

Ego Depletion and Auditors' Judgment and Decision-Making Quality

By

Patrick J. Hurley

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The dissertation is approved by the following members of the Final Oral Committee:

Brian W. Mayhew, Professor, Accounting & Information Systems

Karla M. Johnstone, Professor, Accounting & Information Systems

Terry D. Warfield, Professor, Accounting & Information Systems

Justin R. Sydnor, Assistant Professor, Actuarial Science, Risk Management & Insurance

Yuri Miyamoto, Associate Professor, Psychology

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ABSTRACT

This dissertation reports three separate essays that examine the impact of ego depletion on the judgment and decision-making quality of auditing students and professional auditors. The term ego depletion refers to a state characterized by a reduced desire or ability to use self-control in task performance due to the use of self-control on prior tasks. This research is motivated by the need to continue to explore and understand the determinants of audit quality, including auditors' judgment and decision-making quality and application of professional skepticism. My first essay strengthens this motivation by documenting the pervasive role of self-control in auditing tasks, which suggests that ego depletion may have a significant and pervasive impact on the conduct of the audit.

My second essay reports the results of an experiment aimed at studying a key assumption within the ego depletion literature. Specifically, prior ego depletion research assumes that ego depletion is a within-day phenomenon, and that individuals generally recover their self-control resources between days through rest and sleep. In this experiment, I explore whether ego depletion accumulates over a stressful period, such as busy season or final exam week for professional auditors and auditing students, respectively. I find that ego depletion does significantly accumulate during a stressful period for professional auditors and auditing students, suggesting that ego depletion is both a within- and between-day phenomenon.

My third essay reports the results of an experiment that explores three questions. First, do different types of self-control, such as those in professional tasks, cause ego depletion at different levels? Prior depletion literature does not examine whether different types of self-control leads to different levels of ego depletion. Second, does auditor experience, expertise, and professional skepticism moderate or exacerbate the occurrence of ego depletion? Finally, do different types of

self-control tasks lead to decreased judgment and decision-making quality? I find that different types of self-control do cause different levels of ego depletion. Further, I find that specific task experience mitigates ego depletion, expertise does not significantly impact depletion, and trait professional skepticism causes additional depletion. Finally, I find that depleted individuals exhibit increased willingness to accept a fraudulent financial explanation and exhibit decreased confidence in their task performance, though depletion does not significantly impact the ability to generate plausible alternative explanations for financial trends.

Keywords: ego depletion, self-control, audit, professional skepticism, judgment and decision-making quality

1. INTRODUCTION AND OVERVIEW

This dissertation is comprised of three self-contained essays grounded in ego depletion theory and its application to financial statement auditors' (hereafter "auditors") judgment and decision-making ("JDM") processes. Ego depletion theory is built around the idea that the ability to exercise self-control relies upon a finite and expendable cognitive resource and functions akin to a muscle in one's body. That is, this ability can become fatigued with use and requires a recovery period to restore performance. Self-control, analogous to the traditional concept of willpower, is the ability to consciously control one's behavior, especially to conform to standards or to pursue goals (Baumeister et al. 2007). Self-control is therefore crucial to many auditing tasks, especially in the application of complex cognitive processing and reasoning, decision-making, resisting client persuasion, ignoring distracting information, and persisting in the performance of difficult or tedious auditing tasks. Ego depletion is therefore defined as the inability or unwillingness to exercise subsequent self-control due to prior self-control use (Baumeister et al. 1998). Self-control failure, resulting from ego depletion, can potentially hinder auditors' JDM quality thereby impacting overall audit quality. This dissertation explores the application of ego depletion theory within an accounting setting and to assess how, when, and to what degree ego depletion can potentially hinder auditors' JDM quality.

My dissertation is motivated by two distinct factors: (1) the important and potentially pervasive nature of ego depletion in an auditing setting; and (2) the possibility that ego depletion theory does not allow the findings of prior research to generalize to a professional setting. When considering the former factor, prior psychology research has uncovered a number of causes of

ego depletion that are pervasive within an auditing setting. For example: decision making; maintaining vigilance and focus; resisting persuasion; handling a large cognitive load on complex tasks; and regulating emotions that accompany stress all lead to ego depletion (Brunyeel et al. 2006; Vohs et al. 2008; Gailliot and Baumeister 2005; Muraven and Baumeister 2000; Burkley 2008; Schmeichel 2007; Baumeister 2002b). Similarly, ego depletion has consequences that are germane to an auditing setting, which I detail below in my summary of Chapter 1 of my dissertation. With respect to the latter factor, prior psychology studies typically rely on tasks that are centered on impulse inhibition and that are not familiar or meaningful to the task performers. Neither of these things is likely to be true of most professional tasks. It is therefore possible that different types of self-control may cause different levels of ego depletion. Further, task familiarity and meaningfulness may counteract depletion through motivation (Muraven and Slessareva 2003), practice (Muraven et al. 1999), and conversion of effortful processing into automatic processing that comes with experience and expertise (Neal et al. 2013). As a result, it is possible that auditors do not experience significant levels of ego depletion from performing professional tasks. Further, ego depletion theory assumes that individuals recover sufficient self-control resources between each day, limiting ego depletion to be a within-day phenomenon. However, prolonged periods of heavy workloads and stress, similar to auditors' busy season experiences, raise the question of the validity of this assumption.

The first essay (Chapter 2) of my dissertation provides a synthesis and application of the consequences of ego depletion into auditing practice. I first outline the predominant model of viewing ego depletion – the strength model of self-control – and provide a graphical depiction of the model. I then apply findings from prior research on ego depletion to an auditing setting and pose research questions designed to outline opportunities for future research on ego depletion in

this setting. I find that, theoretically, many consequences of ego depletion potentially impact auditors' JDM quality. For example, ego depletion can affect auditors': evidence collection and evaluation; resistance to client persuasion; response to risk; application of professional skepticism; independence; performance on attention-distributed tasks; and effectiveness in the workpaper review process. Summarily, this essay contributes to the literature on auditors' JDM quality by identifying a potential underlying mechanism that can hinder JDM quality and provides numerous avenues for future research to explore ego depletion within the accounting literature. This exploration can then contribute back to the psychology literature by investigating the robustness and breadth of ego depletion theory.

The second essay (Chapter 3) of my dissertation challenges a fundamental assumption of ego depletion theory using extended stressful periods of time for both professional auditors and undergraduate auditing students. Specifically, I explore the assumption that individuals sufficiently recover self-control resources between days, through rest and sleep. I conduct an experiment using both undergraduate auditing students and professional auditors to examine whether the prolonged stress and increased workloads resulting from final exam time and busy season, respectively, lead to a between-day or accumulation effect of ego depletion. I conduct observations of self-control resources outside of and within final exam week and busy season, and find that both groups of participants experience a significant accumulation of ego depletion during a stressful period. This effect is robust even when controlling for stress, upcoming deadlines, average hours slept in the prior week, and hours worked in the current week. Further, busy season for professional auditors leads to a significantly greater accumulation of ego depletion than does final exam time for students. These results contribute to the ego depletion literature by challenging a fundamental theoretical assumption. These results also contribute to

the literature on auditors' busy season and highlight a potential increase in the role of ego depletion during this time.

The third and final essay (Chapter 4) of my dissertation investigates whether realistic auditing tasks cause ego depletion in a manner predicted by ego depletion theory, and whether ego depletion hinders auditors' subsequent JDM quality and professional skepticism. Using a 1 x 3 between-subjects randomized laboratory experiment, I find that different types of self-control lead to significantly different levels of depletion when compared to an impulse-inhibition task used in prior depletion research. Ego depletion then significantly increases individuals' willingness to accept a CFO's fraudulent explanation for financial trends as reasonable and decreases individuals' confidence in task performance. I also find that task-specific experience mitigates the incidence of depletion, while trait professional skepticism increases depletion. This study contributes evidence to the literature on auditors' JDM quality by finding that depletion can significantly decrease auditors' professional skepticism. Further, this contributes to the ego depletion theory by finding that different types of self-control lead to significantly different levels of depletion and that task-specific experience, but not expertise, mitigates depletion. I contribute to the professional skepticism literature within accounting by demonstrating a detrimental effect of trait professional skepticism, due to its effect of exacerbating ego depletion in task performance.

In Chapter 5, I conclude and provide a discussion of future research and extensions of this research.

2. ESSAY 1: APPLICATIONS AND IMPLICATIONS OF EGO DEPLETION FOR AUDITING RESEARCH

It's not the work that's hard, it's the discipline.

– Anonymous

INTRODUCTION

The above quote captures one of the most important advances in recent psychology research: the rise of ego depletion theory and the recognition that self-control has a pervasive impact on human judgment and behavior. For instance, consider the sensational example of Danziger, Levav, and Avnaim-Pesso (2011), who find that Jewish-Israeli judges' propensity to grant parole declines as they presumably become more depleted later in the day. To date, auditing research has largely ignored the potential impact of ego depletion, and ego depletion theorists have largely ignored whether their theory extends to professional settings and meaningful tasks. The purpose of this paper is to synthesize the existing ego depletion literature to identify important findings that potentially apply to an audit setting and based on the issues identified suggest future research opportunities. To accomplish this purpose I first review prior ego depletion literature to identify key findings arising from the theory. I then apply the theory and these findings to an auditing setting, while suggesting potential implications for auditors' judgment and decision-making (JDM) quality. Finally, I propose research questions designed to advance our understanding of ego depletion and its potential role in auditors' JDM quality.

Self-control – the ability to consciously control one's own behavior, especially to conform to standards or pursue long-term goals (Baumeister, Vohs, and Tice 2007) – underlies many judgment processes (e.g., reasoning, cognitive processing, decision-making). However, prior psychology research finds that self-control functions as a limited and expendable resource (e.g., Baumeister, Bratslavsky, Muraven, and Tice 1998). Using self-control depletes this resource – a phenomenon that psychologists refer to as “ego depletion” (hereafter also “depletion”). Ego depletion leads to a reduced willingness and/or ability to engage in subsequent

acts of self-control (Baumeister et al. 1998). Self-control therefore represents a “Catch-22” for public accounting: auditors must use self-control to exhibit high-quality task performance, yet using self-control depletes this resource, which can decrease judgment and decision-making (JDM) quality (i.e., increase audit risk) in future tasks.

A useful analogy to conceptualize self-control is that of a muscle in one’s body: performance declines with use and a recovery period is necessary to restore performance. As a result, the timing of (i.e., one’s level of depletion during) task performance is critical; depletion is a situation-specific mechanism that can impact auditors’ JDM quality and professional skepticism. Despite the usefulness of the muscle analogy, depletion is not the same as physical or mental fatigue, which follow from repetitive or extended effort. Prior research finds that physical fatigue may be a signal of depletion, but is neither a necessary nor sufficient condition for depletion, and that individuals are often unaware that they are depleted (Baumeister et al. 1998; Muraven, Tice, and Baumeister 1998). Further, depletion is dependent upon a task’s self-control requirements, but not necessarily its duration as prior literature typically observes depletion in less than ten minutes of task performance (Hagger, Wood, Stiff, and Chatzisarantis 2010).

This paper is primarily motivated by two factors. First, there is a pressing need to better understand the determinants of auditors’ JDM quality. Church and Shefchik (2012) study PCAOB inspection reports from 2004-2009 for the largest eight auditing firms in the U.S. and find that, while audit quality is improving over time, the PCAOB issued 664 audit deficiencies to these firms over this time period. Further, Knechel, Krishnan, Pevzner, Shefchik, and Velury (2013, 407) note “virtually every so-called ‘audit failure’ can be traced to an error in judgment ... made by the audit team during the course of an engagement.” Exploring depletion will allow

auditing researchers to build a more extensive theoretical understanding of auditors' JDM processes.

Second, despite being studied in the psychology literature, depletion warrants study in an auditing and/or accounting context because prior psychology research ignores important ecological features of professional tasks and the auditing environment that may impact the effects of depletion. For example, prior psychology research uses mundane tasks that center on impulse inhibition and are not familiar or meaningful to task performers. Attributes of professional auditors and the auditing environment – including task realism, familiarity, and meaningfulness – can increase individuals' motivation to perform tasks, and prior studies find that motivation can counteract the effects of depletion (e.g., Muraven and Slessareva 2003). Task familiarity can also counteract depletion through practice, which can build self-control stamina and increase resistance to depletion (Muraven, Baumeister, and Tice 1999). Further, task familiarity or experience can convert effortful processing into automatic processing that is less susceptible to depletion (e.g., Neal, Wood, and Drolet 2013). As a result, it is important to understand whether and under what conditions these ecological features could mitigate or exacerbate the consequences of depletion; this importance implies a need to investigate the applicability of depletion with auditors in an auditing setting.

The remainder of the paper is organized into six sections. Section 2 provides an overview of ego depletion, discusses the strength model of ego depletion theory, and reviews model and discussion articles within the depletion literature. Section 3 discusses on the causes of ego depletion identified in prior psychology research. Section 4 describes the findings related to consequences of ego depletion. Section 5 reviews means of mitigating or avoiding ego depleting,

including the conservation of self-control resources. Section 6 focuses on ways to recover depleted self-control resources. Finally, I present overall conclusions in Section 7.

THE STRENGTH MODEL OF EGO DEPLETION

Self-control is used on a daily basis through an individual's executive function and assists in the performance of desired behavior and the inhibition of undesired behavior (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, and Baumeister 2012). As a result, self-control is pervasive to human behavior and is key to biological success (Baumeister 2014). The strength model of ego depletion, which analogizes self-control to a muscle in one's body, is the dominant paradigm for studying depletion in the psychology literature. This model originated from seminal work studying patterns of self-regulatory failure, which led to the initial observation that self-control relies upon a limited cognitive resource that can be depleted (Baumeister and Heatherton 1996; Heatherton and Baumeister 1996). Further exploration found self-control to be responsible for exercising the executive component of one's self to control behavior, and that depletion of self-control resources hinders future attempts at self-control (Muraven and Baumeister 2000; Baumeister 2002a; Baumeister 2002b).

Prior literature on ego depletion has provided robust support for the strength model; this support has been bolstered by recent meta-analyses (e.g., Hagger et al. 2010; de Ridder et al. 2012). Based upon the strength model, theory-building papers have reviewed prior literature (Baumeister et al. 2007), discussed potential costs and implications of self-control failure (Gailliot and Baumeister 2005; Baumeister and Ahlquist 2009), and argued for synergies between social and cognitive neuroscience research to continue to advance the ego depletion literature (Berkman and Miller-Ziegler 2012; Hofmann, Schmeichel, and Baddeley 2012; Brass, Lynn, Demanet, and Rigoni 2013). While there have been recent discussions regarding glucose's

role in depletion (Beedie and Lane 2012; Chatzisarantis and Hagger 2014a; Chatzisarantis and Hagger 2014b) and effect sizes (Carter and McCullough 2014; Hagger and Chatzisarantis 2014), overwhelming support has been provided for the strength model of self-control. Although a more mechanistic, “process-model” of depletion has been recently proposed (Inzlicht and Schmeichel 2012), it has yet to receive empirical support. As a result, I construct the current paper around the strength model of self-control.¹

As a muscle becomes fatigued with use, requires a recovery period to restore performance, and improves with practice, so does the ability to use self-control (Muraven et al. 1998). Muraven and Baumeister (2000) set forth five assumptions of the strength model. First, individuals must use self-control in order to utilize the executive component of the self. The executive component of the self makes decisions and initiates or interrupts various types of behavior. Second, self-control is limited in the sense that it relies on a finite set of resources that can become depleted. Third, all individuals possess self-control resources and use them in the same manner, though individuals likely differ in their amount of self-control resources. Fourth, the success of any given self-control act is contingent upon the individual’s current level of resources available for use (i.e., timing of task performance matters). Finally, self-control resources are expended by using self-control, which reduces the available set of resources for future acts. This reduction underlies the finding that self-control efforts, such as remaining vigilant or focused, degrade with increased depletion (Muraven and Baumeister 2000).

Additional literature makes important distinctions within ego depletion theory. For example, Baumeister (2014) indicates that exercising self-control has both state and trait aspects. Trait

¹ Prior psychology researchers have also considered knowledge and skill models to account for ego depletion. These models predict improved and similar performance, respectively, on self-control tasks subsequent to an initial exertion of self-control. The widespread support of the strength model rejects the use of either the skill or knowledge model as appropriate for modeling depletion (see Baumeister et al. 1998 for a discussion).

self-control is stable, measurable (Tangney, Baumeister, and Boone 2004), and unaffected by self-control exertion. State self-control, however, relies upon finite resources as posited by ego depletion theory; ego depletion represents the cost of exercising state self-control (Baumeister and Alquist 2009).

(Insert Figure 1 Here)

Figure 1 provides a graphical representation of the strength model. An individual begins their day with some initial set of self-control resources (A).² As the day progresses, the individual performs various tasks, each of which has task-specific characteristics that require self-control and cause ego depletion (B). After task completion, the individual has a reduced set of self-control resources (i.e., is in a state of ego depletion) with which to face additional self-control tasks. Consequences of depletion (C) then apply to these later tasks. Mitigating and avoiding factors (e.g., task-specific motivation, sufficient breaks to recover resources, increases in glucose levels), as well as conserving self-control due to anticipating the need for self-control on future tasks (D), also impact the self-control required and depletion incurred by each task. Despite the existence of mitigating and avoiding factors, it is unlikely that individuals are able to restore self-control resources as quickly as they are expended; therefore, it is likely that depletion accumulates throughout the day. At the end of the day, an individual is left with their ending self-control resources (E). Between-day recovery (e.g., sleep and rest) (F) then feeds back to initial self-control resources (A), with which the individual begins the subsequent day. However, if an individual incurs more depletion than can be replenished through simple rest and recovery, it seems reasonable that depletion can accumulate between days and affect subsequent day task performance. Finally, individuals can improve their self-control through long-term practice,

² To facilitate reader comprehension, I use letters A through F to refer to elements of the framework explicitly in my description of the framework.

which can result in a resistance to depletion. These self-control improvements (F) reduce the amount of depletion incurred from subsequent days' task-specific causes of depletion (B).

CAUSES OF EGO DEPLETION

As previously noted, depletion is caused by the use of self-control, which is generally used in the executive function of the brain for tasks such as overriding habitual responses, self-regulation, decision-making, and responding to novel situations. This executive function and its roles underlie many of the causes of ego depletion, which I review below.

At a basic level self-control is used in inhibiting habitual, automatic, or desired behavior when engaging in that behavior would be counterproductive, harmful, or forbidden. Resisting temptation therefore leads to depletion (Vohs and Heatherton 2000) based upon using self-control to avoid engaging in a specific behavior, such as eating cookies when instructed to eat radishes (Baumeister et al. 1998). Similarly, inhibiting tendencies leads to depletion based upon prohibiting oneself from engaging in a habitual action (Schmeichel 2007). Germane to an auditing setting, prior literature finds that task interruption, especially when the individual is near completion of the task, leads to depletion (Freeman and Muraven 2010). The rationale is that as one approaches completion of a task they experience a heightened desire to complete the task; they are then forced to override this urge in order to deal with the interruption. Just as prohibiting oneself from engaging in a desired course of action leads to depletion, so does forcing oneself to engage in an undesirable action. For example, prior literature finds that individuals who are externally pressured or otherwise forced to use self-control incur higher levels of depletion than those who do so willingly (Muraven 2008; Muraven, Gagne, and Rosman 2008). To the extent that auditors engage in tasks that they do not enjoy, forcing themselves to complete those tasks can lead to ego depletion.

Cognitive processing represents another source of ego depletion that is especially relevant to auditors. Prior literature finds that both maintaining vigilance and focus (Baumeister et al. 1998) and controlling attention (Schmeichel 2007) cause depletion. This effect arises due to the inherent difficulty in blocking out countless other stimuli, visual and otherwise, while directing attention at the focal stimuli. Because individuals habitually attend and even respond to stimuli, it requires self-control to inhibit this tendency. Prior literature has also found that increased use of working memory requires self-control (Schmeichel 2007), as updating working memory is one of the main executive control functions of the brain (Miyake et al. 2000). Further, handling an increased cognitive load – a task’s attention, working-memory, or information-processing demands (Block, Hancock, and Zakay 2010) – leads to depletion (Schmeichel 2007). Many auditing tasks require configural information processing, which allows auditors to divide their attention appropriately among task features or cues to exhibit more effective JDM (Brown and Solomon 1991). In prior literature increased cognitive load from concurrently performing multiple auditing tasks and task interruption decrease the likelihood that auditors will determine that evidence contradicts management’s assertions (Griffin and Ricchiute 2012). As a result, auditing tasks that are complex (e.g., configural processing tasks) and/or require a large cognitive load (e.g., concurrent processing tasks) can lead to greater levels of depletion. Further, it is likely that working memory and processing demands increase with task complexity and cognitive load; auditors often handle complex tasks (e.g., fair value estimates, impairments, valuation models, etc.) and therefore may be especially susceptible to ego depletion based upon working memory use.

Related to cognitive processing, decision-making represents another pervasive source of ego depletion. Specifically, effortful choice that ties an individual to a specific course of action

via a mental representation (Vohs, Baumeister, Schmeichel, Twenge, Nelson, and Tice 2008) has been found to be depleting in various studies (Baumeister et al. 1998; Vohs et al. 2008; Ent, Baumeister, and Vonasch 2012). Additional studies have refined the understanding of this cause of depletion by finding that controlled choice, as opposed to autonomous choice, is especially depleting (Moller, Deci, and Ryan 2006). Other components of decision-making and choosing have also been studied in the prior literature. For example, an individual's trait indecisiveness causes depletion (Ferrari and Pychyl 2007), as does individuals' compliance with requests from others (Fennis, Janssen, and Vohs 2009). To the extent that auditors are required to comply with requests from superiors, this could deplete auditors' self-control resources. Especially germane to auditors, prior literature indicates that coping with uncertainty leads to depletion (Milkman 2012). Due to the inherent uncertainty and risk within a financial statement audit, it is likely that auditors experience significant levels of depletion in task performance and decision-making. Unfortunately, timely feedback (e.g., the workpaper review process) on performance does not impact individuals' levels of depletion (Wallace and Baumeister 2002). Finally, performance-contingent rewards cause depletion, likely due to the stress that accompanies them (Muraven, Rosman, and Gagne 2007). This finding is interesting because performance-contingent rewards represent a type of extrinsic motivation designed to enhance performance; however, these rewards ironically seem to diminish JDM quality through depletion.

Another pervasive cause of depletion arises from using self-control to control emotions or affective states (Baumeister et al. 1998; Muraven et al. 1998; Niven, Totterdell, Miles, Webb, and Sheeran 2013). Specifically germane to an auditing setting is the ability to control emotions related to stress, which has been linked to depletion due to regulating attention, thoughts, and emotions that accompany stress (Gailliot and Baumeister 2007). Stress arises in an auditing

setting from several sources; however, two common sources of stress are time pressure – especially during busy season – and accountability. Due to the deadline-driven nature of public accounting, time pressure may be slight (e.g., soft internal deadlines), moderate (e.g., completion of audit planning), or extreme (e.g., busy season and the issuance of the audit opinion). Prior literature finds that performance has an inverted-U relationship with time pressure (e.g., DeZoort and Lord 1997). While moderate amounts of time pressure facilitate greater performance by increasing effort and focus, large amounts of time pressure decrease performance through stress. For example, prior auditing research finds that significant time pressure has a negative effect on auditor effectiveness (McDaniel 1990) and effort (Asare, Trompeter, and Wright 2000). Despite its importance in the auditing ecology, and its significant effect on hours worked, busy season has received little attention in the academic literature (Sweeney and Summers 2002). However, busy season may exacerbate factors that contribute to depletion, such as stress. For example, I find in Chapter 3 that busy season conditions can lead to a between-day accumulation of ego depletion, such that individuals begin subsequent days in a depleted state. This residual depletion then would theoretically cause individuals to become depleted more quickly on subsequent days.

