23 -1.38 – 1.84

**Random Parts**

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<tr>
<th>Parameter</th>
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<tbody>
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<tr>
<td>( \tau_{00, \text{Rater}} )</td>
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<td>2.161</td>
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<td>( \tau_{00, \text{Base.Plot}} )</td>
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<td>( N_{\text{Rater}} )</td>
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<td>.338 / .332</td>
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<td>( \text{BIC} )</td>
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<tr>
<td>( \text{Deviance} )</td>
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<td>11896.195</td>
</tr>
</tbody>
</table>

*Note: \( N = 155 \)

- Null random effects model with a participant as a random effect and no predictors
- Hypothesized model with cues and individual difference variables as fixed effects and participant as a varying-intercept random effect
- Unstandardized parameter estimate
- 95% confidence interval surrounding parameter estimate
- Residual variance
- Intercept variance
Rater intraclass correlation

Percentage of variance in the dependent variable explained by model

Akaike Information Criterion index of goodness-of-fit

Bayesian Information Criterion index of goodness-of-fit

Deviance index of goodness-of-fit

* indicates $p<.05$  ** indicates $p<.01$  *** indicates $p<.001$
## Appendices

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Appendix B

Consent Form

Consent to Participate in Research
Title of Project: Errors in Decision-Making

Thank you for considering this study. My name is Marian Pitel and I am a graduate student in Industrial-Organizational Psychology at the University of Guelph, working with Dr. Peter Hausdorf. We are interested in how often people make errors in decision-making at work and what happens after these errors occur. This research will contribute to my Master’s thesis.

If you have any questions or concerns about the research, please feel welcome to contact Marian Pitel at mpitel@uoguelph.ca or (647) 285-1528 and/or Dr. Peter Hausdorf at phausdor@uoguelph.ca or (519) 824-4120 ext. 53976.

Procedures
To be eligible to participate, you must have a minimum 6 months of experience working in the food and beverage industry.

If you volunteer to participate in this study, you will be asked to do the following things over the study session (approx. 1 hour):

- Enter a self-generated identification code.
- Answer questions about demographics.
- Read 24 short scenarios about errors in a restaurant setting.
- For each scenario, answer questions about the situation.
- Answer additional questions about the errors in the scenarios.
- Read debrief form.

Potential Risks and Discomforts
There are no foreseeable physical, financial, or social risks associated with this study. However, you may experience some psychological risks. Because the study involves reading scenarios about errors at work, you may perceive the scenarios to be similar to real errors you have personally made or witnessed in the past, which may bring about negative feelings related to the event. Nonetheless, we anticipate that these risks would be similar or lower in intensity than what can be experienced in everyday life.

Potential Benefits to Participants and/or Society
There are no direct benefits to participating in this research. However, the results from this study will be used to add to the research on errors in decision-making. Moreover, this study will help organizations and employees to learn more about errors at work.

Payment for Participation
You will receive a 1.0 SONA participant pool credit from participating in this research study.
Confidentiality
Any information you provide will be kept confidential. We will use your self-generated identification code to match the data from this study to your responses to some questions during the “Mass Testing” study you completed. We will not be able to determine your identity using your self-generated identification code, unless you provide us the code yourself. After the data are matched, your self-generated code will be replaced with a unique code by the researchers. The de-identified data files will be stored at the University of Guelph (in an online data repository) and Open Science Framework indefinitely, and be made open-access (i.e., available free of charge). We are making our data files openly accessible to the public and other researchers to help facilitate greater collaboration among researchers and advancement in the field of Psychology.

Participation and Withdrawal
You can choose whether to be in this study or not. You may withdraw at any time during the study with no penalty for withdrawing (you will still receive your research credit). Participants who wish to withdraw will simply close down the Qualtrics browser and leave the study session. We will delete any incomplete responses. You may also refuse to answer any questions you would not like to answer and still remain in the study. Moreover, you will be asked at the end of the study if you want your data to be withdrawn from or remain in the study.

If you wish to withdraw from the study after the questionnaire has been submitted, you may email either Marian Pitel or Dr. Peter Hausdorf with your full name and your self-generated code to have your responses removed from the dataset up to 2 weeks after the survey submission date.