Auditors are also exposed to stress through accountability, which they face both internally (e.g., workpaper review with those higher in the audit-team hierarchy) and externally (e.g., to other members of the firm, financial statement users, regulators, and clients). Prior research shows that accountability positively impacts JDM quality when the party to whom the decision-maker is accountable is interested in judgment accuracy (Lerner and Tetlock 1999). For example, extant auditing research finds that accountability increases conservatism (Lord 1992), effort (Asare et al. 2000), and judgment accuracy (Brazel, Agoglia, and Hatfield 2004). However, the need to justify one's decisions to others can increase pressure, stress, and depletion. Thus,

accountability can be a “double-edged sword” by increasing performance on an initial task, but decreasing performance on subsequent tasks due to depletion. It is plausible that JDM quality has an inverted-U relationship with accountability; low-to-moderate levels of accountability can increase JDM quality due to increases in critical reasoning and analysis, yet high levels of accountability can decrease JDM quality due to stress-related depletion. For example, Bagley (2010) finds that accountability to multiple parties increases stress and negative affect due to conflicting views of preferences.

Another significant area of interest with respect to causes of ego depletion is in interpersonal interactions. For instance, managing self-presentation (Vohs, Baumeister, and Ciarocco 2005; Beal, Trougakos, Weiss, and Dalal 2012) and monitoring for relational cues in interactions (Tyler 2008) both cause depletion. As auditors spend a significant amount of time interacting with individuals in many positions within the client firm, managing self-presentation within these interactions can lead to a significant amount of depletion. Similarly, resisting persuasion causes depletion (Burkley 2008); it is likely that many client interactions with auditors involve persuasion tactics in order for the client to convince the auditor of the acceptableness of their reporting decisions. Further, workpaper reviewers can also be viewed as the recipients of persuasive messages from workpaper preparers (Rich et al. 1997). Dealing with high-maintenance interactions – either within or outside of the engagement team or client – can also cause depletion for auditors (Finkel, Campbell, Brunell, Dalton, Scarbeck, and Chartrand 2006). Finally, suppressing thoughts (Muraven et al. 1998), and exaggerating emotional responses within interpersonal interactions all lead to depletion (Schmeichel, Demaree, Robinson, and Pu 2007).

The preceding paragraphs identify and group causes of ego depletion around common themes. However, there also exist additional causes of depletion. Lack of sleep or rest, as auditors may experience during busy season, can lead to depletion (Barber, Grawitch, and Munz 2013). Depletion has also been linked to physiology, as decreases in blood glucose levels lead to depletion (Gailliot, Baumeister, DeWall, Maner, Plant, Tice, Brewer, and Schmeichel 2007). With respect to traits and other relatively stable characteristics, prior literature is inconclusive as to whether higher trait self-control leads to increases (Imhoff, Schmidt, and Gerstenberg 2013) or reductions (Dvorak and Simons 2009) in depletion. However, higher levels of fluid intelligence have been linked to greater observed depletion (Shamosh and Gray 2007). Recent research also finds that younger individuals are especially susceptible to depletion (Dahm, Neshat-Doost, Golden, Horn, Hagger, and Dalgleish 2011), that believing that self-control consumes energy can lead to depletion (Martijn, Tenbult, Merckelbach, Dreezens, and de Vries 2002), and that lying causes depletion (Debey, Verschuere, and Crombez 2012).

Future opportunities in auditing research – Causes of ego depletion

Based upon the preceding discussion, numerous causes of ego depletion exist within the auditing ecology. As such, the following questions merit future research:

RQ1: Does depletion depend upon the individual's role in the audit engagement? For example, do senior associate auditors experience higher levels of depletion based upon continually having to interrupt task performance due to their role as a facilitator, compared to staff auditors who can typically focus on specific tasks for a longer duration of time?

RQ2: What role does concurrent processing have in causing ego depletion? Do auditors experience additional ego depletion based upon whether they concurrently or serially process tasks? This could occur due to task interruption, uncertainty related to task-

relatedness, using working memory, and controlling attention and focus. What is the role of task similarity, or interrelatedness, in determining the amount of depletion stemming from concurrent or configural task performance?

RQ3: Within the workpaper review, do stylized workpapers that are designed to be persuasive cause ego depletion among reviewers? Do trust or professional skepticism attenuate this effect?

RQ4: Is depletion arising from client interactions related to the power differential, or social mismatch, between the auditor and the client? That is, is it more depleting for a senior associate auditor to interact with a CFO than for a manager to do so? Do gender, aggressiveness, or other inherent factors interact with this relationship?

RQ5: Given that high levels of trait self-control and fluid intelligence can lead to ego depletion, do auditing firms hire individuals who are especially susceptible to ego depletion? On what dimensions do these individuals differ from the overall population and/or other types of professionals? Do these differences make auditors more susceptible to depletion than these comparison groups?

RQ6: Does the structure of audit work, where superiors assign tasks, create an environment of controlled choice that is conducive to depletion? Does increased autonomy of task choice mitigate the incidence of depletion?

RQ7: Are increased levels of uncertainty, ambiguity, or risk within financial statement accounts linked to increased depletion for auditors performing work in those areas? Does expertise, experience, or trait professional skepticism mitigate these relationships?

RQ8: Under what conditions does accountability lead to ego depletion? What role do the characteristics of the party to whom the decision-maker is accountable play in the amount

of depletion resulting from task performance? Is it more depleting to be held accountable to multiple parties and/or more senior parties?

RQ9: Does ego depletion mediate the relationship between time pressure and JDM quality? Do the benefits of moderate amounts of time pressure outweigh the related depletion caused by that pressure?

CONSEQUENCES OF EGO DEPLETION

Prior psychology literature identifies an abundance of consequences stemming from ego depletion (e.g., Baumeister et al. 2007; Hagger et al. 2010). This section discusses applications of these findings in an auditing context and how these applications might affect auditors' JDM in various ways. Further, this section expands upon these applications and provides specific research questions for future auditing research to pursue.

Depletion increases passivity, decreases persistence, and increases the likelihood that an individual will accept the status quo (Baumeister et al. 1998). Decreased persistence may result from depletion leading to: overestimation of task duration (Vohs and Schmeichel 2003); decreased self-efficacy, which decreases motivation (Fischer, Greitemeyer, and Frey 2007); or decreased sensitivity to mismatches between goals and current states (Inzlicht and Gutsell 2007). Decreased task persistence can lead an auditor to end testwork or other tasks prematurely, which can hinder JDM quality if further action is needed on that task. Perhaps the auditor's most important and pervasive role is to collect and evaluate audit evidence. Further, because clients are "first movers" in the auditing process (Earley, Hoffman, and Joe 2008), the client's preferred accounting treatment is the status quo in a financial statement audit. As a result, an increased likelihood of accepting the status quo includes an increased likelihood of accepting the client's balances and assertions without appropriate support. This directly opposes requirements that

auditors use professional skepticism and obtain sufficient and appropriate evidence. Increased passivity can also hinder evidence collection efforts, as auditors would be less aggressive in pursuing appropriate evidence. For example, Bennett and Hatfield (2013) find that social mismatch between auditors and client representatives leads to poorer evidence collection efforts. Within an auditing engagement, it is possible that the stress from client interactions with social mismatch leads to depletion, which then causes decreased evidence collection efforts.

Several consequences of depletion can hinder auditors' ability to effectively evaluate evidence, including: decreased ability to ignore distracting information (Heatherton and Baumeister 1996); decreased memory (Li, Nie, Zeng, Huntoon, and Smith 2013) and increased production of false memories (Otgaar, Alberts, and Cuppens 2012); decreased attention and focus (Muraven and Baumeister 2000); and increased use of confirmatory information processing (Fischer, Greitemeyer, and Frey 2008). Auditors must ignore distracting information when considering client explanations and reviewing client-provided evidence in order to efficiently reach appropriate audit conclusions. Distracting information can take several forms, all of which theoretically render the information irrelevant, including: anchoring (e.g., Tversky and Kahneman 1974); the dilution effect (e.g., Hoffman and Patton 1997); and redundant information (e.g., Joe 2003). Auditors' inability to ignore this distracting information can potentially bias their JDM. With respect to the effects of depletion on memory, auditors' may develop incomplete or incorrect information sets due to their necessary reliance on memory, due to efficiency concerns (Libby and Trotman 1993). Further, memory biases have been shown to lead to biased documentation, which, in turn, biases superiors' JDM (Ricchiute 1997, 1998). Decreased attention and focus can lead auditors to overlook important evidence or fraud cues. Finally, the use of confirmatory information processing (i.e., preferring information that is

standpoint-consistent vs. standpoint-inconsistent) during information search and evaluation can effectively lead auditors to engage in motivated reasoning (e.g., Kunda 1990) during task performance. For example, Bamber, Ramsay, and Tubbs (1997) and Brown, Peecher, and Solomon (1999) find that auditors exhibit confirmation bias in auditing cases and diagnostic tasks, respectively.

Multiple studies also find that depletion decreases controlled, effortful processing and leads individuals to rely more on automatic, heuristic processing (Schmeichel, Vohs, and Baumeister 2003; Masicampo and Baumeister 2008; Pocheptsova, Amir, Dhar, and Baumeister 2009). Complex processing and critical thinking are crucial in auditing complex estimates (Griffith, Hammersley, Kadous, and Young 2015), pattern recognition in evaluating audit evidence (e.g., Hammersley 2006), error detection (Bedard, Biggs, and Maroney 1998; Jamal, Johnson, and Berryman 1995), and fraud brainstorming (Carpenter 2007; Hoffman and Zimbelman 2009). It is also possible that decreased complex processing can hinder auditors' hypothesis generation and evaluation in analytical procedures. Prior research underscores the importance of performing plausibility and sufficiency checks (Anderson and Koonce 1998) and generating more hypotheses in order to perform effective planning in the presence of fraud risks (Hammersley, Johnstone, and Kadous 2011), generate the correct explanation (Bedard et al. 1998), and demonstrate high-quality JDM (Wright and Bedard 2000). Further, evaluating more hypotheses also increases the likelihood of finding the correct cause of an error (Asare et al. 2000) and leads auditors to discount the initial hypothesis, which is typically a client-provided explanation.

Increases in heuristic processing can cause overreliance on decision aids to the detriment of JDM quality (e.g., Pincus 1989; Asare and Wright 2004). Heuristic processing serves as the

default for individuals' judgments, and controlled processing acts as a filter when outputs from heuristic processing are undesirable. As a result, depletion leaves auditors more susceptible to biases and cognitive limitations that accompany heuristic-based processing (Tversky and Kahneman 1974; Nelson and Tan 2005, 51), which can also reduce professional skepticism (Nelson 2009, 13).

A consequence of depletion that is especially pertinent to auditors is that, when depleted, individuals are more likely to choose the most appealing or habitual action without considering the ethicality of that action (Gailliot and Baumeister 2005). Further, depletion increases the likelihood that individuals will violate rules or social norms that are effortful to follow (Gailliot, Gitter, Baker, and Baumeister 2012) as well as increasing the likelihood of misrepresenting their performance for monetary gain and exposing themselves to the temptation to cheat (Mead, Baumeister, Gino, Schweitzer, and Ariely 2009). Specifically, these authors note "the moral muscle loses some of its strength after exertion" (Mead et al. 2009, 594). Decreased sensitivity to the ethicality of one's actions can lead auditors to bias their interpretation of standards to support directional goal preferences (Hackenbrack and Nelson 1996; Kadous, Kennedy, and Peecher 2003), compromise their independence, or engage in other behavior that reduces JDM quality. These findings are particularly troubling, given the auditing profession's foundational reliance on ethics and independence.

Prior studies also find that depletion decreases individuals' resistance to persuasion (Burkley 2008) and increases their susceptibility to suggestion (Otgaar, Alberts, and Cuppens 2011). Due to incentives and objectives that – at times – differ, auditors constantly face persuasive attempts from their clients both in the form of evidence and in face-to-face communications or auditor-client negotiations. Kaplan, O'Donnell, and Arel (2008, 67) note that

management is perhaps the auditor's most pervasive source of information in a financial statement audit. However, management may be biased in their presentation of financial information and assertions, and may attempt to persuade the auditor of the acceptableness of this information and these assertions in negotiations or by providing evidence to the auditor. Further exacerbating depletion's effect on susceptibility to persuasion is the fact that managers are considered to be a "first-mover" because they initially process and present their financial information to the auditor, who is the "second-mover" (Earley, Hoffman, and Joe 2008). Prior auditing research finds that management's persuasion attempts induce a systematic bias in auditor judgment (Wolfe, Mauldin, and Diaz 2009), are more successful when directed at less-experienced auditors (Kaplan et al. 2008), and can fool auditors into overlooking fraud cues (Earley, Gramling, and Joe 2010).

A second area affected by decreased resistant to persuasion is within the auditing team through workpaper review. Prior literature recognizes the important of audit workpaper review as a quality control mechanism within the audit process (e.g., Fargher, Mayorga, and Trotman 2005; Rich, Solomon, and Trotman 1997). However, prior literature has also viewed audit workpaper reviewers to be recipients of persuasive messages from workpaper preparers (Rich et al. 1997, 482). That is, preparers use working papers to persuade reviews of the appropriateness and defensibility of their work, conclusions, and documentation. While preparers' can use this persuasion to manage their personal reputation with the reviewer (Rich et al. 1997), they can also use persuasion as a way to reduce future work on that auditing task (e.g., Nelson and Tan 2005, 56). Further, it is possible that preparers will engage in persuasion attempts when they engage in over-documentation when addressing review comments. Prior research provides evidence that a significant proportion of preparers engage in over-documentation, such as premature sign-off and

ghost ticking (i.e., documenting work that the auditor has not actually performed), which is both unethical and dysfunctional (Lambert and Agoglia 2011). Due to decreased sensitivity to ethical consequences of one's actions, depletion can increase auditors' over-documentation or unethical behavior while addressing workpaper review comments. This, in turn, can undermine the effectiveness of the workpaper review as a quality control mechanism.

Prior literature's findings regarding depletion's impact on risky behavior have been mixed in lottery and investment tasks (Bruyneel, Dewitte, Franses, and Dekimpe 2009; Unger and Stahlberg 2011). Fischer, Kastenmüller, and Asal (2012) find that depletion increases risk-taking in a variety of contexts (e.g., sensation seeking and risk tolerance in traffic situations). Due to these mixed findings, and since risk is central to and pervasive within the conduct of a financial statement audit, further research on depletion's impact on individuals' responses to risk is warranted.

Depletion also leads individuals to use low-level construal in lieu of high-level construal (Bruyneel and Dewitte 2012). This distinction is important, as high-level construal focuses on *why* an action should be performed (i.e., global, superordinate, and primary features of the task), while low-level construal focuses on *how* an action should be performed (i.e., local, superordinate, and secondary features of the task) (Trope and Liberman 2003). Using high-level construals is crucial in auditing, as prior literature provides evidence that suggests that critical thinking or high mental construal levels, rather than simply a skeptical mindset, is crucial for auditors' ability to exercise professional skepticism (Griffith et al. 2015).

Future opportunities in auditing research – Consequences of ego depletion

From the preceding discussion it is evidence that numerous consequences of ego depletion exist. Based upon the preceding discussion of prior literature, the following questions merit future research:

RQ10: Does depletion lead to insufficient collection and documentation of audit evidence? Does depletion decrease persistence on auditing tasks and does this depend upon task difficulty and/or complexity?

RQ11: Does depletion increase commission of heuristic biases (e.g., anchoring) or decrease auditors' ability to ignore distracting or irrelevant information (i.e., increase susceptibility to the dilution effect or redundant information)? Does this lead to biased information sets?

RQ12: Does depletion increase memory bias and biased documentation? Are depleted auditors more susceptible to primary or recency effects in sequential evidence evaluation?

RQ13: Does depletion increase auditors' propensity to concede issues in auditor-client negotiation and, if so, are these concessions more likely and/or more severe at times when depletion is elevated?

RQ14: Does depletion systematically impact auditors' responses to, or attitudes toward, risk? Are depleted auditors less likely to exercise professional skepticism?

RQ15: Does ego depletion impair auditors' critical thinking ability or ability to recognize patterns within financial data and/or cues? Do depleted auditors exhibit poorer JDM quality when performing cognitive complex tasks that require integration of disparate evidence?

RQ16: Does depletion lead to less effective workpaper review and does effectiveness differ significantly based on timing of the workpaper review (e.g., beginning vs. end of day)?

Does the workpaper review process mitigate JDM-quality losses when workpaper preparers are depleted but workpaper reviewers are not? Does depletion lead workpaper preparers to engage in significantly more over-documentation or unethical behavior when addressing review comments?

AVOIDING OR MITIGATING EGO DEPLETION

Given the numerous and far-ranging consequences of ego depletion, it is useful to consider ways in which individuals can avoid or mitigate the incidence of ego depletion. Considering that self-control resources are a limited and valuable resource, prior literature has supports a Conservation Hypothesis within ego depletion theory (Muraven, Shmueli, and Burkley 2006; Tyler and Burns 2009; Converse and DeShon 2009). The underlying idea of the Conservation Hypothesis is that individuals who are more depleted are more motivated to conserve self-control resources than individuals who are less depleted. Therefore, if individuals know they have tasks to perform beyond the current task, they will conserve resources for that future task at the expense of the current task. As a result, individuals who perform three consecutive tasks exhibit poorer (better) performance on the second task and better (poorer) performance on the third task if they are more (less) depleted from the first task.

Perhaps the most promising way to avoid depletion is through long-term practice. By practicing self-control over an extended period, individuals are able to essentially increase their self-control stamina such that each act of self-control is less depleting (Muraven et al. 1999; Oaten and Cheng 2006a; Oaten and Cheng 2006b; Oaten and Cheng 2007; Seeley and Gardner 2007; Muraven 2010; Kehr, Hassenzahl, Laschke, and Diefenbach 2012). However, practice and stamina is not the only benefit that accrues to those who have increased experience with a task. Specifically, to the extent that experience translates to some degree of expertise, individuals can

shift actions from controlled and effortful processing to automatic and heuristic processing, which is unaffected by depletion (Neal et al. 2013). Prior literature also finds that increasing individuals' motivation, through self-affirmation or otherwise, for task performance can significantly reduce the incidence of ego depletion (Muraven and Slessareva 2003; Schmeichel and Vohs 2009). To the extent that auditors are properly intrinsically and/or extrinsically, they may be able to stave off the effects of depletion.

Individuals can also take a number of actions to guard against depletion. Prior research finds that individuals who use implementation intentions (i.e., statements of the form: "if X occurs, I will initiate goal-directed behavior Y") to convert controlled processing to automatic processing can avoid depletion (Webb and Sheeran 2003). Using rewards to make responses habitual has a similar effect (Goto and Kusumi 2013). Using high-level task construal (Fujita and Carnevale 2012), broadening one's attention (Hanif, Ferrey, Frischen, Pozzobon, Eastwood, Smilek, and Fenske 2013), distracting oneself from temptations by increasing cognitive load (Van Dillen, Papies, and Hofmann 2013), and effortful monitoring of one's self-control performance (Wan and Sternthal 2008) have all been shown to decrease depletion.

Finally, a number of mental states, attitudes/beliefs, and subtle primes have been shown to reduce depletion. Specifically, one can stave off depletion in the short-term by having a self-perception of not being depleted (Clarkson, Hirt, Jia, and Alexander 2010) or believing that willpower does not consume energy (Job, Dweck, and Walton 2010). Perspective taking, or considering yourself to be in the role of someone who is not depleted, has been shown to decrease depletion in a similar way to the previous beliefs (Egan, Hirt, and Karpen 2012). Finally, priming persistence (Alberts, Martijn, Greb, Merckelbach, and de Vries 2007), examples of non-depleted individuals (Martijn, Alberts, Merckelbach, Havermans, Huijts, and de Vries 2007), and

the concept of money (Boucher and Kofos 2012) have all been shown to subconsciously affect depletion.

Future opportunities in auditing research – Methods of avoiding or mitigating ego depletion

From the preceding discussion it is evident that several avenues exist through which to mitigate or avoid ego depletion in general. It is unclear, however, which of these avenues would be feasible within an auditing setting. Based upon the preceding discussion of prior literature, the following question merits future research:

RQ17: Is task-specific experience or expertise more effective in mitigating ego depletion in task performance?

RQ18: Do both intrinsic and extrinsic motivations mitigate depletion? What are feasible ways to reliably operationalize motivation, intrinsically and extrinsically, over a long-term period? What structures and/or types of extrinsic incentives or financial rewards mitigate or exacerbate depletion?

RQ19: Do decision-aids, such as worksheets to aggregate evidence, reliably mitigate depletion on cognitively complex tasks?

REPLENISHING SELF-CONTROL RESOURCES

In this section, I review literature on the methods of replenishing self-control resources. Because self-control resources can become depleted, methods of restoring these resources are critical to restoring self-control performance. The first, and most obvious, method of replenishing resources is through sleep and rest between days. Limited evidence exists that a lack of sleep can lead to depletion on the subsequent day (Ghumman and Barnes 2013). Ego depletion theory makes an implicit assumption that individuals sufficiently recover self-control resources between days to begin the subsequent day at full capacity. However, using auditors' busy season

and students' final exam time as a unique setting to explore this assumption, I provide evidence that ego depletion can accumulate between days. That is, during these periods individuals do not sufficiently recover depleted self-control resources to begin the following day at full strength. This effect is robust to controlling for hours slept, perceived stress, hours worked, and number of upcoming deadlines. This suggests that ego depletion theory revise this implicit assumption and highlights the importance of studying recovery factors in ego depletion theory.

Within-day recovery factors have received some attention within the depletion literature. For instance, multiple studies find that consuming glucose – because glucose is depleted with ego depletion – helps to recovery self-control resources and boost performance (Gailliot and Baumeister 2007; Masicampo and Baumeister 2008; Sanders, Shirk, Burgin, and Martin 2012). Taking short 10-minute breaks and inducing relaxation (Tyler and Burns 2008), engaging in mindfulness meditation (Friese, Messner, and Schaffner 2012), and engaging in recovery experiences (e.g., relaxation, control, and detachment) (Fritz, Sonnentag, Spector, and McInroe 2010) have also been shown to replenish self-control resources. Finally, inducing positive affect (Tice, Baumeister, Shmueli, and Muraven 2007; Wenzel, Conner, and Kubiak 2013) has also been shown to partially restore self-control resources in some instances.

Future opportunities in auditing research – Restoring self-control resources

As noted above, there exist a number of findings regarding methods of restoring self-control resources. However, it is difficult, if not impossible, to implement these solutions within an auditing setting over a long-term period without significantly losses in efficiency. As a result, it is crucial for future auditing research to extensively explore methods of restoring self-control resources that are viable solutions within auditing practice. Based upon the preceding discussion of prior literature, the following question merits future research:

RQ20: Can individuals organize their tasks in such a way that they are able to sufficiently recover self-control resources between performing depleting tasks? For example, can individuals sufficiently recover performance if they structure their task order as depleting/non-depleting/depleting rather than depleting/depleting/non-depleting?

CONCLUSIONS

In this paper, I apply psychology research on ego depletion to an auditing setting, discuss the potential implications of depletion for auditors' JDM quality, and provide a number of opportunities for future research. Despite an obvious need to better understand auditors' JDM processes, and despite the widespread acceptance of ego depletion theory in the psychology literature, auditing researchers have largely ignored the implications of ego depletion theory. This paper provides a review and synthesis of existing ego depletion literature designed to provide an understanding of the applications of ego depletion theory within an auditing setting and to stimulate future research in this area.

To accomplish my objective of stimulating interest and research on ego depletion within an auditing environment, I propose 20 research questions. These questions are aimed at specific factors of the auditing ecology. Research stemming from these questions has the potential to both expand the literature on ego depletion and auditors' JDM processes, as well as contribute meaningful findings to public auditing firms to improve auditors' effectiveness. The research questions presented within this paper are not intended to represent a comprehensive list of areas within which to study depletion in an auditing setting. Rather, they are intended to serve as a guide for future research to begin to explore how depletion impacts auditors.

In conclusion, ego depletion can have significant and far-reaching implications for various types of auditors' JDM and professional skepticism. As a result, it is important for future

research to investigate these areas in order to develop a more thorough understanding of situations in which depletion is likely to play a significant role. However, researchers must not simply seek to replicate findings from the psychology literature in an auditing setting. Key features of the auditing profession can provide researchers with topics that will meaningfully contribute to the existing literature. Further, while I focus on depletion in an auditing setting within the current paper, future research should consider how depletion might impact other accountants' JDM in ways that are unique to their roles. In order to craft an accurate theoretical underpinning of auditors' and, more broadly, accountants' JDM processes, the accounting literature must incorporate ego depletion theory and rigorously test its implications within our unique professional settings.

The remainder of my dissertation explores specific research questions relating to ego depletion. Chapter 3 investigates the current assumption that individuals sufficiently recover self-control resources between days; that is, the assumption that ego depletion is limited to being a within-day phenomenon. Chapter 4 investigates several research questions. First, do different types of self-control lead to different levels of ego depletion? Second, do experience, expertise, and professional skepticism impact the amount of depletion incurred through task performance? Finally, does depletion impact individuals' susceptibility to fraudulent persuasion, ability to generate plausible alternative hypotheses for account balance fluctuations, or confidence in task performance?

3. ESSAY 2: CHALLENGING AN ASSUMPTION OF EGO DEPLETION THEORY WITH AUDITORS' BUSY SEASON

INTRODUCTION

This paper reports the results of an experiment that challenges the current assumptions of ego depletion theory in the psychology literature. Specifically, I examine whether an extended stressful period, such as public accountants' busy season, can lead to a between-day accumulation effect of ego depletion. The importance of busy season is underscored by both the prominence of public companies using a December fiscal year-end date – 64% of all Compustat companies from 1950-2009 – and the SEC's rules that accelerate public registrants' annual report filing, which can further compress busy season and increase stress (López and Peters 2012). Workload compression resulting from busy season damages both audit quality – through greater abnormal accruals and likelihood of meeting or beating earnings benchmarks (López and Peters 2012) – and the auditor-client relationship – through an increased likelihood of auditor switching (López and Peters 2011). Similarly, Sweeney and Summers (2002) find that auditors' average workload increases from 49 to 63 hours per week when entering busy season, which dramatically increases job burnout. However, despite the importance of busy season in determining audit quality, there is a paucity of evidence on the impact of busy season on audit quality at the individual level. This paper explores the impact of busy season on individuals' baseline self-control resources via ego depletion theory.

In this paper, I conduct an experiment that challenges a significant assumption of ego depletion theory in the psychology literature. Specifically, I study whether ego depletion can

accumulate between days during a stressful period of time by comparing the baseline self-control resources of professional auditors within and outside-of busy season. I also compare auditing students within and outside of final exam time to test the robustness of my results and to compare final exam time to auditors' busy season. Ego depletion theory finds that the ability to exercise self-control relies on a limited, expendable cognitive resource (e.g., Baumeister, Bratslavsky, Muraven, and Tice 1998); using self-control depletes this resource, which leads to ego depletion (hereafter also "depletion"). Self-control – the ability to consciously control one's behavior to conform to standards or pursue long-term goals (Baumeister, Vohs, and Tice 2007) underlies many judgment processes. Depleted individuals are then less willing and/or able to exercise self-control in subsequent task performance.

Auditors' busy season provides an ideal setting to examine a potential accumulation effect of ego depletion. Auditors' anecdotal evidence, academic literature, and regulators' concerns all underscore the rigor of busy season and its importance to the conduct of a quality audit. For example, Persellin, Schmidt, and Wilkins (2014) find that auditors often work 20 or more hours per week beyond the threshold at which they believe audit quality begins to deteriorate. Further, busy season has been linked to stress, burnout, and turnover intentions (Fogarty, Singh, Rhoads, and Moore 2000; Sweeney and Summers (2002) and the Public Company Accounting Oversight Board (PCAOB) has expressed concern in recent years regarding auditors' workloads and their impact on audit quality (PCAOB 2009, 2012, 2013). These factors suggest that busy season could potentially lead to an accumulation of ego depletion and therefore provide an excellent setting to test the assumption that ego depletion is only a within-day phenomenon.

I bolster this intuition by conducting a motivating survey and find that senior-associate auditors, based upon subjective perceptions of busy season, are susceptible to both within- and between-day ego depletion. Specifically, I administer a 27-item survey to 28 Big4 senior-associate auditors at a national training. Table 3.1 provides the results of this exploratory survey. These auditors report feeling significantly less mentally fresh when arriving for work in the morning, more “used up” at the end of the work day, and less able to continue to work effectively at the end of the work day (all $p < .001$) within busy season when compared to outside of busy season. Further, these auditors report feeling less mentally fresh when leaving work compared to when they arrive within busy season compared to outside of busy season ($p < .05$).

[INSERT TABLE 3.1 HERE]

I conduct an online experiment at two separate times – within and outside of busy season (final exam time) – for auditors (auditing students). Within the experiment, participants first complete a measure of ego depletion – a reaction-time task called a Stroop task – that is commonly used in prior depletion literature (e.g., Hagger, Wood, Stiff, and Chatzisarantis 2010).

³ A post-experimental questionnaire collects additional control variables such as trait self-control, mood, subjective stress, upcoming deadlines, average hours slept each night, hours worked in the previous week, and trait professional skepticism. I find that, after controlling for the factors mentioned above, both auditors and students exhibit a significant accumulation of ego depletion, as evidenced by slower reaction times on Stroop task trials. This contrasts the commonly held view in ego depletion theory that individuals are able to sufficiently recover self-control resources between days to mitigate any potential accumulation of depletion. Further, I find that

³ The Stroop task (Stroop 1935) is a reaction-time task that has been utilized to induce and measure depletion in the psychology literature. I discuss this task in greater detail in Section Four of the current paper.

busy season differentially affects auditors, causing greater levels of depletion than does final exam time for students. It is likely that this effect results from the greater duration (e.g., two months versus one week) and more intense nature of public accounting busy season when compared to final exam time in a public university. Finally, I find that individuals who begin the experiment later in the day exhibit significantly higher levels of depletion, which supports a within-day depletion effect as predicted and supported by extant ego depletion research (e.g., Hagger et al. 2010).

Consistent with inferences from prior literature, I also find significant increases in auditors' average hours worked (44.5 to 59.1), deadlines (2.12 to 3.62), and perceived stress (37.19 to 40.08) within busy season when compared to outside of busy season.⁴ Students also report significant increases in average hours worked (29.4 to 45.9) and perceived stress (36.74 to 39.96), but do not report having more deadlines during final exam time (3.28 to 3.25). Interestingly, auditors did not experience a significant decline in average hours slept (7.2 to 7.0) or mood (7.96 to 7.31) within busy season when compared to outside of busy season. However, students experience a significant decline in both average hours slept (7.46 to 6.73) and mood (7.26 to 6.08).

This research offers a number of contributions to both the accounting and psychology literatures. First, this paper extends prior psychology literature on ego depletion by finding a significant *accumulation* effect of ego depletion *between* days during stressful periods of varying length and intensity. The strength model of ego depletion assumes that individuals sufficiently recover self-control resources between days, such that ego depletion is limited to being a within-day effect. However, the results of my study challenge this implicit assumption and indicate that

⁴ The Perceived Stress Scale (PSS; Cohen et al. 1983) has a maximum score of 70.

ego depletion is not limited to a within-day phenomenon, as assumed by the strength model of ego depletion theory.

Second, finding that auditors' are susceptible to ego depletion indicates that ego depletion may have significant consequences for auditors' JDM. This is significant in the sense that professional expertise and task-specific experience do not sufficiently mitigate ego depletion over an extended period of time. For example, ego depletion can reduce auditors' persistence in collecting and evaluating audit evidence, reduce problem solving or pattern detection abilities, increase confirmatory information processing, and decrease professional skepticism. Therefore, this paper emphasizes the need for future research on these consequences. This research can help to inform the PCAOB and auditing firms about an additional factor than can influence auditors' JDM quality and application of professional skepticism. Third, this research underscores the importance of considering workload and busy season as important audit quality indicators. Fourth, the findings in this paper extend the relatively scant literature on the public accounting busy season. By providing evidence regarding auditors' perceptions of busy season, and of busy season's impact on auditors' levels of depletion, this research both informs audit firms of the risks that may arise from busy season workloads and lends credence to the PCAOB's identification of this factor as a potential root cause of observed audit deficiencies.

The remainder of the paper proceeds as follows. Section 2 provides a review of relevant literature and develops my testable hypotheses. Section 3 describes my exploratory survey and analyzes the related data. Section 4 details the construction and administration of my experiment. Section 5 provides my statistical analyses and key results from my data. Section 6 concludes.

RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

Ego depletion theory formalizes the traditional concept of having and exerting willpower, or self-control, by finding that the ability to exercise self-control relies upon a limited and exhaustible cognitive resource (e.g., Baumeister et al. 1998). Ego depletion theory is characterized by the strength model, which has received support in the prior literature (e.g., Baumeister et al. 2007; Hagger et al. 2010). The strength model analogizes the ability to use self-control to a muscle: as a muscle becomes fatigued with use, requires a recovery period to restore performance, and improves with practice, so does the ability to use self-control (Muraven, Baumeister, and Tice 1999). That is, using self-control depletes this finite resource – causing a state of ego depletion –, which renders subsequent use of self-control less effective. Examples of self-control tasks that cause ego depletion include: coping with uncertainty (Milkman 2012); resisting persuasion (Burkley 2008); resisting temptation, maintaining vigilance and focus, making choices, and persisting on difficult tasks (Baumeister et al. 1998; Moller et al. 2006; Vohs et al. 2008; and Ent et al. 2012); and controlling attention and using working memory (Schmeichel 2007).

Based upon the findings in the ego depletion literature, it is apparent that ego depletion can have a significant and pervasive impact on auditors' JDM quality. For example, ego depletion can reduce auditors' persistence in collecting and evaluating audit evidence, reduce problem solving or pattern detection abilities, increase confirmatory information processing, and decrease professional skepticism. Depletion can also impair auditors' ability to resist persuasive messages from management, increase the likelihood of unethical behavior, and generally impair auditors' JDM quality. In Chapter 4, I find that depletion increases individuals' likelihood of

agreeing with a CFO's fraudulent explanations account for account-balance fluctuations. Kremin (2014) and Majors, Shefchik, and Vitalis (2014) also investigate within-day depletion, consistent with the extant psychology research. Kremin (2014), using professional auditors, finds that depletion reduces auditors' skepticism in low-risk clients, and increases auditors' likelihood of accepting misleading client explanations. Majors et al. (2014), using undergraduate students performing a risk task, find that higher levels of professional skepticism can lead to greater ego depletion and increased likelihood of accepting the status quo, consistent with prior psychology literature (e.g., Baumeister et al. 1998).

A key area for depletion research is to investigate the impact of busy season on auditors' levels of ego depletion. While extant psychology literature finds that depletion increases throughout the day, as one uses self-control, self-control is replenished primarily through rest and sleep between days (Baumeister 2002; Ghumann and Barnes 2013). This is important because if sleep and rest did not replenish self-control resources then individuals would constantly be in a state of depletion. This naturally leads to the question of whether sufficient recovery occurs between days.

This paper is primarily motivated by an assumption within the strength model of self-control (e.g., see Muraven and Baumeister 2000). Specifically, ego depletion is considered to be a within-day phenomenon that arises from exertions of self-control on previous same-day tasks. Ego depletion theory itself does not model a between day accumulation effect of ego depletion. Further, the possibility of such an effect is rarely considered; the lone exception is Baumeister et al. (2007), who posit that ego depletion could be similar to a muscle that is abused beyond a typical capacity for recovery. Further, this would also apply to situations where self-control demands may not be extreme but in which rest, recovery, and sleep are limited (e.g., Barber,

Grawitch, and Munz 2012). However, there are no empirical studies of a potential accumulation of busy season between days.

Despite being virtually absent from the accounting literature, busy season has a distinct psychological impact on auditors (Sweeney and Summers 2002). Specifically, prior literature finds that excessive workloads during busy season are linked to decreased employee health, increased stress levels and needs for coping mechanisms, increased job burnout, and increased turnover intentions (Sanders, Fulks, and Knoblett 1995; Fogarty et al. 2000; Sweeney and Summers 2002; Johnson-Moreno 2003; Jones, Norman, and Wier 2010). For example, Sweeney and Summers (2002) find that average weekly workloads increase from 49 hours per week outside of busy season to 63 hours within busy season, which leads to levels of job burnout rarely observed in prior literature. Further, Persellin et al. (2014) find that auditors believe that their work quality decreases when they work more than 60 hours per week; however, survey responses from professional auditors in their study indicate that average busy season workweeks entail between 65 and 80 hours.

Based upon the increased workload, stress, and self-control requirements within busy season, it is possible that individuals incur more depletion each day, within these periods, than can be replenished through normal rest and recovery. If individuals are unable to recover all resources expended in a previous day, then their beginning-of-day self-discipline resources will be reduced.⁵ Starting a day with less-than-optimal resources would, in turn, exacerbate the effects of within-day depletion. There are two main reasons why I might not observe an accumulation effect of depletion. First, it is possible that individuals, even within busy season, simply do not incur enough ego depletion such that self-control resources cannot be restored

⁵ I specifically target the beginning of the day because this reduces the probability that individuals will have performed significantly depleting tasks prior to the measurement. This design feature helps to capture a reliable baseline measurement of self-discipline resources.

through normal rest and recovery. Second, the strength model of self-control does not predict any between-day accumulation of depletion. Rather, it assumes that individuals recover sufficient resources between days to completely restore self-control resources. Based upon this discussion, I posit the following hypothesis:

H1: Individuals will accumulate ego depletion between-days during a stressful period, compared to outside of a stressful period.

It is possible that, due to its extreme nature, busy season leads to an accumulation of ego depletion where other, less extreme, periods would not. In general, busy season – which can last for weeks or months – typically is longer than final exam time, which lasts for approximately one week. It is also likely that professionals, on average, spend more time working during busy season than do students during final exam time. Due to these differences between busy season and final exam time, it is useful to compare the impact of busy season on auditors to the impact of final exam time on auditing students. While busy season may be more intense, auditors may be better equipped to handle the self-control requirements of busy season. Specifically, the depletion literature finds that individuals can improve their self-control “stamina” through practice, rendering them less susceptible to ego depletion (Muraven et al. 1999; Oaten and Cheng 2006a, 2006b, 2007; Muraven 2010; and Kehr, Hassenzahl, Laschke, and Diefenbach 2012). It is possible that professional auditors are then less susceptible to ego depletion than are auditing students. However, I believe that the differences in duration and/or intensity between busy season and final exam time will provide a more significant influence on depletion than will experience and practice. As a result, I posit the following hypothesis:

H2: The accumulation of ego depletion varies with the intensity of the stressful period.

EXPERIMENTAL DESIGN

To examine my hypotheses, I conduct an online experiment for two types of participants: professional auditors and auditing students.⁶ To ensure a high probability of participation based upon the timing of the sessions, the experimental procedures differ slightly for each type of participants. Students arrive at the laboratory to participate in the first experimental session, but receive an email to participate in the second session. Professionals receive an emailed link to begin participation in both the first and second sessions. Participants then read an informed consent form and a detailed set of instructions informing them of the procedures that they will perform. Participants initially complete 60 trials of a Stroop color-word interference task (hereafter “Stroop task”; Stroop 1935). The Stroop task provides a measure of self-control, through reaction time, as participants must override the urge to respond to all trials with the meaning of the word (e.g., Gailliot and Baumeister 2007; Webb and Sheeran 2003; Wright, Stewart, and Barnett 2008). Stroop task trials are balanced equally between congruent and incongruent trials (i.e., 30 of each). In incongruent (congruent) trials, the ink color and the meaning of the word are different (the same); for example, in an incongruent (congruent) trial, the word *green* would be presented in orange (green) ink. Figure 2 provides an example of both congruent and incongruent trials.

[INSERT FIGURE 2 HERE]

Participants then complete a post-experimental questionnaire that captures additional information such as hours devoted to school or professional work during the previous week and the number of significant deadlines within the next week. I also collect data related to participants’ mood, trait self-control (Brief Self-Control Measure; Tangney, Baumeister, and Boone 2004), trait professional skepticism (Hurt 2010), and perceived stress (Perceived Stress

⁶ The data was collected using Qualtrics software, Version 56395 of the Qualtrics Research Suite. Copyright © 2014 Qualtrics. Qualtrics and all other Qualtrics products or service names are registered trademarks of Qualtrics, Provo, UT, USA. <http://www.qualtrics.com>.

Scale [PSS]; Cohen, Kamarck, and Mermelstein 1983). Finally, because professionals complete the task remotely, I include a question to determine at what time each professional arrived at work that day. This controls against possible depletion from performing significant amounts of work prior to completing the experimental procedures.

I first conduct the procedures described above at a time *outside* of the individuals' estimated stressful period (e.g., final exam time or busy season).⁷ This provides a baseline measure of their self-control resources at the onset of a day under "normal" (i.e., not abnormally stressful) circumstances. I also conduct a second test – identical to the first – at the beginning of a day *within* participants' final exam time or busy season. Conducting my procedures at the beginning of the day helps to ensure that any observed depletion is residual between-day depletion, rather than within-day depletion on the date of the experiment. The dependent variables of interest is reaction time for each Stroop trial and accuracy of responses. Measures taken from the questionnaire serve as potential mitigating or exacerbating factors for the observed change in self-discipline resources. Finally, participants are paid for their participation in the study. Each participant receives a \$10 Amazon.com gift card upon completing the second observation in the study; students also are entered into an additional drawing that gave them a 10% chance of winning a \$50 Amazon.com gift card.⁸

RESULTS

⁷ Students participated in the afternoon on the first observation, due to regularly scheduled class time. This biases against finding results that support my predicted hypothesis, because this first observation is more likely to show within-day depletion that will not impact participants' second observation.

⁸ I elect to use Amazon.com gift cards due to the wide variety of products available for purchase on the website. This helps avoid issues where different participants place drastically different values on rewards (e.g., the value one places on a Starbucks gift card likely differs based upon whether the individual enjoys consuming coffee).

Participants

I initially contact 40 auditors, ranging from staff to manager, from a regional public accounting firm during mid-November 2013, receiving 30 responses, for a response rate of 75 percent.⁹ I conduct a follow-up request during the final week of February 2014, receiving 29 responses, for a follow-up (overall) response rate of 96.7 (72.5) percent. However, three of the respondents did not sufficiently complete the follow-up experiment. As a result, I discard these observations and base all results on 26 professional auditors. Table 3.2, Panel A provides descriptive statistics. Participating auditors have a mean (median) age of 27.8 (26.3) years and 46.1 (34.5) months of professional experience. 14 of 26 (53.9 percent) are male, and 14 of 26 (53.9 percent) are Certified Professional Accountants (CPAs). 11 (42.3 percent) are staff auditors, 9 (34.6 percent) are senior associate auditors, and 6 (23.1 percent) are managers.

[INSERT TABLE 3.2 HERE]

I also initially contact 60 students in an auditing course, ranging from junior to graduate students, from a large, public university in the Midwestern United States during the first week of February 2014.¹⁰ 57 students participated in the initial observation, for a response rate of 95 percent. I conducted a follow-up request during the second week of May 2014, which was final exam week at the university. 56 students completed the follow-up survey, yielding an overall (follow-up) response rate of 93.3 (98.2) percent. Table 3.2, Panel B provides descriptive statistics. Participating students have a mean (median) age of 22.5 (22) years and are all upper-level undergraduate or graduate students. Approximately 55-percent are male and the mean (median) GPA is 3.5 (3.6).

⁹ My initial list contained 41 individuals; however, one individual noted that they did not perform financial statement audits. As a result, all overall response rates are calculated out of 40.

¹⁰ Note that this represents the third week of class for the semester. As a result, it is unlikely that students had a significant amount of stressful schoolwork or school-related deadlines.

Demographics – Outside of Busy Season vs. Within Busy Season

To facilitate comparison of both auditor and student responses within busy season (WBS) to outside of busy season (OBS) I conduct a series of untabulated paired two-sample t-tests. Table 3.3, Panels A and B provide the results of these tests. Unsurprisingly, auditors report a significant increase in hours worked in the previous week, from 44.5 OBS to 59.1 WBS ($t = 5.86$, $p < .001$). Students reported a similar increase from 29.4 OBS to 45.9 WBS ($t = 4.394$, $p < .001$). While auditors report a significant increase in important deadlines in busy season (3.62 WBS versus 2.12 OBS; $t = 2.798$, $p < .01$), students do not (3.25 WBS versus 3.28 OBS). Busy season and final exam conditions, respectively, contribute to a significant increase in perceived stress for both auditors (40.08 WBS versus 37.19 OBS; $t = 1.818$, $p = .038$), and students (39.96 WBS versus 36.74 OBS; $t = 2.369$, $p = .01$).¹¹ Somewhat surprisingly, auditors did not experience a significant decrease in average hours slept per night (7.0 hours WBS versus 7.2 hours OBS, $p > .10$), or mood (7.31 WBS versus 7.96 OBS; $t = -1.292$, $p = .101$).¹² Students, by contrast, report a significant decrease in average hours slept per night (6.73 hours WBS versus 7.46 hours OBS; $t = -3.969$, $p < .001$) and mood (6.08 WBS versus 7.26 OBS; $t = -2.982$, $p = .002$). Finally, neither group of participants reports significantly different self-control or professional skepticism between the two observations. This is expected, given that these are both trait measures.

[INSERT TABLE 3.3 HERE]

Main Tests – All Participants

H1 predicts that individuals will take longer to correctly respond to Stroop trials WBS compared to OBS. I compute adjusted means for congruent and incongruent Stroop trials both

¹¹ The Perceived Stress Scale has a maximum score of 70.

¹² Mood is based upon an 11-point Likert scale (1 = “Very unpleasant”; 6 = “Neutral”; 11 = “Very pleasant.”)

WBS and OBS, and further separate these means out between professionals and students. Figure 3 depicts these means for each type of Stroop trial for all participants, while Figure 4 depicts these means broken out by participant type. As expected, participants' average reaction time was slower WBS than OBS for both incongruent (1.27s WBS versus 1.11s OBS) and congruent (1.06s WBS versus 0.91s OBS) trials. Also as expected, professionals exhibited a greater deterioration of reaction time moving from OBS to WBS than did students. Specifically, professionals decreased an average of .22s on both incongruent (1.28s WBS versus 1.06s OBS) and congruent (1.08s WBS versus 0.86s OBS) trials; students decreased an average of .15s on both incongruent (1.27s WBS versus 1.12s OBS) and congruent (1.07s WBS versus 0.92s OBS). This indicates initial support for H1 and H2, as both groups experience delayed response time WBS, and this delay seems to be greater for the professional auditors, who are in the midst of busy season. To formally test these hypotheses I conduct a repeated measures ANOVA. Table 3.4 provides the results of this test. H1 predicts that *Busy* will be significant, while H2 predicts that the interaction of *Busy*Professional* will be significant. Both *Busy* ($F = 257.96, p = .000$) and the interaction term *Busy*Professional* ($F = 7.80, p = .005$) are significant. This provides preliminary support for both H1 and H2 among all participants.