Rights of Research Participants
You do not waive any legal rights by agreeing to take part in this study. If you have questions regarding your rights and welfare as a research participant in this study (REB#:17-10-036), please contact: Director, Research Ethics; University of Guelph; reb@uoguelph.ca; (519) 824-4120 (ext. 56606). This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. If you have any questions or concerns about this study or for a summary of the results, contact either Marian Pitel or Dr. Peter Hausdorf.

Signature of Research Participant
Clicking on the “Agree” button indicates that:
I have read the Consent to Participate in Research Letter for this study,
I acknowledge that I have at least six (6) months of work experience in the food and beverage service industry,
I hereby consent to take part in this study.

<<Agree>>  <<Disagree>>

We invite you to print a copy of this consent for your personal records.
Appendix C

Mass Testing Items

Please fill out the following information as of January 1st of this year (e.g. where you were living at that time, number of siblings you had at that point). If you do not have an answer to a question enter ‘1’ in its place. For example: FTAAA116.

(1) What is the first letter of your birth month?
- A
- D
- F
- J
- M
- N
- O
- S
- Check this box if you do not want to provide an answer for this question.

(2) What is the third letter of your first name?
- Check this box if you do not want to provide an answer for this question

(3) What is the second letter of your last name?
- Check this box if you do not want to provide an answer for this question

(4) What is the last number in your phone number?
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Check this box if you do not want to provide an answer for this question

(5) What is the second letter of the name of the city or town you were born in?
- Check this box if you do not want to provide an answer for this question

(6) How many siblings do you have, excluding yourself?
- 0
-
(7) Which gender do you identify with?  
Female, Male, Other

(8) What is your age?

HEXACO Personality Scale (Ashton & Lee, 2009).

For the following questions, please indicate how much you agree with each statement. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

1. I would be quite bored by a visit to an art gallery.
2. I plan ahead and organize things, to avoid scrambling at the last minute.
3. I rarely hold a grudge, even against people who have badly wronged me.
4. I feel reasonably satisfied with myself overall.
5. I would feel afraid if I had to travel in bad weather conditions.
6. I wouldn't use flattery to get a raise or promotion at work, even if I thought it would succeed.
7. I'm interested in learning about the history and politics of other countries.
8. I often push myself very hard when trying to achieve a goal.
9. People sometimes tell me that I am too critical of others.
10. To answer this question, please choose option number four, “agree.”
11. I rarely express my opinions in group meetings.
12. I sometimes can't help worrying about little things.
13. If I knew that I could never get caught, I would be willing to steal a million dollars.
14. I would enjoy creating a work of art, such as a novel, a song, or a painting.
15. When working on something, I don't pay much attention to small details.
16. People sometimes tell me that I'm too stubborn.
17. I prefer jobs that involve active social interaction to those that involve working alone.
When I suffer from a painful experience, I need someone to make me feel comfortable.  

Having a lot of money is not especially important to me.  

I think that paying attention to radical ideas is a waste of time.  

Choose the first option – “strongly disagree” – in answering this question.  

I make decisions based on the feeling of the moment rather than on careful thought.  

People think of me as someone who has a quick temper.  

On most days, I feel cheerful and optimistic.  

I feel like crying when I see other people crying.  

I think that I am entitled to more respect than the average person is.  

If I had the opportunity, I would like to attend a classical music concert.  

When working, I sometimes have difficulties due to being disorganized.  

My attitude toward people who have treated me badly is “forgive and forget”.  

I feel that I am an unpopular person.  

When it comes to physical danger, I am very fearful.  

To respond to this question, please choose option number five, “strongly agree.”  

If I want something from someone, I will laugh at that person's worst jokes.  

I’ve never really enjoyed looking through an encyclopedia.  

I do only the minimum amount of work needed to get by.  

I tend to be lenient in judging other people.  

In social situations, I’m usually the one who makes the first move.  

I worry a lot less than most people do.  

I would never accept a bribe, even if it were very large.  

People have often told me that I have a good imagination.  

I always try to be accurate in my work, even at the expense of time.  

I am usually quite flexible in my opinions when people disagree with me.  

Please answer this question by choosing option number two, “disagree.”  

The first thing that I always do in a new place is to make friends.  