[INSERT FIGURE 3 HERE]

[INSERT FIGURE 4 HERE]

[INSERT TABLE 3.4 HERE]

To further investigate my hypotheses, I conduct a linear mixed effects model regression with robust standard errors to control for repeated measures and learning effects using the following model where each observation in the model represents a Stroop trial:

$$Time = \beta_0 + \beta_1 Busy + \beta_2 Incongruent + \beta_3 Professional + \beta_4 Start\ Time + \beta_5 StroopDiff + \beta_6 StroopFam + \beta_7 Age + \beta_8 HoursWkd + \beta_9 Deadlines + \beta_{10} Mood +$$

$$\beta_{11}TraitSC + \beta_{12}Stress + \beta_{13}ProfSkep + \beta_{14}OverallQuestion + \beta_{15}Busy*Incongruent + \beta_{16}Busy*Professional + \varepsilon$$

Time represents the individual's reaction time to correctly respond to the Stroop trial, and is the dependent variable for this test.¹³ The main independent variable of interest is *Busy*, which is a binary 1 (0) when the observation is taken WBS (OBS). *Incongruent* is a binary 1 (0) when the observation is an incongruent (congruent) Stroop trial. *Professional* is a binary 1 (0) when the observation relates to a professional auditor (auditing student). *StartTime* is the time at which participants began the experiment. *StroopDiff* (*StroopFam*) is the participant's self-reported difficulty of (familiarity with) the Stroop task. *HoursWkd* represents the number of hours worked in the prior week, and *Deadlines* represents the self-reported number of significant deadlines the participant has in the upcoming week. *Sleep* is the average hours of sleep per night in the prior week, and *Mood* is self-reported at the time of the survey. *TraitSC*, *Stress*, and *ProfSkep*, are measures of trait self-control, state levels of stress, and trait professional skepticism from measures in the psychology and accounting literatures. Finally, *Busy*Incongruent* and *Busy*Professional* are interaction terms, and ε is a residual. *OverallQuestion* is a listing of 1-120 that indicates the number of overall Stroop trials that the individual has completed (e.g., 60 OBS and 60 WBS). My test also controls for issues involved with repeated measures (e.g., non-independence issues and learning effects), and I scale and center all non-binary variables and interaction terms.

Table 3.5 provides the results of my tests of H1 and H2. H1 predicts that *Busy* will be positive and significant, indicating decreased reaction time for correct observations during busy season or final exam time (i.e., slower reaction time when depleted). My test supports H1, as *Busy* is positive and significant (coeff = .129, p = .000). This reaction time indicates a significant

¹³ I winsorize all outliers in the reaction time observations to be equal to the closest non-outlier value.

amount of ego depletion at the start of a day WBS when compared to OBS, which supports the existence of a between-day accumulation of ego depletion. *Incongruent*, unsurprisingly, is also positive and significant (coeff = .193, $p = .000$); this is expected because incongruent trials are much more difficult than congruent trials due to the self-control required to override an individual's habitual response of responding with the meaning of the word. H1 receives additional support from the interaction term *Busy*Incongruent*, which is also positive and significant (coeff = .019, $p = .048$). Further, *OverallQuestion* is negative and significant (coeff = -.549, $p = .000$), indicating a significant learning effect for participants as they progressed through all 120 trials (both OBS and WBS). It is useful to note that I find the same learning effect within each observation, OBS and WBS, separately for both professionals and students. This strongly indicates the presence of a learning effect. It is important to control for this learning effect, as it would otherwise be picked up in the *Busy* variable, thus confounding my test.

[INSERT TABLE 3.5 HERE]

H2 predicts that the interaction term *Busy*Professional* will be positive, indicating decreased reaction time for professionals within busy season. My test supports H2, as *Busy*Professional* is positive and significant (coeff = .047, $p = .027$). This indicates that busy season causes incremental depletion for professionals when compared to final exam time for students. *StartTime* is also positive and significant (coeff = .135, $p = .020$), indicating that participants who started the experiment later exhibited greater depletion through slower reaction time. This result supports the strength model of ego depletion and indicates that participants are susceptible to a within-day depletion effect. *StroopDiff* is positive and significant (coeff = .117, $p = .002$), indicating that participants' who judged the task to be more difficult demonstrated slower reaction times. Interestingly, *HoursWkd* is negative and marginally significant (coeff = -

.090, $p = .085$), as is *Mood* (coeff = $-.071$, $p = .090$). No other variables are significant at conventional levels.

Robustness Tests

It is possible that, due to the relative length and intensity of busy season when compared to final exam time, the auditors in my sample are driving the results of my overall test. It is important to note that both groups exhibited similar accuracy rates across both time periods. However, one should not conflate accuracy with self-control performance, as self-control is the theoretical construct of interest and is significantly impaired within busy season. However, for robustness, I conduct a linear mixed-effects model regression for each set of participants separately. For brevity, and due to similarity to the previously described model, I omit the model and variable definitions in this sub-section of the paper. Table 3.6 Panels A and B present the results of these tests.

[INSERT TABLE 3.6 HERE]

As with my overall analysis, *Busy* is positive and significant for both auditors (coeff = $.238$, $p = .000$) and students (coeff = $.131$, $p = .000$). Similarly, *Incongruent* is positive and significant for both auditors (coeff = $.219$, $p = .000$) as well as students (coeff = $.184$, $p = .000$). However, it appears that the overall significance in the *Busy*Incongruent* interaction is being driven primarily by student subjects (coeff = $.040$, $p = .001$), rather than by auditors (coeff = $-.026$, $p = .811$). Further, *OverallQuestion* is negative and significant for both groups (coeff = $-.571$, $p = .000$ for auditors; and coeff = $-.546$, $p = .000$ for students), and *StroopDiff* is positive and significant for both auditors (coeff = $.130$, $p = .032$) and students (coeff = $.089$, $p = .030$).

Due to a lack of variation, *StartTime* was insignificant for auditors (coeff = $.456$, $p = .236$), while it was positive and significant for students (coeff = $.136$, $p = .020$). This indicates

a within-day effect of ego depletion when start time is sufficiently varied. No other variables were significant at conventional levels for students. However, auditing experience (*AuditExp*) significantly decreased depletion for auditors (coeff = $-.475$, $p = .001$), while *Stress* significantly increased depletion (coeff = $.420$, $p = .025$). Finally, *Age* was positively and significantly related to depletion for auditors (coeff = $.913$, $p = .000$).

CONCLUSIONS

The results presented within this paper challenge the assumption of ego depletion theory that individuals sufficiently recover self-control resources between days. Specifically, I explore whether an extended stressful period, such as busy season (final exam time) for professional auditors' (auditing students'), can lead to a between-day *accumulation* of ego depletion. I also conduct a survey involving professional auditors in order to provide motivation for studying an accumulation effect of ego depletion within a busy season. I find, via my exploratory survey, that senior associates are likely susceptible to both within day and accumulation of ego depletion. These results enhance my motivation for conducting my experiment. I find, within my experiment, support for my hypothesis that both professional auditors and auditing students experience significant *accumulation* of ego depletion during busy season and final exam time, respectively.¹⁴ Additionally, I find that busy season causes greater between-day depletion for professionals than does final exam time for students; this finding is likely due to the relative differences in duration and/or intensity, and thus stress, between busy season and final exam time. Finally, I find that students experience significant within-day depletion, based upon later start times for the experiment during their first observation. This finding supports within-day depletion predicted by the strength model.

¹⁴ Using auditors, despite the task used to measure depletion not requiring auditor expertise, allows me to investigate differences between auditing busy season and final exam time for students.

As with all research, my study is subject to certain limitations. First, as both observations for professionals and the second observation for students were taken remotely, my experiment involves a loss of control over participants that would normally be accomplished in a laboratory. However, this was necessary to obtain my manipulation of interest – that is, observations during busy season and final exam time – and achieve an acceptable response rate. Further, based upon accuracy rates and reaction times, it appears that all respondents for whom I analyzed data took the task seriously. As a result, I do not consider this to be a significant limitation to the generality of my findings. Second, my experiment does not directly tie ego depletion to auditors' or students' JDM quality. Instead, I rely upon a robust literature on ego depletion theory to generalize my findings. Chapter 2 details the numerous potential consequences of ego depletion for auditors' JDM; theoretically my findings of increased depletion within busy season should generalize to impact JDM quality. However, I leave these questions for future research to explore.

This primary contribution of this paper is the discovery of a between-day accumulation of ego depletion. That is, my results contradict the assumption in ego depletion theory that individuals sufficiently recover self-control resources to begin the subsequent day at full capacity. To my knowledge, no study has addressed a potential accumulation of ego depletion. I also provide initial evidence that auditors and students both experience ego depletion, despite learning effects from the task and experience at dealing with the stress of busy season and final exam time. This discovery lends credence to theoretical arguments made in Chapter 2 that ego depletion can play a significant role in public accounting, and that auditors' JDM may be significantly impacted by the consequences of ego depletion, especially within busy season. As a result, the current research represents a first step in ego depletion research in accounting; before we can understand whether mechanisms are in place to mitigate ego depletion, we must first

determine whether ego depletion occurs in the auditing ecology. My findings suggest that depletion does exist in the auditing ecology, both within and between-days. Finally, this research expands our understanding of the public auditing busy season by providing individual-specific findings that can be tied to JDM quality, and by documenting the overall impact of increased hours and deadlines on individuals' stress levels.

Future research can help to expand the findings of the current study and extend them in interesting ways. First, because my experiment uses professionals from a regional auditing firm, it is useful for future research to expand this testing to auditors at national and international firms. To this end, DeZoort and Lord (1997) call for a greater understanding of the effect of firm size on workload pressures, and Sanders et al. (1995) find that the working environment for national and, presumably, international, firms is significantly more stressful than that of local and regional firms. As a result, future research can extend my experiment to encompass these other firms to more fully understand the effect of busy season on auditors and their levels of depletion. Second, based upon evidence within this paper that auditors are indeed susceptible to ego depletion, future research should explore this new area within accounting JDM research. To quote Maslach (1982, 40), who describes the benefits of initially exploring the burnout phenomenon, "the promise inherent in understanding burnout is the possibility of doing something about it." So too is the promise inherent in understanding ego depletion. The next step is to determine the impact of depletion on JDM quality and understand if quality-control mechanisms within accounting firms (e.g., the workpaper review process, audit programs, decision aids, concurring partner review, etc.) can mitigate the occurrence and/or effects of ego depletion.

4. ESSAY 3: EGO DEPLETION AND AUDITORS' JUDGMENT AND DECISION-MAKING QUALITY

INTRODUCTION

This paper reports the results of an experiment that investigates ego depletion and auditors' judgment and decision-making (JDM). My experiment is grounded in the psychology literature on ego depletion, which is defined as a condition in which prior exertions of self-control temporarily reduce an individual's self-control resources; this reduction leads to a reduced willingness and/or ability to engage in subsequent acts of self-control (Baumeister et al. 1998). Importantly, ego depletion is distinct from the concept of mental fatigue. Individuals are aware of mental fatigue, which occurs over a longer period of time; however, individuals are not aware of ego depletion (Segerstrom and Nes 2007), which typically occurs in the prior literature over short periods of five or ten minutes (Hagger, Wood, Stiff, and Chatzisarantis). Self-control – the ability to consciously control one's own behavior, especially to conform to standards or pursue long-term goals (Baumeister et al. 2007) – is analogous to the traditional concept of willpower, and is crucial in many JDM processes that auditors use on a daily basis. For example, reasoning, complex cognitive processing, maintaining vigilance and focus, and persisting in task performance all require self-control. However, prior psychology research finds that self-control functions as an expendable and limited cognitive resource, which can be depleted (e.g., Baumeister et al. 1998). As a result, self-control can be a critical determinant of auditors' JDM quality.

I design and conduct an experiment to address three fundamental questions. First, does the source of ego depletion impact the observed amount of ego depletion? Second, do experience, expertise, and professional skepticism reduce individuals' susceptibility to depletion? Third, does

ego depletion impact individuals' professional skepticism, hypothesis generation, and confidence (i.e., factors influencing JDM quality) on a subsequent auditing task? These questions are motivated by three distinct factors. First, prior research suggests that auditing tasks can cause depletion through complex cognitive processing and maintaining vigilance and focus; similarly, depletion can impact auditors' JDM quality by decreasing logical reasoning and complex cognitive processing, increasing confirmatory information processing, decreasing vigilance and focus, and decreasing resistance to persuasion. Second, prior depletion research ignores important ecological features of professional tasks and the auditing environment by using mundane tasks that center on impulse inhibition. Research has largely ignored that motivation, practice, and expertise in task performance can decrease susceptibility to depletion. These factors are important because prior studies primarily test only one type of self-control and ignore important features that have been shown to potentially reduce the effects of depletion. Finally, while two prior archival studies study depletion's impact on professionals (Danziger et al. 2011; Kelz et al. 2009), the generality of these findings to other professional settings remain unclear because these studies, due to methodological constraints, cannot directly assess whether ego depletion was the underlying mechanism that generated in their reported findings.

To investigate my research questions, I conduct a 1 x 3 between-subjects experiment with two separate groups of participants: professional senior-associate auditors, and upper-level undergraduate auditing students. These participants perform a task manipulated as primarily requiring one of three types of self-control: complex cognitive processing and logical reasoning; impulse inhibition; and vigilance and focus. I then measure participants' ego depletion via their reaction time on a psychological task of attention control. This allows me to determine whether participants' level of ego depletion varies based upon their initial self-control requirements.

Participants then complete a task in which they are required to: (1) rate the reasonableness of a CFO's explanations for troubling financial trends; and (2) provide as many plausible alternative explanations as possible for these trends. Importantly, these trends and explanations are based upon a previous case of fraud at Koss Corporation. Reasonableness ratings allow me to test whether depletion leads to a decrease in professional skepticism through increased susceptibility to persuasion and/or confirmatory information processing. The number of alternatives allows me to examine the impact of depletion on complex cognitive processing and hypothesis generation.

Importantly, using a realistic professional task enhances the experimental realism of my study, as auditors and auditing students are more likely to take seriously a familiar and meaningful task than an abstract task used in prior psychology research (Swieringa and Weick 1982). It follows that using a realistic professional task will more accurately capture ego depletion based upon participants using self-control in task performance, and will capture benefits that accrue with task familiarity and/or experience, knowledge, and expertise. These factors, in turn, probe the robustness of ego depletion theory. Further, a realistic professional task will help to test depletion theory by examining whether self-control used in prior psychology studies (impulse inhibition) is more or less depleting than self-control used in realistic accounting tasks (complex cognitive processing or maintaining vigilance and focus).

I find that both complex cognitive processing and maintaining vigilance and focus lead to greater levels of observed depletion (i.e., slower reaction time) than does an impulse inhibition task. That is, realistic accounting tasks led to greater levels of depletion than did a depleting psychology task used in prior research. Further, while I find that experience with the depleting task reduces the incidence of ego depletion, additional skills and knowledge that come with being a professional auditor do not. This expands inferences from Kremin (2014), who finds that

audit experience helps to reduce ego depletion, by suggesting that task-specific experience may be a more specific determinant of depletion. I also find results generally consistent with Majors et al. (2014) in that trait professional skepticism interacts with the depleting tasks to cause incrementally more depletion.

With respect to the consequences of ego depletion for accounting tasks, I find that individuals in the complex processing and impulse inhibition treatments are significantly more persuaded by the CFO's explanations for the troubling financial trends. Individuals in these treatments provide higher likelihood ratings for the CFO's explanations, suggesting that they exhibit decreased professional skepticism through increased susceptibility to persuasion and/or confirmatory information processing. Both of these findings are associated with ego depletion. I do not find significant differences in the ability to generate alternative explanations when individuals are prompted to do so within the experiment. However, it is possible that individuals who are more easily persuaded by the CFO's explanation will forego this process, absent this prompting. Finally, I find that the impulse inhibition task significantly lowers individuals' confidence in their performance on a subsequent familiar task, even when controlling for experience with the initial and subsequent tasks.

This research offers a number of contributions to theory, practice, and policy. This research extends ego depletion theory and provides evidence that ego depletion can hinder auditors' JDM quality through decreased professional skepticism and increased susceptibility to client persuasion. Specifically, my research contributes to the literatures that consider auditors' JDM quality, use of professional skepticism, and performance in analytical procedures tasks. Using professional auditors better matches participants to the experimental task and allows me to extend depletion theory by determining whether skills, knowledge, and expertise that accrue to

professionals can play a role in mitigating ego depletion. My experimental results test the boundaries of the strength model of ego depletion by explicitly examining the impact of realistic tasks on depletion and the resultant impact of depletion on JDM.

With respect to practice, the findings offer public accounting firms a greater understanding of how various tasks and workloads impact their employees JDM quality. For example, based upon my findings, ego depletion can represent another source of risk to audit firms through an increased willingness to accept a client's fraudulent explanations. Further, the insights from this research can help PCAOB inspectors better understand the potential for ego depletion to impact professional judgment. Future research can assist firms in planning and resource-allocation decisions as well as identifying tasks that are likely to cause high levels of depletion. Further, this research can explore the impact of depletion on individuals' ability to perform cognitively complex tasks, such as the audits of complex estimates, and methods of mitigating the effect of ego depletion on auditors' JDM quality. Summarily, this research will provide a fruitful new avenue for academics to offer practical contributions to audit firms.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Ego Depletion Background – The Strength Model

Ego depletion is grounded in the strength model of ego depletion. The strength model of ego depletion analogizes using self-control, or willpower, to using a muscle in one's body (Baumeister et al. 1998; Muraven and Baumeister 2000). Specifically, Muraven et al. (1998) finds that, as with muscles, the ability to exercise self-control becomes fatigued with use, requires a period of rest to recover and restore performance, and improves with long-term practice or training. The strength model therefore predicts that an individuals' subsequent self-control performance will suffer after performing an initial act that requires self-control. Because

nearly all of the prior psychology literature supports the strength model (e.g., see Hagger et al. 2010 for a meta-analysis), I elect to use the strength model as a benchmark for my testable hypotheses later in this section.¹⁵

The strength model of ego depletion is predicated on five assumptions (Muraven and Baumeister 2000). Table 4.1 summarizes these assumptions. Of specific interest are assumptions two, four, and five. The second assumption highlights the occurrence of ego depletion. The fourth assumption indicates that the timing of task performance matters; that is, it is likely that self-control performance will differ if a task is performed before, as opposed to after, several other self-control acts. The final assumption underlies the findings that self-control efforts degrade with increased depletion.

[INSERT TABLE 4.1 HERE]

I focus my discussion of causes and consequences of ego depletion on those that apply to the current research.¹⁶ Prior psychology research finds that complex cognitive processing (Schmeichel et al. 2003), maintaining vigilance and focus (Vohs et al. 2008; Gailliot and Baumeister 2005), and impulse inhibition (e.g., Baumeister et al. 1998) all cause ego depletion.¹⁷ Further, related to complex cognitive processing, increased cognitive load (Schmeichel 2007) and general decision-making (Brunyeel et al. 2006; Vohs et al. 2008; Gailliot and Baumeister 2005) also cause depletion.

¹⁵ Inzlicht and Schmeichel (2012) have recently proposed a mechanistic approach, which they term the “process model.” However, as this model has yet to receive empirical support I focus on the strength model for the purposes of the current research.

¹⁶ For a more comprehensive discussion of the causes and consequences of ego depletion in an auditing environment, refer to Chapter 2.

¹⁷ I follow Block et al. (2010) in defining cognitive load as the mental effort (e.g., attention, working-memory, or information-processing demands) required to perform a task.

¹⁸ This study uses 52 participants across six conditions; approximately half of the participants are accounting majors. As a result, it is uncertain whether their results will generalize to participants whose skill and experience levels are more appropriately matched to their task.

Perhaps more importantly, prior research has discovered a number of consequences stemming from ego depletion. Baumeister et al. (1998) find that depletion decreases task persistence and increases passivity, leading depleted individuals to be more likely to accept the status quo. Importantly, the status quo in accounting is accepting the client's explanations or financial statement presentation without obtaining appropriate supporting evidence. Further, depletion has been found to decrease logical reasoning and complex cognitive processing (Schmeichel et al. 2003), decrease resistance to persuasion (Burkley 2008), and decreased vigilance and focus (Vohs et al. 2008; Gailliot and Baumeister 2005). All of these consequences can potentially decrease auditors JDM quality and professional skepticism.

Causes of Ego Depletion and Accounting Tasks

Prior psychology research relies on a general subject base (e.g., undergraduate college students) and general tasks (e.g., persistence in keeping one's hand in a bucket of ice water or willingness to consume an unpleasant beverage) to assert the generality of their results to all individuals. However, there are several reasons why these findings might not generalize to a professional accounting setting.

First, prior depletion studies typically involve tasks that are centered entirely on exercising self-control in the form of resisting urges and impulses (e.g., resisting the temptation to eat chocolate cookies; stifling emotions during funny or sad videos; suppressing thoughts; and retyping a paper without using the letter "e" or the space bar). These tasks differ from professional tasks in two significant ways: (1) they focus solely on strong impulse inhibition, while largely ignoring other types of self-control; and (2) they are not familiar or meaningful to task performers, thus largely ignoring the impact of experience and motivation on depletion.

Professional tasks, by contrast, likely contain different types of self-control requirements and are

at least somewhat familiar and/or meaningful to task performers. As a result, it is unclear that professional tasks would incur a significant amount of depletion, as do these tasks.

Second, and related to the above discussion on task familiarity and meaningfulness, prior research provides evidence that motivation can mitigate depletion (Muraven and Slessareva 2003). However, most prior psychology studies inhibit motivation and potentially bias their results by using tasks that are not familiar and/or meaningful to task performers. Auditors may be sufficiently motivated in task performance for several reasons, including: succeeding in a familiar and/or meaningful task; enhancing one's reputation; furthering one's knowledge and/or career; or avoiding litigation or discipline from regulators and/or superiors. Further, auditors likely have experience with familiar tasks, which can reduce depletion through self-control practice (Muraven 2010) and conversion of effortful processing into automatic processing that is unaffected by depletion (Neal et al. 2013). Though professional tasks may be more difficult or complex than those used in prior literature, Muraven and Slessareva (2003) note that difficult tasks that do not require self-control do not cause and are not affected by depletion. As a result of this discussion, and the uncertainty surrounding the generality of prior depletion findings to professional tasks that are more meaningful and contain different types of self-control requirements, I posit the following non-directional hypothesis:

H1: Different types of self-control cause different levels of ego depletion.

Additionally, prior literature has shown that self-control stamina can increase through practice such that each act of self-control is less depleting to the individual (e.g., Muraven et al. 1999). However, prior psychology research has typically used tasks that are unfamiliar to their participants. This design feature decreases the likelihood that individuals will have experience or practice with the experimental tasks, potentially limiting the external validity of the studies with

respect to professionals. Since auditors obtain practice in dealing with daily auditing tasks and their self-control requirements, they potentially develop a resistance to depletion. By contrast, graduate auditing students are less likely to have developed this resistance, due to limited practice in performing realistic auditing tasks. These students (auditors) may (not) exhibit similar levels of depletion, and related effects, as found in extant psychology research.

Similarly, experience can facilitate the conversion of controlled, effortful processing into automatic, heuristic-based processing, based upon the acquisition of expertise. For example, Neal et al. (2013) posit that practice automates responses and once these responses become automated they require less self-control. Because prior studies have found automatic processing to be unaffected by depletion (e.g., Schmeichel et al. 2003), it stands to reason that more experienced auditors may be less susceptible to depletion, compared to prior psychology studies' participants who are unlikely to have this benefit when performing unfamiliar tasks. For example, Kremin (2015) finds that depletion decreases with more experienced auditors, a finding that can potentially be attributed to increased expertise and task automaticity that accompany increased experience. By contrast, students are unlikely to have developed such expertise and automaticity. However, it is useful to disentangle the effects of both task experience and expertise arising from general experience on ego depletion. Based upon this discussion, I posit the following non-directional hypotheses:

H2a: Experience with a depleting task impacts the incidence of ego depletion

H2b: Depletion resulting from a depleting task will differ based upon individuals' expertise.

Finally, with respect to causes of ego depletion, Majors et al. (2014) study the interaction of ego depletion and professional skepticism using auditing students and a risk assessment task.

The Majors et al. (2014) study answers calls for future research on professional skepticism (e.g.,

Nelson 2009; Hurtt et al. 2013) and aligns with the PCAOB's increased emphasis on the importance of professional skepticism (e.g., Staff Audit Practice Alert No. 10, PCAOB 2012a). These authors use undergraduate accounting students in an experiment that manipulates ego depletion through resisting temptation, similar to many psychology studies (e.g., Baumeister et al. 1998; Hagger et al. 2012). Participants complete a decoding task and then an auditing risk assessment task.¹⁸ Majors et al. (2014) find that individuals with higher levels of trait professional skepticism incur more depletion, leading to poorer performance on the risk-assessment task. As a result, I posit the following directional hypothesis:

H3: An individual's task-related depletion depends upon their level of trait professional skepticism.

Consequences of Ego Depletion and Accounting Tasks

After investigating the causes of depletion, it is useful to determine whether the task manipulations in the treatments can affect participants' subsequent task performance. Prior research finds that depletion increases individuals' passivity, decreases their persistence in task performance, and increases the likelihood that they will accept the status quo. Further, prior literature also finds that depletion increases confirmatory information processing (Fischer, Greitmeyer and Frey 2008) and leads to increased susceptibility to persuasion (Burkley 2008).

However, a key hypothesis of the ego depletion literature – the conservation hypothesis – makes it unclear in what way measured ego depletion from H1-H3 will carry forward to influence participants' performance on subsequent tasks. The conservation hypothesis posits that individuals view self-discipline as an investment of a limited resource, and are therefore

¹⁸ This study uses 52 participants across six conditions; approximately half of the participants are accounting majors. As a result, it is uncertain whether their results will generalize to participants whose skill and experience levels are more appropriately matched to their task.

increasingly motivated to conserve this resource as they incur more depletion (Muraven 1998; Muraven et al. 2006). The expectations of future self-control needs, in conjunction with prior depletion, can then increase an individuals' desire to conserve self-control resources. In this way, individuals' depletion from the initial task may lead them to conserve resources on the Stroop task (Task 2, described in Section 3), which will cause them less depletion than individuals who were less depleted by the initial task. Multiple studies (e.g., Muraven 1998; Tyler and Burns 2009; and Converse and DeShon 2009) find results consistent with the conservation hypothesis. As a result, I posit the following non-directional hypothesis:

H4a: Individuals' professional skepticism on a subsequent task will differ based upon the type of self-control used on an initial task.

Prior research also finds that depletion decreases controlled, effortful processing; this forces individuals to rely more on automatic, heuristic processing (Schmeichel et al. 2003; Masicampo and Baumeister 2008; Pocheptsova, Amir, Dhar, and Baumeister 2009). This decrease in effortful processing is significant in the sense that auditors may exhibit poorer task performance on subsequent tasks if they are depleted as a result of an initial task. This decrease in effortful processing can then potentially hinder audits of complex estimates (Griffith et al. 2013), overall evidence evaluation and pattern recognition (Hammersley 2006), and the ability to determine the plausibility and sufficiency of client-provided explanations (Anderson and Koonce 1998). Indeed, Kremin (2014) finds, in a study with professional auditors, that ego depletion reduces auditors' professional skepticism and increases their reliance on misleading client explanations. Further, it is possible that individuals, due to decreased logical reasoning and complex cognitive processing, are less able to generate plausible alternative explanations when evaluating a client's proposed explanation for a given trend or fluctuation. As a result, I posit the following non-directional hypothesis:

H4b: Individuals' hypothesis generation ability will differ based upon the type of self-control used on an initial task.

Finally, it is important to determine whether depletion may play a role in individuals' confidence in their performance. Because confidence can impact auditors both through their perceived need to continue working, as well as their self-efficacy and subsequent motivation, it is important to study depletion's effect on confidence. Kennedy and Peecher (1997) document that auditors are overconfident in technical knowledge judgments. DeBono and Muraven (2013) find that depletion reduces individuals' confidence in their predictions of future performance; however, because individuals are typically overconfident, the authors note that this reduced confidence facilitates more accurate predictions of performance. It remains to be seen whether different task manipulations can significantly impact individuals' confidence subsequent to task completion, as opposed to confidence in predictions of future performance. Because confidence on current task performance serves as an input into whether an individual will continue to persist on that task, I posit an additional non-directional hypothesis to study this effect:

H5: Individuals' confidence in their performance on a subsequent task will differ based upon the type of self-control used on an initial task.

EXPERIMENTAL DESIGN

Prior ego depletion research has exclusively used laboratory experiments to investigate the causes and consequences of depletion. This research relies upon a two-task paradigm, where participants perform an initial task (manipulated as depleting or non-depleting) and subsequently perform a task that provides a measure of depletion levels – typically through task persistence or the ability to suppress habitual responses. These methods provide valid measures of depletion because they require self-control to override a habitual response or urge to quit a task. Lower persistence or decreased ability to suppress habitual responses is interpreted as a sign of

depletion. However, no study has investigated whether professional tasks contain a self-control requirement sufficient to incur depletion on participants. As a result, if accounting tasks do not require a substantial amount of self-control, they arguably will not incur depletion.

I use a 1x3 design for my experiment and randomly assign participants to one of three separate conditions centered on the first (manipulated) task below: *Processing*; *Vigilance*; and *Inhibition*. Random assignment ensures that any between-participant differences are randomized across treatments. My experiment contains the following four tasks:

1. Auditing risk assessment task – manipulated as described below
2. Stroop color-word interference task
3. Professional skepticism task
4. Post-experimental questionnaire

Procedures

Participants arrive at the laboratory and read a consent form to indicate their willingness to participate in the experiment and understanding of what the experimental procedures entail.¹⁹ The participants then begin the four separate experimental procedures, as outlined above.²⁰ The risk assessment task is manipulated based upon the primary type of self-control required for task performance. These treatments will be labeled “*Vigilance*”, “*Processing*”, and “*Inhibition*,” for the remainder of the paper and are described in more detail below. The *Processing* manipulation of the task requires participants to complete typical risk assessment procedures from the planning

¹⁹ For professionals this process occurred within national or local office training classrooms.

²⁰ Participants in Firm #1 only completed three procedures, as their firm required their tasks to be hard copy only. As a result, they did not complete the Stroop task. All participants in each session are told how many tasks that they will perform, so as to control for differences in expectations across participants.

²¹ To incentivize participation, all student participants receive a \$10 gift card and are entered in a drawing to receive one of nine \$50 Amazon.com gift cards. I elect to use generic gift cards as my incentive due to the broad range of items that can be purchased with these gift cards. This helps to ensure that participants are not differentially motivated by incentives that are more or less compatible with their interests (*e.g.*, participants may respond differently to a Starbucks gift card depending on whether they do or do not like to consume coffee).

phase of an audit. This treatment requires self-control as participants primarily use complex reasoning and logical processing in performing the risk assessment. Specifically, participants will perform a portion of the audit planning case used in Hammersley et al. (2011). This case requires that participants read information about a hypothetical client in order to identify risk factors and assess risk levels (inherent, control, and fraud risk). I elect to use a risk assessment task because these tasks have a pervasive impact on the conduct of the audit. While my experiment only deals with a risk assessment task, inferences drawn from this experiment should generalize to a number of tasks across the conduct of an audit based upon the self-control requirements listed above.

The *Inhibition* manipulation requires participants to read the auditing case and to cross out all instances of the letter “e” that they find. Participants complete the first page of the case by crossing out all instances of the letter “e,” with no additional rules. Upon completing the first page, participants read updated instructions, which inform them that they must continue to cross out instances of the letter “e” according to several specific rules (e.g., do not cross out the letter “e” if it is immediately preceded or followed by a vowel). This task causes depletion because participants must override their habitual response or impulse to crossing out all instances of the letter “e”. As a result, this impulse inhibition has been found to cause ego depletion in prior psychology research (e.g., Baumeister et al. 1998, Study 4). Further, because prior psychology literature finds that this task causes depletion, this treatment will provide a valid benchmark against which to compare the depleting-accounting and non-depleting-accounting treatments.

By contrast, the *Vigilance* task requires participants to read case information and respond to a number of easy questions about the case. Participants are informed that the answers to these questions can be found chronologically throughout the case and are simple in nature (e.g., What

is the full name of the company in the case; What is the materiality for planning purposes of your engagement; etc.). This task therefore requires self-control in the form of vigilance and focus in scanning for the answers. Further, this task is similar to some tasks that individuals complete prior to entering an audit engagement, in order to become more familiar with the client.

Upon completing the manipulated task, participants complete the Stroop color-word interference test (Stroop 1935). The Stroop task is a psychological test of attention control, which requires participants to quickly identify the color ink in which words are displayed, rather than the actual meaning of the word. The Stroop task contains both congruent and incongruent trials. In congruent trials, the ink color of the word and the meaning of the word are the same (e.g., *orange* is presented in orange ink). However, in incongruent trials, the ink color of the word and the meaning of the word differ (e.g., *orange* is presented in green ink). Participants complete 40 trials of the Stroop task, balanced equally between congruent and incongruent trials (i.e., 20 of each). Though some prior literature has allowed participants to perform as many trials as possible within an allotted time (e.g., Gailliot et al. 2007), I fix the number of trials in order to achieve greater experimental control.

Next, participants complete an auditing task that involves evaluating explanations that a CFO has given to explain troubling financial trends of a company, providing reasonableness ratings for those explanations, and generating plausible alternative explanations that explain those trends. This task was adapted from Johnstone et al. (2012, 670). Importantly, the task is built around the fraud at Koss Corporation, perpetrated by Sujita Sachdeva. This task provides direct evidence of the professional skepticism (reasonableness ratings) and JDM quality (plausible alternative explanations) that individuals exhibit when they are depleted. Subsequent to submitting this task, I ask participants how confident they are in their responses.

Finally, participants complete a post-experimental questionnaire, which helps to rule out alternative explanations for the findings from the prior portions of the experiment, consistent with prior psychology literature. Specifically, I collect participants' demographics, overall mood, trait self-control (Brief Self-Control Measure; Tangney et al. 2004), and trait professional skepticism (Professional Skepticism measure; Hurtt 2010).

RESULTS

Participants and Demographics

Students

94 upper-level undergraduate accounting students from a large, public university in the Midwestern United States participated in my experiment in the Fall semester of 2013 and the Spring semester of 2014. These students were recruited from an undergraduate auditing course and participated in the experiment towards the end of the course.²¹ One student did not meaningfully complete the experiment; as a result, my subsequent analyses are based upon 93 participants.

Overall, students mean (median) age is 21.75 (22) years and their mean (median) standing is 3.84 (4), which indicates that most students were undergraduate seniors. 51.6 (48.4) percent of students were male (female). Students' mean (median) mood was 1.33 (2) on a scale ranging from -5 ("Very unpleasant") to 5 ("Very pleasant"), with 0 as "Neutral". Mean (median) scores on the Brief Self-Control Measure were 44.02 (44), while mean (median) scores on the

²¹ To incentivize participation, all student participants receive a \$10 gift card and are entered in a drawing to receive one of nine \$50 Amazon.com gift cards. I elect to use generic gift cards as my incentive due to the broad range of items that can be purchased with these gift cards. This helps to ensure that participants are not differentially motivated by incentives that are more or less compatible with their interests (*e.g.*, participants may respond differently to a Starbucks gift card depending on whether they do or do not like to consume coffee).

Professional Skepticism measure were 127.27 (127). 32/31/30 students participated in the *Processing / Inhibition / Vigilance* treatments, respectively.

Professionals

105 senior-associate auditors from two international public accounting firms participated in my experiment in the summer of 2014. These professionals participated in the experiment at the conclusion of national and local-office training sessions.²² Five professionals did not meaningfully complete the entire experiment and one participant did not complete the post-experimental questionnaire; as a result, subsequent demographics are based upon 99 participants.

Overall, 67 (32) participants are from Firm 1 (2). 44.4 (54.6) percent of professionals are male (female) and one percent decline to provide their gender. Mean (median) age was 1.85 (2) on the provided range scale, indicating that most participants are between 24 and 27 years of age. Mean (median) experience was 4.3 (4) on the provided range scale, indicating that participants average 18-30 months of auditing experience. 98 (2) percent of participants are senior-associates (managers), and 57.6 percent are CPAs. Professionals' mean (median) mood was .56 (0) on a scale ranging from -5 ("Very unpleasant") to 5 ("Very pleasant"), with 0 as "neutral". Mean (median) scores on the Brief Self-Control Measure were 45.28 (45), while mean (median) scores on the Professional Skepticism measure were 130.53 (131).²³ 33/33/34 professionals participated in the *Processing / Inhibition / Vigilance* treatments, respectively. Table 4.2 provides descriptive statistics for all participants.

[INSERT TABLE 4.2 HERE]

²² The experiments were administered at trainings on Tuesdays or Wednesdays. This guards against the possibility that participants incur between-day depletion and thus would perform worse later in the week.

²³ The Brief Self-Control Measure has a maximum attainable score of 65, while the Professional Skepticism measure has a maximum score of 180.

²⁴ Firm A required that the experiment be solely hard-copy; as a result, their auditors could not complete the Stroop task. 30 of 32 auditors from Firm B meaningfully completed the Stroop task.

Causes of Ego Depletion (H1 – H3 Tests)

Variables of Interest

The main variable of interest for the current analysis is participants' reaction time on correctly answered Stroop task trials. All reaction times are measured in seconds. All 93 students who completed the experiment participated in the Stroop task, while only 30 professionals from Firm B completed the Stroop task.²⁴ As a result, the following analysis over causes of depletion is based upon 123 participants.

Analysis

To test H1 I begin by analyzing average reaction times to correct incongruent Stroop trials. Participants in the *Inhibition/Processing/Vigilance* treatments averaged reaction times of 1.20/1.23/1.26 seconds per correct incongruent Stroop trial. To explore whether *Treatment* is a significant determinant of deletion, based upon reaction times, I conduct a repeated-measures ANOVA. Table 4.3, Panel A, provides the results of this test, which indicate that *Treatment* significantly impacts the amount of depletion generated by the initial task ($F = 5.52, p = .004$), supporting H1. *Participant* ($F = 19.67, p = .000$) and *Question* ($F=59.58, p = .000$) are also significant predictors of depletion, indicating participant-specific and learning effects, respectively.

[INSERT TABLE 4.3 HERE]

To further investigate H1, and to explore H2 and H3, I use the following linear mixed-effects regression model for students and professional auditors:

$$Time = \beta_0 + \beta_1 Processing + \beta_2 Vigilance + \beta_3 Incongruent + \beta_4 Professional + \beta_5 T1Exp + \beta_6 Processing * Incongruent + \beta_7 Vigilance * Incongruent +$$

²⁴ Firm A required that the experiment be solely hard-copy; as a result, their auditors could not complete the Stroop task. 30 of 32 auditors from Firm B meaningfully completed the Stroop task.

$$\beta_8 \text{Processing} * \text{Professional} + \beta_9 \text{Vigilance} * \text{Professional} + \beta_{10} \text{Processing} * \text{ProfSkep} + \beta_{11} \text{Vigilance} * \text{ProfSkep} + \beta_k \text{Controls}_{k,it} + \varepsilon$$

where *Time* is the reaction time for correct incongruent trials of the Stroop task.

Processing (*Vigilance*) is an indicator set to 1 if an observation related to the *Processing* (*Vigilance*) treatment, and 0 if related to the *Inhibition* treatment. I use the interaction terms *Processing*Incongruent* and *Vigilance*Incongruent* to test H1, which predicts the null hypothesis that different treatments will not cause different levels of depletion. *T1Exp* is participants' subjective rating of the experience dealing with tasks similar to the manipulated task; this variable is used to test H2a, which predicts that experience with the initial task will mitigate the incidence of ego depletion. I test H2b, which predicts that professionals will be differentially depleted than students from the *Processing* treatment, with the interaction term *Processing*Professional*. The interaction terms *Processing*ProfSkep* and *Vigilance*ProfSkep* test H3, which predicts that there will be a significant interaction of trait professional skepticism and a depleting task on overall ego depletion. I use robust standard errors to control for heteroskedasticity. I use the following control variables: self-assessed difficulty and familiarity with the Stroop task, gender, mood, trait self-control, trait professional skepticism, and the overall question number of the Stroop trial.²⁵ Table 4.3, Panel B, contains the results of these tests.

The interaction of *Processing*Incongruent* and *Vigilance*Incongruent* test H1, given that incongruent trials require self-control. *Processing*Incongruent* (coeff = .051, p = .017) and *Vigilance*Incongruent* (coeff = .069, p = .005) are both positive and significant, indicating that both the *Processing* and *Vigilance* treatments cause significantly more depletion than does the

²⁵ Firm preferences required me to place restrictions on obtaining precise ages of participants. As a result, I do not include age as a control variable in the analysis across all participants.

Inhibition treatment. As a result, H1 is supported for both the *Vigilance* and *Processing* treatments. Note that it is not entirely surprising that the *Vigilance* task caused depletion, given the vigilance and focus component of searching for answers to the questions.

H2a predicts that experience with the manipulated task does not mitigate depletion. My results support H2a, as *T1Exp* is negative and significant (coeff = $-.172$, $p = .011$). This indicates that experience with the depleting task does mitigate ego depletion. H2b predicts that auditors will incur less depletion than will students from performing the *Processing* task that is better suited to their experience level. The interaction of *Processing*Professional* captures this effect, and supports H2b with moderate significance (coeff = $-.110$, $p = .083$). By comparison, auditors have no comparative advantage in performing the *Vigilance* task.

H3 predicts that the interactions of *Processing*ProfSkep* and *Vigilance*ProfSkep* will be positive and significant, indicating greater depletion for individuals who are high in trait professional skepticism. My results support this prediction for both *Processing*ProfSkep* (coeff = $.904$, $p = .005$) and *Vigilance*ProfSkep* (coeff = $.685$, $p = .009$). This provides support for H3 in that trait professional skepticism seems to cause incremental depletion.

Consequences of Ego Depletion (H4 – H5 Tests)

Variables of Interest

The main variables of interest and coding methods are the same for students and for professionals. The main variables of interest are participants' rating of the CFOs explanation for each trend and the number of valid alternative explanations presented. Two PhD students assess and code the validity of the provided explanations; these individuals are former senior managers at a Big 4 accounting firm and are blind to both experimental condition and participant type (i.e.,

professional vs. student) during their coding.²⁶ Due to the discussion of the conservation hypothesis in Section 2, I elect not to perform mediation analysis with observed depletion as a mediating variable. Further, the conservation hypothesis may lead to a reversal of findings based upon observed depletion in H1. Because of this conservation hypothesis, my main analyses include only individuals who completed the experiment with the Stroop task.²⁷

Main Analysis – Test of Reasonableness and Alternative Explanations for Trends

Reasonableness Ratings (H4a)

I conduct a simple average of reasonableness ratings (*Rating*) for participants by treatment type. *Rating* captures a participant's rating, via seven-point Likert scale, of how likely they believe the CFO's explanation accounts for a given trend (1 = "Very unlikely"; 7 = "Very likely"). *Rating* averaged 4.50 for *Processing*, 4.30 for *Inhibition*, and 3.93 for *Vigilance*. Further, I find that professionals assess lower ratings, on average, in all conditions. Specifically, in the *Processing/Inhibition/Vigilance* treatments, professionals average 4.31/3.81/3.65, while students' average 4.57/4.47/4.03. To test H4, I conduct an ANOVA to investigate the effect of *Treatment* on differences in *Rating*. Table 4.4, Panel A, presents the results of this test, which indicate that *Treatment* significantly impacts *Rating* ($F = 7.34, p < .001$), providing support for H4. Further, I find that *Professional* is significant in determining *Rating* ($F = 9.63, p = .000$), as is *Trend* ($F = 18.99, p = .000$). The former indicates that professional auditors assess significantly lower ratings than do auditing students, and the latter indicates significant variation based upon each specific trend.

[INSERT TABLE 4.4 HERE]

²⁶ In untabulated results, I find the inter-rater reliability to be acceptable, based upon a Cohen's Kappa of .757 for assessing the validity of alternative explanations.

²⁷ In untabulated results, I find that including the individuals who did not complete the Stroop task do not materially affect my results.

To further investigate these effects I conduct a linear mixed-effects regression to control for repeated measures. Specifically, I use the following model:

$$Rating = \beta_0 + \beta_1 Processing + \beta_2 Inhibition + \beta_3 Professional + \beta_4 ProfSkep + \beta_k Controls_{k,it} + \varepsilon$$

where *Rating*, the dependent variable for the test, is as previously described. *Processing* (*Inhibition*) are binary dummy variables for observations from the *Processing* (*Inhibition*) treatment. *Professional* is a dummy variable set to 1 (0) if the participant is an auditing professional (student). I use the following control variables: gender, experience with the depleting task, mood, trait self-control. I use robust standard errors to control for heteroskedasticity and repeated measures to control for participant- and trend-specific differences. Table 4.4, Panel B, provides the results of this regression.

H4a predicts that treatments will not cause any differences in participants' ratings for the CFO's explanations. *Processing* is both positive and significant (coeff = .704, p = .000), indicating that participants in the *Processing* treatment were significantly more likely to agree that the CFO-provided explanation accounted for the given trends. Similarly, *Inhibition* is positive and significant (coeff = .514, p = .032). These results reject the null hypothesis H4a and indicate that students in *Processing* and *Inhibition* treatments had a higher likelihood of accepting the CFO's given explanation for trends. *Professional* is negative and significant (coeff = -.447, p = .016), indicating that professionals provide significantly lower ratings for the CFO's fraudulent explanations than do students. All other control variables were insignificant at conventional levels (p > .10).

To provide a valid comparison group that is not depleted an additional 55 graduate auditing students completed only the CFO explanation task during the spring semester of 2015. These students provided an average rating of 4.27, compared to 4.57/4.47/4.02 for

Processing/Inhibition/Vigilance treatments. In untabulated t-tests I find that the average for the control group is significantly lower than for the *Processing* treatment ($t = -1.88, p = .031$) and approaches marginal significance for the *Inhibition* treatment ($t = 1.20, p = .116$). The control group is higher than for the *Vigilance* group, but the difference is only marginally significant ($t = 1.47, p = .071$). These tests support my findings that individuals in the *Processing* and *Inhibition* experienced depletion, as evidenced by higher ratings of a CFO's fraudulent explanations for financial trends and ratios.

Generation of Alternative Explanations (H4b)

I conduct similar analyses for *Alternatives* and *ValidAlternatives*. *Alternatives* (*ValidAlternatives*) averaged 1.79 (1.35) for *Processing*, 1.72 (1.32) for *Inhibition*, and 1.79 (1.36) for *Vigilance*. I conduct an ANOVA to determine the impact of *Treatment* on both *Alternatives* and *ValidAlternatives*. In untabulated results, *Treatment* is not significant at conventional levels in determining either *Alternatives* or *ValidAlternatives* ($F_s < 1$). This rejects H4b, indicating that the type of self-control on the initial task does not significantly impact individuals' generation of alternative hypotheses.