I can handle difficult situations without needing emotional support from anyone else.  

I would get a lot of pleasure from owning expensive luxury goods.  

I like people who have unconventional views.  

I make a lot of mistakes because I don’t think before I act.  

Most people tend to get angry more quickly than I do.  

Most people are more upbeat and dynamic than I generally am.  

I feel strong emotions when someone close to me is going away for a long time.
I want people to know that I am an important person of high status.

I don’t think of myself as the artistic or creative type.

In response to this question, please choose option number three, “neither agree nor disagree.”

People often call me a perfectionist.

Even when people make a lot of mistakes, I rarely say anything negative.

I sometimes feel that I am a worthless person.

Even in an emergency I wouldn’t feel like panicking.

I wouldn’t pretend to like someone just to get that person to do favors for me.

I find it boring to discuss philosophy.

I prefer to do whatever comes to mind, rather than stick to a plan.

When people tell me that I’m wrong, my first reaction is to argue with them.

When I’m in a group of people, I’m often the one who speaks on behalf of the group.

I remain unemotional even in situations where most people get very sentimental.

I’d be tempted to use counterfeit money, if I were sure I could get away with it.

Locus of Control of Behavior Scale (LCBS; Craig, Franklin, & Andrews, 1984)

On this page, you will find a series of statements about you. Please read each statement and decide how much you agree or disagree with that statement. Then indicate your response using the following scale:

6 = strongly agree
5 = agree
4 = somewhat agree
3 = somewhat disagree
2 = disagree
1 = strongly disagree

66 ___ I can anticipate difficulties and take action to avoid them
67 ___ A great deal of what happens to me is probably just a matter of chance
68 ___ Everyone knows that luck or chance determines ones’ future
69 ___ I can control my problem(s) only if I have outside support
70 ___ When I make plans, I am almost certain that I can make them work
71 ___ My problem(s) will dominate me all my life
72 ___ My mistakes and problems are my responsibility to deal with
73 ___ Becoming a success is a matter of hard work, luck has little or nothing to do with it
74 ___ My life is controlled by outside actions and events
75 ___ People are victims of circumstance beyond their control
76 ___ To continue to manage my problems I need professional help
77 ___ When I am under stress, the tightness in muscles is due to things outside my control
78 ___ I believe a person can really be the master of his/her fate
It is impossible to control my irregular and fast breathing when I am having difficulties.

I understand why my problem(s) varies so much from one occasion to the next.

I am confident of being able to deal successfully with future problems.

In my case maintaining control over my problems is due mostly to luck.

In your honest opinion, should we use your data in our analyses in this study? Yes, No, Unsure.
Appendix D

Pre-Scenario Instructions

INSTRUCTIONS
PLEASE READ CAREFULLY

Thank you for completing the demographic questionnaire.

Next, you will be presented a series of scenarios about situations in a restaurant. Following each scenario, you will respond to a question about what is likely to occur in the situation. It is very important that you respond honestly so that we can capture what you believe would actually happen, instead of what you think should happen. We thank you in advance for your honesty.

For these scenarios, please make sure that your browser window is in full-screen mode so that all parts are displayed properly. To get you used to the study materials, we will be giving you five practice scenarios. Because these scenarios are a way to get you familiarized with the format of this study, these practice scenarios will look slightly different from the rest. Even though the first five scenarios are Practice Scenarios, we ask that you please respond honestly to the questions about these situations.

All of the scenarios are different. Some of the scenarios you read might look the same at first glance; that is because some parts get repeated throughout (e.g., the plot of the scenarios). However, please read these scenarios extra carefully since there are slight but very important differences, especially within the bullet points.

For all of the scenarios, please take the following perspective:

You are 8 months into your job as a food server at an up-scale restaurant with a well-known chef. The restaurant has a good reputation in the neighbourhood that it is located in. It is known for using high-quality ingredients and providing great service. You consider it a good place to work at in terms of tips, environment, and your rapport with co-workers and the customers. Overall, you enjoy working as a server at this restaurant.

Please take a moment to deeply imagine yourself in this role.