As with the ratings analysis, I conduct a linear mixed-effects regression to control for repeated measures and personal differences. Specifically, I use the following model for testing both *Alternatives* and *ValidAlternatives*:

$$(Valid)Alternatives = \beta_0 + \beta_1 Processing + \beta_2 Inhibition + \beta_3 Professional + \beta_4 ProfSkep + \beta_5 Rating + \beta_6 TIEp + \beta_k Controls_{k,it} + \varepsilon$$

where all variables are identical to my model for testing ratings, with the exception of including *Rating* as a covariate. I use robust standard errors to control for heteroskedasticity.

Table 4.5, Panels A and B, provides the results of this test.

[INSERT TABLE 4.5 HERE]

Both tests indicate that neither *Processing* nor *Inhibition* is significant at conventional levels ($p > .10$). As a result, I cannot reject the null hypothesis H4b for raw or valid alternatives. *Rating*, unsurprisingly, is negative and significant (coeff = $-.515$, $p = .005$ for raw alternatives; coeff = $-.518$, $p = .003$ for valid alternatives), indicating that participants who view the CFO's explanation of the trend as more reasonable generate fewer alternative explanations. *ProfSkep* is also negative and significant for generation of raw alternatives (coeff = -3.03 , $p = .010$), but is not significant at conventional levels for generation of valid alternatives (coeff = $-.859$, $p = .516$). *Professional* is negative and significant for generation of valid alternatives (coeff = $-.178$, $p = .015$), indicating that professionals generate fewer valid alternatives for the trends than do students. *T1Exp* is positive and significant for both tests (coeff = $.280$, $p = .025$ for raw alternatives; coeff = $.367$, $p = .012$ for valid alternatives). Finally, *Mood* is positive and significant (coeff = $.524$, $p = .000$ for raw alternatives; coeff = $.404$, $p = .001$ for valid alternatives) in both tests, indicating that participants' moods positively impact their generation of alternative explanations.

Confidence (H5)

H5 predicts that treatments will not cause a difference in participants' confidence ratings on the CFO explanation task. I include all participants who provided a confidence rating for the CFO task and investigate average confidence per treatment. I find that participants' average confidence in the *Processing/Inhibition/Vigilance* treatments is $4.28/3.70/4.35$. Further, professionals display greater confidence than auditing students; professionals average $4.91/4.18/4.55$ compared to students' averages of $4.03/3.52/4.28$. I conduct an ANOVA test to investigate the impact of *Treatment* on *Confidence*. Table 4.6, Panel A, provides the results of

this test, indicating that both *Treatment* ($F = 3.91, p = .023$), supporting H5, and *Professional* ($F = 6.71, p = .011$) significantly impact *Confidence*.

[INSERT TABLE 4.6 HERE]

To further investigate determinants of individuals' confidence, I conduct a multiple linear regression. Table 4.6, Panel B, reports the results of this regression. *Inhibition* (coeff = $-.742, p = .012$) is negative and significant. This supports H5 and indicates that individuals in this treatment are less confident in their performance on the CFO explanation-rating task. However, *Processing* (coeff = $-.403, p = .110$) is negative but not significant at conventional levels. *Professional* is positive and significant (coeff = $.489, p = .017$), consistent with expectations. *Gender* is positive and significant (coeff = $.345, p = .037$), indicating that males are more confident in their performance than are females. *T3Familiarity* is also positive and significant (coeff = $.200, p = .002$), which is consistent with expectations, as individuals who have more experience with a task are likely to be more confident in their performance on that task. *T1Exp* is negative and significant (coeff = $-.144, p = .032$), indicating that participants who had more experience with their initial manipulated task exhibited lower confidence on the rating task. Finally, *Mood* is positive and significant (coeff = $.192, p = .001$), indicating that participants in a better mood expressed higher confidence in their performance. All other variables are not significant at conventional levels (all $p > .10$).

To provide a valid comparison group that is not depleted an additional 55 graduate auditing students completed only the CFO explanation task during the spring semester of 2015. The average confidence rating for this group is 4.55; comparatively, student participants in the *Processing/Inhibition/Vigilance* treatments averaged 4.03/3.52/4.28. In untabulated t-tests, I find that average confidence in the control group is significantly higher than in *Processing* ($t = 2.48, p$

= .008) and *Inhibition* ($t = 4.58, p = .000$) treatments, and is higher than in the *Vigilance* treatment ($t = 1.18, p = .120$). This supports my inferences that individuals in the *Processing* and *Inhibition* treatments are significantly depleted, as evidenced by significantly lower task performance.

CONCLUSIONS

I conduct an experiment to explore the causes and consequences of ego depletion with professional accounting tasks. I study both auditing students as well as professional senior-associate auditors using a three-task experiment, which manipulates the initial task as a simple accounting, processing, or psychology task used in prior depletion literature. This experiment allows me to explore two main research questions: (1) do all types of self-control use cause ego depletion at similar rates; and (2) does ego depletion impact individuals' JDM quality on a subsequent auditing task? My participants also allow me to investigate whether professional experience helps to reduce the incidence of ego depletion.

As with all research, my study is subject to certain limitations. First, I did not find a significant effect of measured ego depletion during untabulated mediation analyses; however, it is likely that the conservation hypothesis explains this absence of effect. As a result, I am unable to make direct causal inferences as to depletion's impact on subsequent task performance; rather, I simply determine whether differences exist between task manipulations, as does prior research in the ego depletion literature. Second, due to participation restrictions at one firm, I have a limited number of professionals participating in the Stroop task. As a result, the power of my tests in H1-H3 is limited for professionals. However, this biases against finding results and therefore I do not consider it to be a significant limitation.

With respect to causes of depletion, I find that both Vigilance and processing tasks cause greater initial levels of depletion than does a depleting psychology task. Further, I find that experience with the depleting task reduces the incidence of ego depletion. Perhaps surprisingly, additional skills and knowledge that come with being a professional auditor do not mitigate depletion stemming from a processing task above and beyond general experience with the depleting task. I also find results generally consistent with Majors et al. (2014) in that trait professional skepticism interacts with the depleting tasks to cause incrementally more depletion.

When investigating consequences of ego depletion for accounting tasks, I find that individuals in the processing and depleting psychology treatments are significantly more likely to agree that a CFO's explanation is the underlying cause of a troubling financial trend. However, I do not find significant differences in the ability to generate plausible alternative explanations. It is useful to note that while I do not find results in the ability to generate plausible alternative explanations, it is possible that individuals who are more easily persuaded by the CFO's explanation will forego this process, absent prompting that was included in the experimental materials. Finally, I find that the depleting psychology task significantly lowers individuals' confidence in their performance on a subsequent familiar task, even when controlling for experience with the initial and subsequent tasks.

This paper makes a number of contributions. First, this is the first study to find that realistic, professional tasks cause ego depletion and do so at higher levels than previously used psychological tasks of self-control. Therefore, despite arguments as to why individuals may be less susceptible to depletion on familiar professional tasks, my results support that these tasks cause within-day ego depletion in both auditing students and professional auditors. The results suggest ego depletion represents a potential determinant of auditors' JDM quality. Second, I

contribute knowledge to the depletion literature, as I find that professionals do not accrue a greater resistance to depletion above that provided by general experience with the depleting task. Third, I reinforce and extend the results of Majors et al. (2014) by demonstrating a significant interaction effect between trait professional skepticism and a depleting task; that is, individuals higher in trait professional skepticism incur greater levels of depletion while performing a depleting task than do individuals who are lower in trait professional skepticism. However, I further explore this finding and find that auditing students primarily drive this finding and that it does not hold in the population of professional auditors. This potentially indicates that higher levels of trait professional skepticism may be detrimental in tasks that are more difficult for an individual, but may not significantly impact depletion when an individual performs a task that is appropriate for their skill and experience levels. Finally, I contribute evidence that depleting tasks can lead to a significantly greater propensity to accept a client's explanations for proposed trends and fluctuations. While treatment does not significantly impact the number of plausible alternative explanations generated by participants, it is possible that participants who are more persuaded by a client explanation may truncate or forego the process of generating alternative explanations entirely in practice.

Given the findings in the current research, ego depletion has important implications for auditors' JDM quality and overall audit quality. Future research should investigate the causes and consequences of ego depletion within a professional auditing setting. For example, future research can examine whether greater levels of ego depletion prohibit auditors from exhibiting high-quality JDM on complex auditing tasks, such as the audits of complex estimates. Other potential next steps in depletion research in accounting relate to mechanisms or processes that can potentially counter the effects of ego depletion (e.g., workpaper review, decision aids).

Investigating these topics can offer significant contributions to both academic literature as well as auditing practice.

5. OVERALL CONCLUSIONS

This dissertation investigates various applications and implications of ego depletion theory within an auditing setting. In my first essay, I apply ego depletion theory to an auditing setting and note several potential consequences and opportunities for future research. In my second essay, I use auditors' busy season and students' final exam time to challenge a fundamental assumption to ego depletion theory; specifically, I find evidence that contradicts the assumption that individuals sufficiently recover self-control resources through between-day rest and sleep. In my third essay, I study the performance of auditors' and auditing students' performance on various tasks and find that different types of self-control lead to different levels of ego depletion and that ego depletion subsequently decreases auditors' professional skepticism and confidence in task performance. I additionally find that task-specific experience mitigates ego depletion, while trait professional skepticism exacerbates depletion.

Several opportunities for future research arise from the current research. Future research can investigate whether depletion significantly inhibits auditors' JDM quality on complex tasks, such as auditing complex estimates. Further, future research should explore whether there are tools that can mitigate the incidence of ego depletion. For example, a promising area for future research is exploring the effects of ego depletion on the audit workpaper review process.

Theoretically, workpaper review is thought to increase the quality of the workpapers in two ways: (1) knowledge of an impending review causes the preparer to exert more effort to meet the anticipated standards of the reviewer; and (2) the reviewer serves as a control to detect any errors

or inconsistencies in JDM of the preparer. However, the former assumes that preparers are not depleted before or during their completion of the procedures and the accompanying workpaper, while the latter assumes that the reviewers are not depleted before or during their review of the workpaper. If these assumptions are violated, specifically with respect to the reviewer, then the audit workpaper review may not function as an effective control against errors. If the reviewer is depleted, then they may exhibit lower persistence, vigilance, or focus on their reviewer; in this case, the reviewer may fail to detect errors in the workpaper. Similarly, if we view the workpaper review process as a persuasion attempt of the preparer to convince the reviewer to sign off on the workpaper, reviewers who are depleted may be more susceptible to these persuasion attempts. Exploring this area would allow researchers to directly investigate whether increased depletion leads to decreased ability to detect mechanical and/or conceptual errors, and whether experience (senior associates vs. managers) mitigates this effect.

Another, more broadly applicable, area for future research is grounded in the idea that depletion may cause differences in risk behavior. Prior depletion literature has found conflicting results in investigating depletion's impact on risky behavior. Brunyeel et al. (2009) tie depletion, through regulation of negative affect, to an increase in risky choices in a lottery task. By contrast, Unger and Stahlberg (2011) find that depletion reduces risky choices in situations where subjects have greater control over the outcome of the decision (an investment task as opposed to a lottery). Therefore, it may be useful for future research to investigate the impact of depletion on risk-, ambiguity-, and loss-aversion. This would significantly extend Brunyeel et al.'s (2009) work by providing a tangible measure of subjects' range of constant relative risk aversion (CRRA) and the ability to determine the impact of depletion, on average, on CRRA. A similar experiment could be devised to investigate loss or ambiguity aversion.

Finally, it is important for future research to investigate the effects of depletion on risk-assessment ability and auditor-client negotiations. With respect to risk-assessment, depletion should theoretically decrease risk-assessment ability through decreased vigilance, persistence, and focused attention. However, if this task is deemed to be important then individuals may be able to exercise self-discipline to effectively complete the task. With respect to auditor-client negotiations, auditors must often negotiate applied accounting treatments with their clients. However, if an auditor is depleted then they would be less likely to resist the client's persuasion and may perform more poorly in negotiations.

Each of these areas of future research could have a significant and pervasive impact on individuals' JDM performance in accounting and other disciplines. It is important to investigate these areas in future research to develop a more thorough understanding and knowledge of situations in which depletion is likely to play a significant role. Future research can also help to develop a taxonomy of auditing tasks that are ranked in terms of their likelihood of causing depletion. This taxonomy would greatly assist firms in managing employee workloads. Finally, experimental researchers in accounting should seek to design experiments that are sensitive to the fact that different task manipulations may lead to differing levels of depletion among participants. Researchers should be sure to design their experiments in such a way that depletion will not play a significant role in confounding their results with respect to their variables and constructs of interest.

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7. Tables

Table 1: Summary of literature on ego depletion theory

Citation	Main topic(s)	Purpose	Research method	Key findings
Ainsworth et al. (2014)	Consequences of Depletion	To examine the impact of depletion on individuals' propensity to trust.	Experiment	<ul style="list-style-type: none"> • Depletion leads to less trust (Experiment 1). • This finding is exacerbated when participants would not meet their trust game partner (Experiment 2) or were told they were dissimilar from their partner (Experiment 3).
Alberts et al. (2007)	Avoiding Ego Depletion	To examine whether priming persistence can mitigate ego depletion.	Experiment	<ul style="list-style-type: none"> • Priming persistence can partially mitigate ego depletion on a task that immediately follows the prime.
Barber et al. (2013)	Causes of depletion.	To examine the relationship between sleep hygiene and self-regulation.	Field Study	<ul style="list-style-type: none"> • Poor sleep hygiene led to lower self-regulatory capacity, higher subjective depletion, and lower work engagement.
Baumeister (2002a)	Model / Discussion	To review existing studies and develop the Strength Model of Ego Depletion Theory.	Theory Building and Literature Review	<ul style="list-style-type: none"> • Self-control relies upon a limited resource that can be depleted. • Depletion leads to decreased ability to use self-control. • This resource may be the basis of the self's entire executive function. • Provides initial support for the Strength Model of Ego Depletion Theory.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Baumeister (2014)	Model / Discussion	To discuss the implications of self-control and ego depletion for inhibition in human social life.	Discussion	<ul style="list-style-type: none"> The ability to inhibit behavior is a pervasive human activity and is key to biological success. Inhibition includes both trait and state aspects. Ego depletion reduces individuals' state ability to engage in inhibition.
Baumeister and Alquist (2009)	Model / Discussion	To discuss the potential costs of exercising self-control.	Discussion	<ul style="list-style-type: none"> Ego depletion represents the most important cost related to state self-control. Impaired self-control can impact intelligent thought, decision-making processes, and initiative. Trait self-control has few downsides.
Baumeister and Heatherton (1996)	Model / Discussion	To review the major patterns of self-regulatory failure and construct a theory to describe these patterns.	Theory Building	<ul style="list-style-type: none"> Self-regulation relies upon standards, monitoring, and action. A limited strength model most accurately describes self-regulation. Depleting the self-regulatory resource increases self-regulation failure (under-regulation or mis-regulation).
Baumeister (2002b)	Model / Discussion	To review existing findings on self-control and apply these findings to consumer behavior and impulsive purchasing.	Theory Building and Literature Review	<ul style="list-style-type: none"> The ability to exercise self-control relies upon standards, monitoring, and the capacity to change behavior. Initial studies support a Strength Model of Self-Control. Depleted self-control resources can increase buying and impulsive purchasing and, as a result. Ego Depletion Theory is a fruitful new avenue to pursue in consumer behavior research.

Baumeister et al. (1998)	Causes of depletion. Consequences of Depletion.	To examine whether using self-control depletes a cognitive resource, leading to a state of ego depletion. To examine whether ego depletion impacts subsequent self-control attempts.	Experiment	<ul style="list-style-type: none"> Resisting temptation (Exp 1), responsible choice (Exp 2), controlling emotions (Exp 3), and maintaining vigilance and focus (Exp 4) all led to depletion. Depletion subsequently led to decreased task persistence.
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Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Baumeister et al. (2007)	Model / Discussion	To review existing studies to reinforce and expand upon the Strength Model of Self-Control within Ego Depletion Theory.	Theory Building and Literature Review	<ul style="list-style-type: none"> Self-control practice can lead to improvements in self-control stamina. Expending self-control resources leads individuals to conserve remaining self-control resources. Depleted individuals can still exert self-control if sufficiently motivated. Consuming glucose may restore self-control resources. Automatic processes are relatively unaffected by ego depletion, while controlled and effortful processes are negatively impacted by depletion.
Beal et al. (2013)	Causes of depletion.	To examine whether affect spin - high trait variability of affective states - can partially mitigate ego depletion from regulating emotions.	Field Study	<ul style="list-style-type: none"> Self-presentation causes ego depletion. High trait variability of affective states buffers this effect.

Beedie and Lane (2012)	Discussion	To discuss whether glucose's role in ego depletion theory is one of allocation, rather than of limited supply.	Discussion	<ul style="list-style-type: none"> • Evolutionary developments give the brain sufficient resources and an effective delivery mechanism for glucose to support self-control. • Resources are allocated based upon personal priorities, which supports an allocation problem rather than one of limited supply.
Berkman and Miller-Ziegler (2012)	Discussion	To discuss possible underlying processes which cause ego depletion to occur.	Discussion	<ul style="list-style-type: none"> • Neuroimaging findings provide support for both the strength model of self-control and also the process model of self-control. • Neuroimaging can contribute towards a greater understanding of self-control and ego depletion going forward.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Bertrams et al. (2013)	Consequences of Depletion	To examine the role of self-control with respect to anxiety and cognitive test performance.	Experiment	<ul style="list-style-type: none"> • Anxiety, specifically the worry component, was negatively related to performance on verbal learning and mental arithmetic for depleted individuals, but not for non-depleted individuals.
Boucher and Kofos (2012)	Avoiding or Mitigating Depletion	To investigate whether the concept of money can mitigate ego depletion by increasing motivation.	Experiment	<ul style="list-style-type: none"> • Individuals who were primed to think of the concept of money showed decreased effects from ego depletion.
Brass et al. (2013)	Discussion	To discuss research on brain imaging and volition and how cognitive neuroscience and social psychology research can interact to more	Discussion	<ul style="list-style-type: none"> • Based upon the medial prefrontal cortex's role in voluntary action, self-control may be able to be studied using neuroimaging techniques. • Strong evidence exists for construing willpower as a regulatory function guided by the medial prefrontal

successfully study self-control and ego depletion.

cortex.

Bray et al. (2008)	Consequences of Depletion Markers of Depletion	To examine the effects of ego depletion on physical endurance performance and to examine whether depletion impacts electromyographic (EMG) activation.	Experiment	<ul style="list-style-type: none">• Depleted individuals showed significant degradation in their handgrip performance.• Depletion increases electromyographic (EMG) activation, which is commonly associated with stress and/or fatigue.
Bruyneel and Dewitte (2012)	Consequences of Depletion	To examine whether using self-control and subsequent ego depletion impacts individuals' construal levels.	Experiment	<ul style="list-style-type: none">• Depleted individuals engaged in lower-level construal than did non-depleted individuals.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Bruyneel et al. (2006)	Consequences of Depletion	To examine whether repeated active choice making increases susceptibility to affective product features.	Experiment	<ul style="list-style-type: none"> Depleted individuals are more likely to be attracted to emotionally affective products, despite being much more expensive.
Bruyneel et al. (2009)	Consequences of Depletion	To examine whether emotion regulation leads to ego depletion and whether depletion affects risky decision-making.	Experiment	<ul style="list-style-type: none"> Regulating negative affect or moods causes depletion. Depletion links negative affect or moods to increases in risky decision-making.
Burkley (2008)	Causes of depletion. Consequences of Depletion.	To examine whether resisting persuasion requires self-control resources (i.e., causes ego depletion) and whether ego depletion can inhibit the ability to resist persuasion.	Experiment	<ul style="list-style-type: none"> Resistance to persuasion caused ego depletion (Study 1). Ego depletion led to decreased resistance to persuasive arguments (Studies 2 and 3). Depleted individuals' resistance to persuasion was especially low for strong persuasive messages (Study 4).
Carter and McCullough (2014)	Discussion	To examine and discuss the possibility of a publication bias within the ego depletion research in psychology.	Meta-Analysis	<ul style="list-style-type: none"> Strong signals of publication bias. Possible indication that the depletion effect may not be statistically significant from zero.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Chatzisarantis and Hagger (2014a)	Discussion	To discuss the conflicting findings on glucose's role in restoring self-control resources.	Discussion	<ul style="list-style-type: none"> • Previous unsuccessful attempts to replicate the effect of glucose on ego depletion may result from the exclusion of important factors, such as motivation, from the experimental design. • Researchers should consider the ego-depleting value of self-control tasks when designing experiments to test the effects of glucose on depletion.
Chatzisarantis and Hagger (2014b)	Discussion	To discuss and highlight limitations of a previous unsuccessful attempt to replicate the effects of glucose on ego depletion.	Discussion	<ul style="list-style-type: none"> • Researchers who test the glucose hypothesis within ego depletion research should use dissimilar acts of self-control, due to the role of motivation in mitigating ego depletion.
Clarkson et al. (2010)	Avoiding or Mitigating Depletion	To examine the impact of perceived resource depletion on subsequent task performance.	Experiment	<ul style="list-style-type: none"> • Individuals who perceived themselves as less (more) depleted, regardless of actual levels of depletion, were more (less) successful at subsequent self-control attempts.
Converse and DeShon (2009)	Conservation of Self-Control	To examine whether the results of prior ego depletion literature were based upon the specific paradigm of using two tasks rather than more than two tasks.	Experiment	<ul style="list-style-type: none"> • An initial task caused ego depletion. • Individuals who were depleted initially performed better on a third task than did individuals who were not initially depleted. • Provides support for the conservation hypothesis within ego depletion theory.
Dahm et al. (2011)		To examine whether ego depletion affects both younger and older participants.	Experiment	<ul style="list-style-type: none"> • Younger participants (<25 years of age) were susceptible to depletion but older participants (40-65 years) were not.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Danziger et al. (2011)	Consequences of Depletion	To examine whether extraneous factors can influence judicial decision-making.	Archival	<ul style="list-style-type: none"> Judges who were deemed to be more depleted (i.e., making rulings later in a session) showed evidence of depletion via an increased propensity to rely on the status quo of denying parole.
De Langhe et al. (2008)	Consequences of Depletion	To examine whether ego depletion impacts risk aversion.	Experiment	<ul style="list-style-type: none"> Depleted individuals showed increase risk-aversion in mixed-gamble (gain/loss) situations than non-depleted individuals.
de Ridder et al. (2012)	Model / Discussion	To review and examine the role of trait self-control in a variety of behaviors.	Meta-Analysis	<ul style="list-style-type: none"> Self-control relates to the performance of desired behavior and the inhibition of undesired behaviors. The association between self-control and behavior is strong for automatic behavior than for controlled behavior. The Self-Control Scale is the only scale found to provide moderation of self-control and behavior.
Debey et al. (2012)	Causes of depletion.	To examine whether lying requires executive control (i.e., self-control) and therefore causes or is affected by ego depletion.	Experiment	<ul style="list-style-type: none"> Ego depletion does not reliably affect lying. Lying requires more executive control than truth telling, which results in depletion.
DeBono and Muraven (2013)	Consequences of Depletion	To examine whether individuals are automatically self-assured, or whether self-assurance requires self-control.	Experiment	<ul style="list-style-type: none"> Depleted participants demonstrated lower confidence in future performance, which resulted in more accurate predictions due to an overall propensity for all individuals to be overconfident.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
DeWall et al. (2008)	Consequences of Depletion	To examine whether failure to help is an individual's default response and, therefore, whether helping behavior requires self-control to override this default response.	Experiment	<ul style="list-style-type: none"> • Depletion reduced willingness to help others across all three studies. • Glucose undid this effect. • Willingness to help family members was not affected, but willingness to help strangers was.
Dvorak and Simons (2009)	Avoiding or Mitigating Depletion	To examine the relationship between trait-level self-control, ego depletion, and the ability of glucose to mediate the incidence of ego depletion.	Experiment	<ul style="list-style-type: none"> • Good trait-level self-control attenuated the effects of depletion on task persistence. The association between depletion and task persistence was partially mediated by glucose levels.
Egan et al. (2012)	Avoiding or Mitigating Depletion	To examine whether individuals can replenish self-control resources by vicariously taking the perspective of an individual who has done so.	Experiment	<ul style="list-style-type: none"> • Individuals who took the perspective of someone who had restored self-control resources demonstrated a reduced susceptibility to depletion. • This effect only holds if the target of perspective taking is viewed as similar to the participant.
Ent et al. (2012)	Model / Discussion	To review papers to examine the self-control requirements of exercising power in various ways.	Literature Review	<ul style="list-style-type: none"> • Exercising power through making decisions and leading can cause depletion.
Fennis et al. (2009)	Causes of depletion. Consequences of Depletion.	To examine why and how social influence techniques promote increased charitable behavior.	Experiment (Field and Laboratory)	<ul style="list-style-type: none"> • Allowing a foot-in-the-door request induced depletion (Exp 1 and 2). • Ego depletion mediated the effects of the initial request on compliance with the final charitable request (Exp 3). • Depletion fostered compliance through reliance upon compliance-promoting characteristics (e.g., reciprocity) (Exp 4-6).

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Ferrari and Pychyl (2007)	Causes of depletion.	To examine the effects of trait-level indecisiveness on performance speed, accuracy, and subsequent ego depletion.	Experiment	<ul style="list-style-type: none"> Exercising self-control led to ego depletion. Less decisive individuals who faced no feedback or negative feedback experienced greater ego depletion than did individuals who were more decisive. Less decisive individuals required greater self-control to maintain speed and accuracy of decisions.
Finkel et al. (2006)	Causes of depletion.	To examine whether inefficient social coordination on interpersonal tasks can impair the ability to exercise self-control.	Experiment	<ul style="list-style-type: none"> Experiencing high-maintenance interactions leads to ego depletion. This effect cannot be consciously mediated. Unconscious high-maintenance interactions also trigger depletion.
Fischer et al. (2007)	Consequences of Depletion	To examine whether self-control is necessary to generate positive illusions, such as sense of one's own abilities, control, and expectations about one's future.	Experiment	<ul style="list-style-type: none"> Depletion decreased optimism with respect to one's own abilities (Study 1), one's sense of subjective control (Study 2), and less optimistic expectations about one's future (Study 3). The underlying mechanism responsible for these findings is that depletion reduces the generation of positive self attributes (Studies 4 and 5) and reduces self-efficacy (Study 5).
Fischer et al. (2008)	Consequences of Depletion	To examine the relationship between self-control and confirmatory information processing (a preference for standpoint-consistent information to standpoint-inconsistent information).	Experiment	<ul style="list-style-type: none"> Ego depletion increases confirmatory information processing. The underlying mechanism is that depletion increases levels of commitment to an individual's own standpoint, which biases their information processing.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Fischer et al. (2012)	Consequences of Depletion	To examine the relationship between self-control and risk-taking behaviors and inclinations.	Experiment	<ul style="list-style-type: none"> Ego depletion leads to higher levels of sensation seeking (Study 1) and risk tolerance in traffic situations (Study 2). Neither cognitive load nor feelings of anger mediate this relationship (Study 3). The underlying mechanism that leads to increased risk taking is cognitive exhaustion from depletion (Study 4).
Freeman and Muraven (2010)	Causes of depletion.	To examine the relationship between task interruption and self-control resources.	Experiment	<ul style="list-style-type: none"> Task interruption causes ego depletion if the interruption occurs close to task completion. The desire to pursue a goal heightens as an individual nears completion, and it therefore requires more self-control to interrupt task performance.
Friese et al. (2012)	Recovery	To examine whether mindfulness meditation can restore depleted self-control resources.	Experiment	<ul style="list-style-type: none"> Depleted participants who performed a brief meditation exercise performed similarly to non-depleted participants. Mindfulness meditation seems to be a short-term way of replenishing self-control resources.
Fritz et al. (2010)	Recovery	To examine how specific recovery activities during the weekend are associated with affective states in the following week.	Longitudinal Study	<ul style="list-style-type: none"> Recovery experiences (e.g., relaxation, control, and detachment) significantly explained differences in affective states during the following workweek.
Fujita and Carnevale (2012)	Avoiding or Mitigating Depletion	To examine the role of construal levels in promoting self-control.	Theory Building and Literature Review	<ul style="list-style-type: none"> High-level construal (abstracting to goal-relevant features across classes of tasks or events) promotes greater self-control relative to lower-level (attending to idiosyncrasies of specific events).

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Gailliot and Baumeister (2007)	Recovery	To review existing findings on the link between self-control and glucose and propose a role for glucose in the recovery of self-control resources for the strength model of self-control.	Theory Building and Literature Review	<ul style="list-style-type: none"> Performing self-control acts depletes large amounts of glucose. Insufficient glucose available to the brain inhibits further self-control activities. Restoring glucose typically improves self-control. The human brain consumes glucose faster than it can replenish this resource; as a result, cognitive activities can deplete glucose and self-control.
Gailliot et al. (2007)	Causes of depletion.	To examine whether decreased glucose levels leads to ego depletion and decreased self-control.	Experiment.	<ul style="list-style-type: none"> Using self-control depletes glucose levels. Depleted glucose levels predict poorer subsequent task performance. Consuming a glucose drink counteracted this effect. Self-control requires acceptable levels of glucose to operate effectively.
Gailliot et al. (2012)	Consequences of Depletion	To examine whether ego depletion will increase social norm violations or violations of rules that conflict with an individual's desired actions.	Experiment.	<ul style="list-style-type: none"> Depletion causes individuals to violate social norms and rules that are effortful to follow. Lower trait-level self-control increases the propensity to take ethical risks. Depletion increases both ethical risk taking and violation of explicit rules.
Ghumman and Barnes (2013)	Recovery	To examine whether sleep plays a role in resource recovery to be able to inhibit prejudice.	Experiment.	<ul style="list-style-type: none"> Amounts of sleep influenced prejudice during the next day. The relationship between sleep and prejudice was marginally moderated by negative implicit associations (i.e., sleep primarily influenced prejudice in individuals who had high levels of negative implicit associations).

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Goto and Kusumi (2013)	Recovery	To examine whether rewarding the reinforcement of habitual actions can reduce ego depletion following self-control tasks.	Experiment.	<ul style="list-style-type: none"> Rewards can reduce the incidence of ego depletion if they are aimed at making task responses habitual.
Govorun and Payne (2006)	Consequences of Depletion	To examine the effects of ego depletion on both the automatic and controlled components of stereotype responses.	Experiment.	<ul style="list-style-type: none"> Ego depletion affected the controlled and effortful response processes but did not affect the automatic or heuristic response processes.
Greitemeyer et al. (2012)	Consequences of Depletion	To examine the effects of social exclusion on the propensity to engage in confirmatory information processing.	Experiment.	<ul style="list-style-type: none"> Social exclusion led to ego depletion. Ego depletion increased propensity to engage in confirmatory information processing. The authors posit that this relationship is due to depletion reducing individuals' willingness to confront negative affect associated with standpoint inconsistent information.
Hagger et al. (2010)	Model / Discussion	To perform a meta-analysis of previous ego depletion findings to help determine the strength of the findings.	Meta-Analysis	<ul style="list-style-type: none"> Ego depletion has a significant impact on self-control task performance. Motivation, practice/training, and glucose promoted better self-control among depleted participants. Findings support an ego depletion effect and the hypotheses from the strength model. Findings indicate a need to integrate other theories with the strength model to account for the effects of motivation and fatigue.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Halali et al. (2013)	Consequences of Depletion	To investigate the impact of ego depletion on behavior in ultimatum and dictator games to determine whether fairness is an automatic or deliberately-controlled cognitive act.	Experiment.	<ul style="list-style-type: none"> Depleted participants in the ultimatum game proposed a fair split more frequently than non-depleted participants. Depleted participants in the dictator game proposed a fair split significantly less frequently than non-depleted participants. Preference for fairness seems to be an automatic act, but also reflects some degree of concern for self-gain.
Hanif et al. (2012)	Avoiding or Mitigating Depletion	To examine whether manipulating attention through response inhibition and broadening attention focus can reduce the effects of ego depletion.	Experiment.	<ul style="list-style-type: none"> Both response inhibition and broadening of attention reduce the effects of ego depletion. This effect may occur due to increased salience of goal-related information and reduced attention to competing information.
Heatherton and Baumeister (1996)	Model / Discussion	To develop a comprehensive general theory of self-control/regulation.	Theory Building	<ul style="list-style-type: none"> Posits that self-control may rely on a depletable cognitive resource. Lays the foundation for the strength model of self-control.
Hofmann et al. (2007)	Consequences of Depletion	To examine whether available self-control resources determine the influences on individuals' behavior.	Experiment.	<ul style="list-style-type: none"> Ego depletion causes behavior to be influenced by automatic attitudes, whereas exercising self-control resources causes behavior to be influenced by personal standards.
Hofmann et al. (2012)	Model / Discussion	To examine the potential benefits of increased communication between social and cognitive psychology for understanding self-regulation.	Theory Building	<ul style="list-style-type: none"> Basic components of executive functioning (e.g., working memory, behavior inhibition, and task switching) may support self-regulation. Ego depletion underlies many situational risk factors identified in prior social psychology research. Training these executive functions can potentially improve self-regulation.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Imhoff et al. (2013)	Causes of depletion.	To examine the interaction of trait and situational self-control.	Experiment.	<ul style="list-style-type: none"> High trait self-control individuals experienced greater depletion from resisting temptation, engaging in risk-taking behavior, and motivating achievement. High trait self-control allows individuals to avoid impulse inhibition within their daily routine. As a result, they have less practice with exercising self-control.
Inzlicht and Gutsell (2007)	Consequences of Depletion	To examine neural mechanisms responsible for self-control failure.	Experiment.	<ul style="list-style-type: none"> Ego depletion reduces the sensitivity and responsiveness of individuals' neural systems to mismatches between their actions and their desired goals.
Inzlicht and Schmeichel (2012)	Model / Discussion	To explore a mechanistic model of ego depletion.	Theory Building	<ul style="list-style-type: none"> The authors propose a process model of ego depletion, where exercising self-control reduces motivation to engage in subsequent self-control and redirects attention to more gratifying behaviors.
Janssen et al. (2010)	Consequences of Depletion	To examine the role of self-control in determining the effectiveness social-influence techniques designed to induce compliance.	Experiment.	<ul style="list-style-type: none"> Yielding to initial requests induces depletion. Ego depletion increases extent of compliance by increasing the use of the heuristic principle of authority.
Job et al. (2010)	Avoiding or Mitigating Depletion	To examine whether belief in willpower theories influences the incidence of ego depletion.	Experiment.	<ul style="list-style-type: none"> Belief that willpower is not a limited resource mitigated the incidence of ego depletion. These beliefs can be manipulated and have the same effect.
Kehr et al. (2012)	Improving Self-Control	To examine whether long-term practice can improve individuals' self-control through resisting temptation.	Field Study	<ul style="list-style-type: none"> Practicing self-control through resisting the temptation to eat chocolate increased general and perceived self-control stamina.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Kelz et al. (2009)	Consequences of Depletion	To examine whether time-of-day in planned surgical care cases can influence the incidence of morbidity and mortality rates.	Archival.	<ul style="list-style-type: none"> Both morbidity and mortality rates increase dramatically throughout the day, which is consistent with depletion as a cause. Due to the archival methodology employed, the authors are unable to ascertain whether ego depletion was the underlying mechanism responsible for the reported findings.
Li et al. (2013)	Consequences of Depletion	To examine whether self-control impacts subsequent event-based prospective memory.	Experiment.	<ul style="list-style-type: none"> Ego depletion led to significantly worse event-based prospective memory. The effect of ego depletion on memory is mainly due to an impaired ability to engage in prospective memory (i.e., memories of activities to be performed in the future), rather than retrospective memory.
Martijn et al. (2002)	Causes of depletion. Avoiding depletion.	To examine whether ego depletion is partially reliant upon individuals' expectations of self-control being a limited resource.	Experiment.	<ul style="list-style-type: none"> Challenging individuals' expectations that self-control leads to decreased performance on a subsequent task moderated ego depletion (Study 1). Ego depletion is strongly influenced by individuals' expectations or schemata regarding self-control's role in performance (Study 2). The belief that self-control consumes energy was dominant among participants.
Martijn et al. (2007)	Avoiding or Mitigating Depletion	To examine whether priming of a persistent person can help to overcome ego depletion.	Experiment	<ul style="list-style-type: none"> Primes that followed high levels of self-control (i.e., for high levels of depletion) led to increased task persistence. Primes that followed low levels of self-control (i.e., for low levels of depletion) led to decreased task persistence when compared to a neutral prime.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Masicampo and Baumeister (2008)	Avoiding or Mitigating Depletion. Consequences of depletion.	To examine whether glucose can restore self-control resources and to examine whether self-control resources and glucose directly affect the type of processing utilized.	Experiment.	<ul style="list-style-type: none"> • Depletion led to increased use of heuristic processing and decreased use of effortful and controlled processing. • Glucose reduces the effects of ego depletion.
Mead et al. (2009)	Consequences of Depletion	To examine whether honesty requires self-control resources to properly function.	Experiment.	<ul style="list-style-type: none"> • Depletion leads individuals to misrepresent their performance for monetary gain to a larger extent than non-depleted individuals (Study 1). • Depleted individuals are more likely to expose themselves to the temptation to cheat (Study 2). • Individuals are unable to predict when they are depleted.
Milkman (2012)	Causes of depletion.	To examine whether uncertainty leads to ego depletion and impacts the ability to exercise self-control.	Experiment.	<ul style="list-style-type: none"> • Coping with uncertainty leads to depletion and increases impulsiveness. • This effect occurs in the face of real uncertainty, when salience of uncertainty is heightened, and when individuals must make choices regarding outcomes of uncertain future events. • Reducing uncertainty should reduce individuals' depletion.
Moller et al. (2006)	Causes of depletion. Avoiding depletion.	To examine whether autonomy in choice mitigates the amount of ego depletion incurred.	Experiment	<ul style="list-style-type: none"> • Autonomous choice, when compared to controlled choice, led to lower levels of ego depletion.
Muraven (2008)	Causes of depletion. Avoiding depletion.	To examine whether autonomously motivated self-control is less depleting than other forms of self-control.	Experiment.	<ul style="list-style-type: none"> • Autonomously motivated individuals incurred less ego depletion than other individuals. • Being compelled to exercise self-control is more depleting than freely exercising self-control.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Muraven (2010)	Improving Self-Control	To examine whether self-control can be improved with long-term practice.	Experiment.	<ul style="list-style-type: none"> Individuals who practiced self-control tasks for two weeks increased their self-control stamina or capacity. Individuals who believed they were practicing self-control but whose tasks did not actually require self-control did not show a similar increase.
Muraven and Baumeister (2000)	Model / Discussion	To review existing findings on self-control and develop a model of self-control.	Theory Building and Literature Review	<ul style="list-style-type: none"> A strength model best describes the effect of self-control on task performance. Self-control is necessary to use the executive component of the self to control behavior. Individuals have a finite capacity for self-control. All self-control acts draw upon the same limited resource. An individual's success at exercising self-control depends upon their available self-control resources. Self-control acts reduce available self-control resources, incurring a state of ego depletion.
Muraven and Slessareva (2003)	Avoiding or Mitigating Depletion	To examine whether depletion and motivation jointly determine self-control performance.	Experiment.	<ul style="list-style-type: none"> Motivation increases self-control performance, despite depletion. Depletion only affects tasks that require self-control, but not tasks that are difficult but contain no self-control requirement.
Muraven et al. (1998)	Causes of depletion.	To examine why self-regulation may fail. Specifically, to investigate whether individuals have a limited capacity for exercising self-control.	Experiment.	<ul style="list-style-type: none"> Regulating one's emotions subsequently decreased self-control on a physical stamina test (Exp. 1). Suppressing thoughts subsequently decreased task persistence (Exp. 2). Suppressing thoughts impaired the ability to control emotion (Exp. 3). Recounting prior self-control failures led to decreased self-regulation (Exp. 4). The strength model of self-control better fits these findings than activation, skill, priming, or constant capacity models.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Muraven et al. (1999)	Improving Self-Control	To examine whether self-control can be improved with long-term practice.	Experiment.	<ul style="list-style-type: none"> Individuals who practiced one of three self-control exercises for two weeks performed significantly better on task persistence following a thought-suppression task than did individuals in a control group.
Muraven et al. (2006)	Conservation of Self-Control	To examine whether individuals conserve self-control resources when they are faced with future tasks.	Experiment.	<ul style="list-style-type: none"> Depleted individuals who anticipated future self-control tasks performed more poorly on an intermediate self-control task than did those who did not expect a future self-control task. However, those who conserved strength on the intermediate task performed better on the final task, compared to those who had not conserved strength. These findings lend support to the conservation hypothesis within the strength model of self-control.
Muraven et al. (2007)	Causes of depletion.	To examine whether autonomously motivated self-control is less depleting than other forms of self-control.	Experiment.	<ul style="list-style-type: none"> Individuals who had performance-contingent rewards (i.e., controlled self-control) experienced greater levels of ego depletion than did individuals who faced non-contingent rewards.
Muraven et al. (2008)	Causes of depletion.	To examine whether autonomously motivated self-control is less depleting than other forms of self-control.	Experiment.	<ul style="list-style-type: none"> Individuals whose autonomy was supported during self-control exertion experienced less ego depletion than those who had more pressure placed upon them during self-control exertion. Feelings of autonomy support increased feelings of subjective vitality, which mediated the relation between autonomy support and depletion.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Niven et al. (2013)	Causes of depletion.	To examine whether higher ability to regulate emotions reduces the impact of emotion regulation on glucose reduction and ego depletion.	Experiment.	<ul style="list-style-type: none"> Individuals who are good at emotion regulation do not experience a significant decrease in glucose levels from performing emotion regulation tasks, while individuals who are poor at emotion regulation do experience a significant decrease in glucose levels.
Oaten and Cheng (2006a)	Improving Self-Control	To examine whether self-control can be improved with long-term practice.	Experiment.	<ul style="list-style-type: none"> Individuals in a long-term study plan showed significant improvements in self-control capacity.
Oaten and Cheng (2006b)	Improving Self-Control	To examine whether self-control can be improved with long-term practice.	Experiment.	<ul style="list-style-type: none"> Individuals in a long-term exercise plan showed significant improvements in self-control capacity.
Oaten and Cheng (2007)	Improving Self-Control	To examine whether self-control can be improved with long-term practice.	Experiment.	<ul style="list-style-type: none"> Individuals in a long-term financial monitoring program showed significant improvements in self-control capacity.
Otgaar et al. (2011)	Consequences of Depletion	To examine whether depleted self-control can lead to increased susceptibility to suggestion.	Experiment.	<ul style="list-style-type: none"> Ego depletion increased individuals' susceptibility to suggestion. That is, individuals were more likely to incorporate suggested information into their memories.
Otgaar et al. (2012)	Consequences of Depletion	To examine whether depleted cognitive resources can increase neutral or negative spontaneous false memories.	Experiment	<ul style="list-style-type: none"> Ego depletion increased the production of false memories. Ego depletion did not impact the recollection of true memories.
Pocheptsova et al. (2009)	Consequences of Depletion	To examine whether using self-control impacts subsequent intuitive reasoning.	Experiment.	<ul style="list-style-type: none"> Ego depletion reduces individuals' ability to engage in effortful and deliberative processing, leaving them to rely on more automatic and intuitive modes of processing.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Reinhard et al. (2013)	Consequences of Depletion	To examine whether ego depletion impacts the ability to detect deception.	Experiment.	<ul style="list-style-type: none"> Ego depletion reduced judges' ability to detect deception. This effect was caused by ego depletion increasing the difficulty of relying on verbal content information.
Sanders et al. (2012)	Recovery	To examine whether gargling with a glucose rinse can restore self-control resources.	Experiment.	<ul style="list-style-type: none"> Glucose rinsing improved self-control performance following depletion. Because the glucose was not ingested, it is likely that this effect occurs non-metabolically.
Schmeichel (2007)	Causes of depletion. Consequences of Depletion.	To examine whether initial executive control efforts undermine subsequent executive control efforts.	Experiment.	<ul style="list-style-type: none"> Attention control (Exp. 1), inhibiting tendencies (Exp. 2), using working memory (Exp. 3), and exaggerating emotional responses (Exp. 4) all led to ego depletion. Depletion inhibited performance of working memory and response inhibition.
Schmeichel and Vohs (2009)	Avoiding or Mitigating Depletion	To examine whether self-affirmation can mitigate the incidence of ego depletion.	Experiment.	<ul style="list-style-type: none"> Self-affirmation improves self-control when individuals are depleted (Exp. 1 and 2). Self-affirmation increases the use of high- (as opposed to low-) level construals, which mediates the relationship between self-affirmation and self-control.
Schmeichel et al. (2003)	Consequences of Depletion	To examine the role of self-control in intelligent thought.	Experiment.	<ul style="list-style-type: none"> Ego depletion decreased performance on logic and reasoning, cognitive extrapolation, and thoughtful reading comprehension. Ego depletion did not impact general knowledge, or memorization and recall of nonsense syllables. Ego depletion therefore hinders controlled and effortful processing, while having no impact on automatic or heuristic processing.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Schmeichel et al. (2006)	Causes of depletion.	To examine whether response exaggeration leads to ego depletion.	Experiment.	<ul style="list-style-type: none"> Response exaggeration led to ego depletion in the form of decreased cognitive fluency.
Seeley and Gardner (2003)	Avoiding or Mitigating Depletion	To examine whether different cultural features can mitigate ego depletion.	Experiment.	<ul style="list-style-type: none"> Individuals from collectivist cultures that are more "other-oriented" are less susceptible to ego depletion, due to chronic socially-motivated exertion of self-control.
Seegerstrom and Nes (2007)	Markers of Depletion	To examine whether there are physiological markers of ego depletion.	Experiment.	<ul style="list-style-type: none"> Individuals performing depleting tasks exhibit higher heart rate variability than those performing non-depleting tasks. Heart rate variability is a marker or indicator of ego depletion.
Shamosh and Gray (2007)	Causes of depletion.	To examine whether ego depletion varies with individual differences in fluid intelligence (gF).	Experiment.	<ul style="list-style-type: none"> Individuals with higher levels of fluid intelligence, a measure of cognitive capacity tied to the executive function, experienced higher levels of depletion.
Tangney et al. (2004)	Development of Self-Control Measure	To create a measure of an individual's trait level of self-control.	Psychometrics	<ul style="list-style-type: none"> The Self-Control Scale and the Brief Self-Control Scale both appropriately measure an individual's trait level self-control. High trait self-control is correlated with better GPA, higher self-esteem, less pathology, and better interpersonal skills.
Tice et al. (2007)	Recovery	To examine whether positive mood or affect can counteract ego depletion.	Experiment.	<ul style="list-style-type: none"> Inducing positive affect reduces ego depletion compared to sad or neutral stimuli or a brief rest period.
Tyler (2008)	Causes of depletion. Consequences of Depletion.	To examine whether monitoring for relational cues (e.g., verbal and/or nonverbal expressions) causes and/or is impacted by depletion.	Experiment.	<ul style="list-style-type: none"> Monitoring others for relational cues leads to ego depletion. Ego depletion inhibits the ability to effectively monitor for relational cues.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Tyler and Burns (2008)	Recovery	To examine methods by which individuals can recover self-control resources.	Experiment.	<ul style="list-style-type: none"> Depleted individuals who had a 10-minute break between tasks performed equivalent to non-depleted individuals. Inducing relaxation restores self-control performance.
Tyler and Burns (2009)	Conservation of Self-Control	To examine individuals' motivation to conserve self-control resources.	Experiment.	<ul style="list-style-type: none"> Individuals who believe they will face additional self-control requirements conserve self-control resources and thus perform more poorly on an intermediate task.
Unger and Stahlberg (2011)	Consequences of Depletion	To examine whether ego depletion impacts individuals' risk-taking behavior.	Experiment.	<ul style="list-style-type: none"> Ego depletion reduced individuals' propensity to engage in risky behavior. Ego depletion did not enhance habitual risk seeking or risk-avoidance strategies.
Van Dillen et al. (2013)	Avoiding or Mitigating Depletion	To examine whether cognitive load can have beneficial effects on ego depletion.	Experiment.	<ul style="list-style-type: none"> High cognitive load lessened the effects of ego depletion by prohibiting individuals from viewing alternatives as tempting and, thus, avoiding the need to inhibit impulses to engage in tempting behavior.
Vohs and Heatherton (2000)	Causes of depletion.	To examine whether the ability to exercise self-control relies upon an exhaustible resource.	Experiment.	<ul style="list-style-type: none"> Resisting the urge to eat tempting snacks or suppressing emotions led to ego depletion. These studies support a limited-strength model of ego depletion.
Vohs and Schmeichel (2003)	Consequences of Depletion	To examine the relationship between self-control resources and subjective perceptions of time.	Experiment.	<ul style="list-style-type: none"> Ego depletion led individuals to have lower persistence on a task, but to estimate that they persisted much longer. Ego depletion therefore increases the subjective experience of time, which accounts for individuals decreased persistence on tasks when depleted.
Vohs et al. (2005)	Causes of depletion. Consequences of Depletion.	To examine the role of self-control resources in self-presentation actions.	Experiment.	<ul style="list-style-type: none"> Self-presentation under difficult or counter normative patterns led to ego depletion. Ego depletion subsequently leads to less successful self-presentation behavior.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Vohs et al. (2008)	Causes of depletion.	To examine whether the act of choosing requires self-control resources.	Experiment.	<ul style="list-style-type: none"> • Making choices leads to ego depletion. • Actually making choices leads to ego depletion, while simply deliberating, forming preferences, or implementing the choices of another are not.
Wallace and Baumeister (2002)	Causes of depletion.	To examine whether a limited strength model or self-attribution model better fits ego depletion.	Experiment.	<ul style="list-style-type: none"> • Neither success nor failure feedback following a depleting task had an impact on observed levels of ego depletion. This finding contradicts the self-attribution model as fitting the findings of ego depletion.
Wan and Sternthal (2008)	Avoiding or Mitigating Depletion	To examine whether simple monitoring of performance can mitigate the incidence of ego depletion.	Experiment.	<ul style="list-style-type: none"> • Individuals who monitored their performance did not display patterns of ego depletion, while those who did not monitor their performance did.
Webb and Sheeran (2003)	Avoiding or Mitigating Depletion	To examine whether implementation intentions (e.g., statements of the form: "as soon as X occurs, I will initiate Y goal-directed behavior) can reduce ego depletion resulting from self-control use.	Experiment.	<ul style="list-style-type: none"> • Forming implementation intentions decreased individuals' susceptibility to ego depletion. • Implementation intentions essentially convert future behavior to automatic processing, which does not cause and is unaffected by ego depletion.
Wenzel et al. (2013)	Avoiding or Mitigating Depletion	To examine the cognitive processes underlying self-control and examine ways of mitigating ego depletion.	Experiment.	<ul style="list-style-type: none"> • If individuals performed different self-control tasks back-to-back then inducing positive affect reduced the effects of depletion. • If individuals performed the same self-control tasks back-to-back then inducing positive affect caused incremental ego depletion.