You may proceed to the Practice Scenarios.
Appendix E

Error Exemplars / Base Scenario Plots

Error Exemplar 1: Your manager comes back after cashing out a table for you, passes you the credit receipts, and heads straight to his office. The large party, which you shared with two other servers, had asked your manager to split the bill between four of the birthday celebrant’s grandchildren. You finish processing the receipts into the system and are puzzled by the amount paid. You suddenly remember that you punched in four bottles of red wine, instead of four glasses of red wine. You realized it at the time but thought that you would be able to correct the order before the bill was printed. The other two servers working with you also punched drinks in for the table and the whole night was very busy. The four customers each overpaid by $40, for a total of $160 overcharge. You remember that the customers were in a rush to pay for the bill and leave. It appears that neither the customers nor your manager noticed the overcharge.

Error Exemplar 2: You hear the kitchen bell ring and see that food is ready for one of your tables. Your food runner is busy so you decide to run the food yourself because it’s for one of the restaurant’s regular customers and you don’t want to keep him waiting. He regularly places large catering orders from the restaurant and he is at the restaurant tonight for an anniversary date with his wife. You get to the restaurant’s only private booth and reach over to drop the wife’s dish off when you knock over an opened bottle of wine, causing wine to spill onto her lap. You try to apologize but they quickly ask for their bill and the rest of their order to be packed up.

Error Exemplar 3: As your food runner finishes dropping appetizers off at a table you’re serving, you quickly realize that you forgot to let the kitchen know about a customer’s nut allergy. Before you can run to the table to take the dish away, you notice the customer inspecting the dish. He calls you over and demands a new dish. You ask the kitchen staff to make a new dish for the customer without nuts and because the floor is so busy, they do it no questions asked. You serve the new dish to the customer but it seems that he is still unhappy with what happened.

Error Exemplar 4: You are standing by one of your tables, waiting for a customer to finish using the debit machine when you decide to check on the other tables in your section. You scan your eyes up and down your section when your eyes stop at a table close to the bar. You vaguely remember seeing them in your section but for some reason, you can’t remember what they ordered. You excuse yourself and make your way to the ordering system. You find that there is no order punched in for the table close to the bar. Before you can think about what to do, the customer who was paying waves the debit machine at you, signaling that they are finished with their transaction. As you walk to obtain the debit machine, the customers at the table close to the bar call your attention and ask about their order. Hoping that you will find the paper slip on which you wrote their order, you tell them, “it will take another 20 minutes.” The customers look at you in disbelief and one of them quickly says, “Never mind, we will eat somewhere else.” As they leave the restaurant, you see them shaking their heads, seeming upset.
Error Exemplar 5: You are re-setting one of the tables in your section when you overhear the restaurant hostess talking to a customer. You realize based on what you hear that they are talking about a reservation that was not recorded in the system. The customer ultimately says “Forget it, we will take our business elsewhere.” You continue wiping down the table when you quickly remember something. One of the restaurant’s regulars, a customer who often chooses the restaurant as the venue for his company’s parties, came to you last night and said that one of his business partners was planning on bringing his family to the restaurant the following day. He asked you to book a nice table for his business partner and you said yes, writing the reservation details down on your notepad. You, however, forgot to book the reservation in the restaurant’s booking system.
Appendix F

Cues and Levels

Error Belief: At every meeting, the restaurant owner emphasizes how important it is for you and the other restaurant workers to understand that mistakes can often be avoided (negative) or At every meeting, the restaurant owner emphasizes how important it is for you and the other restaurant workers to understand that mistakes are bound to happen (positive).

Reporting Consequence: In the past month, you witnessed other servers getting publicly reprimanded in staff meetings for admitting their errors to your manager (negative) or In the past month, you witnessed other servers getting publicly praised in staff meetings for admitting their errors to your manager (positive).

Error Visibility: You take a moment to wonder if any of your co-workers can figure out what happened, and you push the thought away, certain that no one can possibly identify you as the person who made the error (low) or You take a moment to wonder if any of your co-workers can figure out what happened, and you begin to worry, certain that some of your co-workers can definitely identify you as the person who made the error (high).

Error Consequence: The restaurant owner enforces a “three strikes and you’re fired” rule. Regardless of your decision, it is possible that the customer will complain to your manager. You currently have two strikes (high) or The restaurant owner enforces a “three strikes and you’re fired” rule. Regardless of your decision, it is possible that the customer will complain to your manager. You currently have zero strikes (low).
Appendix G

Sample Scenario

Your manager comes back after cashing out a table for you, passes you the credit receipts, and heads straight to his office. The large party, which you shared with two other servers, had asked your manager to split the bill between four of the birthday celebrant’s grandchildren. You finish processing the receipts into the system and are puzzled by the amount paid. You suddenly remember that you punched in four bottles of red wine, instead of four glasses of red wine. You realized it at the time but thought that you would be able to correct the order before the bill was printed. The other two servers working with you also punched drinks in for the table and the whole night was very busy. The four customers each overpaid by $40, for a total of $160 overcharge. You remember that the customers were in a rush to pay for the bill and leave. It appears that neither the customers nor your manager noticed the overcharge.

- At every meeting, the restaurant owner emphasizes how important it is for you and the other restaurant workers to understand that mistakes can often be avoided.
- In the past month, you witnessed other servers getting publically reprimanded in staff meetings for admitting their errors to your manager.
- You take a moment to wonder if any of your co-workers can figure out what happened, and you push the thought away, certain that no one can possibly identify you as the person who made the error.
- The restaurant owner enforces a “three strikes and you’re fired” rule. Regardless of your decision, it is possible that the customer will complain to your manager. You currently have two strikes.

How likely are you to report your error to your manager?

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<th>2</th>
<th>3</th>
<th>4</th>
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<th>7</th>
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<td></td>
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<td></td>
<td></td>
<td>I am extremely sure</td>
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</tr>
<tr>
<td>I would NOT report it</td>
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<td></td>
<td>I would report it</td>
<td></td>
</tr>
</tbody>
</table>

Considering how other people that you have worked with in the past have handled situations similar to this,

How likely are others to report this error, if they had made it themselves, to the manager?

<table>
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<tr>
<th></th>
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<td>they would NOT report it</td>
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Appendix H
Debrief and Second Consent Form

Work errors can have immense effects on many people at multiple levels. The costs of work errors can be financial, legal, and personal. Furthermore, work errors can affect the individual who committed the error, their work group, and their organization. In line with this perspective, Kumar and Raina (2017) reviewed error cascades in the medical profession and noted that between 48% and 54% of adverse medical events were the result of error chains, where identifying individual errors earlier in the process could have prevented the occurrence of more aversive outcomes like incidents or injuries.

Due to the potential for individual work errors to affect multiple stakeholders at different levels, researchers often encourage the reporting of errors, regardless of severity. The benefits of reporting errors are as wide-ranging as the consequences of errors described above. This study is a first attempt to experimentally investigate which and how aspects or characteristics of the organization, situation, or the person who committed the error influence the likelihood of error reporting.

In an attempt to increase careful responding, we stated in the beginning of the experiment that the study was about how often errors occur in the workplace and what actions are taken thereafter. The true purpose of the study, however, is to see how changing different parts of the scenario affects how likely you are to report the error to the manager. Recall that, during the experiment, you read scenarios that looked similar but had minor differences. Based on what is known about research participation, we determined that the true purpose had to be hidden in the beginning in order to obtain more accurate responses from you and the other participants.

Thank you once again for your participation in this study. We appreciate your contribution to our program of research. Although your individual results will not be made available to you, you may request a copy of the aggregated results from the study by e-mailing any one of the researchers listed below. These will be provided to you when the study has been completed. We hope that you understand the reasoning for hiding the purpose of this study; however, in the event that you feel uncomfortable about this or any other aspect of the study, you may withdraw your data from the sample.

CONSENT OF RESEARCH PARTICIPANT
I have read the information about the deception provided for this study as described above. By pressing YES I agree to allow the researchers to use my results in their analyses. By pressing NO, I do not agree to the researchers using my results in their analyses. Having participants know the true purpose of this study would invalidate the results, as such, I agree to not share the true purpose of this study to anyone.

<<YES>>
<<NO>>
Thank you for your participation in this study. We appreciate your contribution to our program of research.
If you have any further questions about the study or would like to receive the study findings, please contact either:

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<th>Marian Pitel</th>
<th>Dr. Peter Hausdorf</th>
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Reference