Table 1 continued

Citation	Main topic(s)	Purpose	Research method	Key findings
Wheeler et al. (2007)	Consequences of Depletion	To examine the role of self-control in resisting persuasion.	Experiment.	<ul style="list-style-type: none"> Ego depletion increased individuals' susceptibility to persuasion. Creating a counter-arguments is undermined when you are depleted.
Xu et al. (2012)	Consequences of Depletion.	To examine whether ego depletion affects guilty feelings and/or prosocial behavior.	Experiment.	<ul style="list-style-type: none"> Ego depletion decreased feelings of guilt and prosocial behavior. Decreased guilt moderated the relationship between ego depletion and decreased prosocial behavior.

Table 2.1: Exploratory Survey Results

#	Question	Mean	SD	Median	Min	Max
1	Rank within the firm.	All participants were senior associates.				
2	Years worked with the firm.	3.78	0.99	4.00	1.00	6.50
3	Number of busy seasons in the previous 12 months.	3.10	1.74	3.00	1.00	7.00

#	Question	Prediction (Within vs. Outside)	Mean		t	p-value
			Within Busy Season	Outside Busy Season		
4	My percentage of work time spent BEFORE 8am and AFTER 5pm for an average day within busy season and outside of busy season is:	Greater	81.48%	39.38%	7.6563	<0.001
5	In the morning, when I arrive at work, I feel mentally fresh.	Less	3.321	5.393	-5.0986	<0.001
6	In a typical day at work I make choices that have a significant impact on the conduct of the audit.	Greater	6.357	5.464	3.1332	0.002
7	When I leave work, I feel as mentally fresh as when I arrive.	Less	2.25	3.107	-1.912	0.031
8	I feel "used up" mentally at the end of the workday.	Greater	5.929	4.036	4.6961	<0.001
9	In a typical day at work I help supervisors make audit-related choices or decisions.	Greater	5.75	4.857	2.6369	0.005
10	At the end of the workday, I feel as though I could continue to work effectively.	Less	2.286	4.214	-4.7538	<0.001
11	In a typical day at work I help subordinates make audit-related choices or decisions	Greater	6.107	5.714	1.2359	0.111
12	I typically do not exercise judgment on a daily basis while at work.	Less	1.286	1.75	-2.0451	0.023
13	Judgments that I make at work do not have an impact on my team's ability to complete the audit.	Less	1.286	1.893	-2.6266	0.006
*24	In an average week I am able to participate in leisure activities a total of _____ hours per week	< 1.0	0.283 1		-25.4921	<0.001
25	If I am unable to participate in leisure activities as much as I'd like per week, the primary reason(s) for this are: Work-related (1) or Personal/Family-related (0)	Greater	100%	60.70%	4.1798	<0.001
26	During a typical day, I tend to make subjective judgments that have a significant impact on the conduct of the audit (1 = much more frequently outside of busy season; 4 = at an equal rate within or outside of busy season; 7 = much more frequently within busy season)	> 4.0	5.556		7.2111	<0.001
27	Number of periods of the day that auditors indicate that they work outside of and within busy season ²	Greater	10.5	8.786	3.8018	<0.001

* Note that the questions jump from 13 to 24 because questions 14-22 were repetitions of questions 5-13. 5-13 (14-22) addressed subject responses to outside of (within) busy season.

¹ <1 indicates that individuals participate in fewer hours of leisure activities within busy season than they do outside of busy season.

² Note that this was not directly posed to the participants. Rather, participants were asked to fill in which periods, in 1.5 hour increments, they did not work by dictating "N/A" and to rank the periods in which they did work in order of when they mentally feel the sharpest (1) to least sharp (highest applicable value). The averages reported here are the number of periods in the grid for which they did not dictate "N/A."

Table 2.2: Descriptive Statistics by Observation Time

Panel A: Professional Auditors

Variable	Outside of Busy Season (n = 26)					Within Busy Season (n = 26)				
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Time	1.12	0.32	1.06	0.44	1.73	1.02	0.3	0.98	0.26	1.73
CongruentScore	30.00	0.00	30.00	30.00	30.00	30.00	0.00	30.00	30.00	30.00
IncongruentScore	28.84	1.39	29.00	24.00	30.00	29.32	0.98	30.00	26.00	30.00
StroopDifficulty	2.46	1.24	2.00	1.00	5.00	2.04	0.82	2.00	1.00	4.00
StroopFamiliarity	2.23	1.37	2.00	1.00	5.00	2.50	1.10	2.00	1.00	4.00
Age	27.75	3.68	26.25	23.50	36.00	27.97	3.68	26.38	23.50	36.00
AuditExp	46.12	31.93	34.50	5.00	119.00	49.96	31.92	38.50	8.00	123.00
Position	1.81	0.80	2.00	1.00	3.00	1.96	0.72	2.00	1.00	3.00
HoursWkd	44.46	9.31	45.00	18.00	64.00	59.08	8.65	60.00	32.00	75.00
Deadlines	2.12	1.42	2.00	0.00	6.00	3.62	2.33	3.50	0.00	10.00
Sleep	7.20	0.81	7.50	5.25	8.50	7.00	0.77	7.00	5.00	8.50
Mood	7.96	1.75	8.50	4.00	11.00	7.31	1.89	8.00	4.00	10.00
TraitSC	45.35	7.13	46.50	33.00	55.00	44.85	7.36	46.00	33.00	59.00
Stress	37.19	5.22	36.00	27.00	51.00	40.08	6.18	40.00	29.00	52.00
ProfSkep	130.54	10.47	132.00	114.00	161.00	128.92	10.33	128.50	112.00	154.00

Note. Time = reaction time on Stroop trials. CongruentScore (IncongruentScore) is the participant's score, out of 30, on the Congruent (Incongruent) items in the task. StroopDifficulty (StroopFamiliarity) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. Age is the participant's age in years. AuditExp is the participant's experience with auditing, provided in months. Position is the participant's rank within the firm where 1= staff, 2 = senior, 3 = manager. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has had in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180.

Panel B: Auditing Students

Variable	Outside of Final Exam Time (n=53)					Within Final Exam Time (n=53)				
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Time	1.16	0.33	1.10	0.34	1.77	1.03	0.31	0.97	0.34	1.77
CongruentScore	29.87	0.38	30.00	28.00	30.00	29.93	0.25	30.00	29.00	30.00
IncongruentScore	29.44	0.78	30.00	27.00	30.00	29.18	1.26	30.00	25.00	30.00
StroopDifficulty	2.53	1.30	2.00	1.00	6.00	2.64	1.44	2.00	1.00	7.00
StroopFamiliarity	2.58	1.15	2.00	1.00	5.00	3.75	1.14	4.00	2.00	7.00
Age	22.25	1.96	21.90	20.50	31.00	22.46	1.84	22.00	20.50	31.00
Year	3.72	0.77	4.00	3.00	5.00	3.74	0.76	4.00	3.00	5.00
GPA	3.54	0.29	3.60	2.70	4.00	3.56	0.30	3.60	2.70	4.00
HoursWkd	29.42	17.44	27.50	1.00	100.00	45.89	20.99	45.00	12.00	110.00
Deadlines	3.28	2.26	3.00	1.00	12.00	3.25	1.70	3.00	0.00	10.00
Sleep	7.46	0.85	8.00	5.00	9.00	6.73	1.04	7.00	4.00	9.00
Mood	7.26	2.28	7.00	1.00	11.00	6.08	1.80	6.00	2.00	10.00
TraitSC	43.85	8.31	44.00	19.00	58.00	42.70	8.58	44.00	16.00	59.00
Stress	36.74	6.70	36.00	24.00	58.00	39.96	7.31	41.00	26.00	58.00
ProfSkep	134.62	15.13	134.00	91.00	166.00	132.28	15.87	133.00	105.00	174.00

Note. Time = reaction time on Stroop trials. CongruentScore (IncongruentScore) is the participant's score, out of 30, on the Congruent (Incongruent) items in the task. StroopDifficulty (StroopFamiliarity) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. Age is the participant's age in years. Year is the participant's year in school where 1 = Freshman, 2 = Sophomore, 3 = Junior, 4 = Senior, 5 = Graduate student. GPA is the participant's GPA on a 4-point scale. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has had in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180.

Table 2.3: Tests of Descriptive Statistics

Panel A: Professional Auditors

Variable	<i>OBS Mean</i>	<i>WBS Mean</i>	<i>Prediction WBS vs. OBS</i>	<i>t</i>	<i>p</i>
StroopDifficulty	2.46	2.04	Less	-1.449	0.077
StroopFamiliarity	2.23	2.50	Greater	0.782	0.219
HoursWkd	44.46	59.08	Greater	5.864	<.001
Deadlines	2.12	3.62	Greater	2.798	0.004
Sleep	7.20	7.00	Less	-0.917	0.182
Mood	7.96	7.31	Less	-1.292	0.101
TraitSC	45.35	44.85	N/A	-0.249	0.805
Stress	37.19	40.08	Greater	1.818	0.038
ProfSkep	130.54	128.92	N/A	-0.650	0.578

Panel B: Auditing Students

Variable	<i>OBS Mean</i>	<i>WBS Mean</i>	<i>Prediction WBS vs. OBS</i>	<i>t</i>	<i>p</i>
StroopDifficulty	2.53	2.64	Less	0.425	0.664
StroopFamiliarity	2.58	3.75	Greater	5.253	<.001
HoursWkd	29.42	45.89	Greater	4.394	<.001
Deadlines	3.28	3.25	Greater	-0.097	0.539
Sleep	7.46	6.73	Less	-3.969	<.001
Mood	7.26	6.08	Less	-2.982	0.002
TraitSC	43.85	42.70	N/A	-0.701	0.485
Stress	36.74	39.96	Greater	2.369	0.010
ProfSkep	134.62	132.28	N/A	-0.777	0.439

Note. StroopDifficulty (StroopFamiliarity) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has had in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180.

Table 2.4: ANOVA of Reaction Times (All Participants)

<i>Source</i>	<i>Partial SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Model	520.988	201	2.592	52.520	0.000
Busy	12.731	1	12.731	257.960	0.000
Professional	2.330	1	2.330	47.220	0.000
Busy*Professional	0.385	1	0.385	7.800	0.005
Incongruent	0.990	1	0.990	20.060	0.000
Question	160.352	117	1.371	27.770	0.000
Participant	245.055	80	3.063	62.070	0.000
Residual	461.794	9357	0.049		
Total	982.782	9558	0.103		
n	9559				
Adj. R ²	0.520				

Table 2.5: Linear Mixed-Effects Regression Analysis of Reaction Times (All Participants)

<i>Variable</i>	<i>Prediction</i>	<i>Coeff</i> <i>(Robust SE)</i>
<i>Intercept</i>	<i>N/A</i>	0.859*** (.046)
<i>Busy</i>	+	0.129*** (.023)
<i>Incongruent</i>	+	0.193*** (.010)
<i>Professional</i>	+/-	-0.037 (.061)
<i>StartTime</i>	+	0.135** (.066)
<i>StroopDiff</i>	+	0.117*** (.040)
<i>StroopFam</i>	-	0.013 (.048)
<i>Age</i>	+/-	0.236 (.243)
<i>HoursWkd</i>	+/-	-0.090* (.052)
<i>Deadlines</i>	+/-	-0.008 (.047)
<i>Sleep</i>	+/-	-0.098 (.079)
<i>Mood</i>	+/-	-0.071* (.042)
<i>TraitSC</i>	+/-	0.158 (.100)
<i>Stress</i>	+	0.115 (.108)
<i>ProfSkep</i>	+/-	0.215 (.168)
<i>OverallQuestion</i>	-	-0.549*** (.025)
<i>Busy X Incongruent</i>	+	0.019** (.011)
<i>Busy X Professional</i>	+	0.047** (.025)

N = 9,559

R² = .1806

Note. Busy is a dummy variable set to 0 (1) for OBS (WBS) observations. Incongruent is a dummy variable set to 0 (1) for congruent (incongruent) trials. Professional is a dummy variable set to 0 (1) for student (professional) trials. StartTime is the average time when individuals started the experiment. StroopDiff (StroopFam) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. TimeToStart is the amount of time elapsed between arriving at work and beginning the experiment. CPA is a dummy variable set to 0 (1) if the individual is not (is) a CPA. Gender is 0 (1) for females (males). Age is the participant's age in years. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has gotten in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. OverallQuestion is a measure from 1 to 120 that corresponds to the overall trial number for that individual for that observation (e.g., first session 30th question would be 30, while second session 30th question would be 90). Busy*Incongruent is an interaction term of the two previously mentioned dummy variables. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Table 2.6: Analysis of Reaction Times for Correct Observations

Panel A: Professional Auditors

<i>Variable</i>	<i>Prediction</i>	<i>Coeff</i> <i>(Robust SE)</i>
<i>Intercept</i>	<i>N/A</i>	0.757*** (.220)
<i>Busy</i>	+	0.238*** (.035)
<i>Incongruent</i>	+	0.219*** (.016)
<i>StartTime</i>	+	0.456 (.632)
<i>StroopDiff</i>	+	0.130** (.070)
<i>StroopFam</i>	-	0.046 (.065)
<i>TimeToStart</i>	+	-0.104 (.105)
<i>AuditExp</i>	-	-0.475*** (.138)
<i>NonCPA</i>	+/-	-0.066* (.038)
<i>Gender</i>	+/-	-0.088 (.060)
<i>Age</i>	+/-	0.913*** (.233)
<i>HoursWkd</i>	+/-	-0.246** (.123)
<i>Deadlines</i>	+/-	-0.078 (.095)
<i>Sleep</i>	+/-	-0.230 (.169)
<i>Mood</i>	+/-	-0.134 (.097)
<i>TraitSC</i>	+/-	0.481 (.325)
<i>Stress</i>	+	0.420** (.214)
<i>ProfSkep</i>	+/-	-0.082 (.383)
<i>OverallQuestion</i>	-	-0.571*** (.030)
<i>Busy X Incongruent</i>	+/-	-0.026 (.019)

N = 3,071

R² = .2195

Note. Busy is a dummy variable set to 0 (1) for OBS (WBS) observations. Incongruent is a dummy variable set to 0 (1) for congruent (incongruent) trials. StartTime is the average time when individuals started the experiment. StroopDiff (StroopFam) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. TimeToStart is the amount of time elapsed between arriving at work and beginning the experiment. CPA is a dummy variable set to 0 (1) if the individual is not (is) a CPA. Gender is 0 (1) for females (males). Age is the participant's age in years. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has gotten in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. OverallQuestion is a measure from 1 to 120 that corresponds to the overall trial number for that individual for that observation (e.g., first session 30th question would be 30, while second session 30th question would be 90). Busy*Incongruent is an interaction term of the two previously mentioned dummy variables. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Panel B: Auditing Students

<i>Variable</i>	<i>Prediction</i>	<i>Coeff (Robust SE)</i>
<i>Intercept</i>	<i>N/A</i>	0.846*** (.043)
<i>Busy</i>	+	0.131*** (.026)
<i>Incongruent</i>	+	0.183*** (.012)
<i>StartTime</i>	+	0.136** (.066)
<i>StroopDiff</i>	+	0.089** (.047)
<i>StroopFam</i>	-	-0.029 (.056)
<i>Gender</i>	+/-	0.016 (.045)
<i>GPA</i>	+/-	0.200 (.200)
<i>Year</i>	+/-	0.124 (.149)
<i>Age</i>	+/-	0.271 (.446)
<i>HoursWkd</i>	+/-	-0.081 (.052)
<i>Deadlines</i>	+/-	-0.027 (.058)
<i>Sleep</i>	+/-	-0.060 (.087)
<i>Mood</i>	+/-	-0.052 (.044)
<i>TraitSC</i>	+/-	0.133 (.114)
<i>Stress</i>	+	0.026 (.107)
<i>ProfSkep</i>	+/-	0.177 (.198)
<i>OverallQuestion</i>	-	-0.546*** (.035)
<i>Busy X Incongruent</i>	+	0.040*** (.013)

N = 6,439
R² = .1925

Note. Busy is a dummy variable set to 0 (1) for OBS (WBS) observations. Incongruent is a dummy variable set to 0 (1) for congruent (incongruent) trials. StartTime is the average time when individuals started the experiment. StroopDiff (StroopFam) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. Gender is 0 (1) for females (males). GPA is the participant's overall grade point average. Year is the participant's year in school, where 1 = Freshman, 2 = Sophomore, 3 = Junior, 4 = Senior, 5 = Graduate student. Age is the participant's age in years. HoursWkd is the participant's self-reported hours in the prior week. Deadlines is the participant's self-reported number of significant deadlines in the upcoming week. Sleep is the average hours of sleep per night the participant has gotten in the previous week. Mood is a 10-point Likert scale measure of the participant's mood, where 1 = very unpleasant and 10 = very pleasant. TraitSC is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Stress is the participant's score on the Perceived Stress Scale (Cohen et al. 1983) out of a maximum of 70. ProfSkep is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. OverallQuestion is a measure from 1 to 120 that corresponds to the overall trial number for that individual for that observation (e.g., first session 30th question would be 30, while second session 30th question would be 90). Busy X Incongruent is an interaction term of the two previously mentioned dummy variables. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Table 3.1: Assumptions Underlying the Strength Model of Self-Control

- 1 Individuals require self-control to use the executive component of the self; the executive component makes decisions and initiates/interrupts various types of behavior
- 2 Self-control is limited, due to its reliance on a finite set of cognitive resources that can become depleted.
- 3 While all individuals possess self-control resources and use them in a similar manner, individuals likely differ in their overall amount of self-control resources.
- 4 The success of any self-control act is contingent upon the individual's current level of self-control resources available for use.
- 5 Self-control resources are expended by using self-control, which reduces the available set of resources for future self-control acts.

Table 3.2: Descriptive Statistics for all Participants**Panel A: Processing Treatment**

Variable	Processing (n = 214)				
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Rating	4.50	1.58	5.00	1.00	7.00
Alternatives	1.79	1.21	2.00	0.00	7.00
ValidAlt	1.35	1.20	1.00	0.00	6.00
Gender	0.51	0.50	1.00	0.00	1.00
T1Exp	2.43	1.41	2.00	1.00	6.00
Mood	1.17	1.50	1.00	-2.00	5.00
SC	44.66	7.60	45.00	22.00	57.00
ProfSkep	129.07	14.58	129.00	99.00	157.00

Panel B: Inhibition Treatment

Variable	Inhibition (n = 207)				
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Rating	4.30	1.59	4.00	1.00	7.00
Alternatives	1.72	1.16	1.00	0.00	5.00
ValidAlt	1.32	1.22	1.00	0.00	5.00
Gender	.049	0.50	0.00	0.00	1.00
T1Exp	2.11	1.20	2.00	1.00	6.00
Mood	0.90	1.80	0.00	-5.00	5.00
SC	42.57	7.04	42.00	29.00	58.00
ProfSkep	124.05	14.33	122.00	99.00	161.00

Panel C: Vigilance Treatment

Variable	Vigilance (n = 204)				
	<i>M</i>	<i>SD</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Rating	3.93	1.70	4.00	1.00	7.00
Alternatives	1.79	1.33	1.00	0.00	7.00
ValidAlt	1.36	1.28	1.00	0.00	7.00
Gender	0.50	0.50	1.00	0.00	1.00
T1Exp	4.75	1.80	5.00	1.00	7.00
Mood	1.88	1.72	2.00	-2.00	5.00
SC	44.00	7.05	44.00	27.00	64.00
ProfSkep	127.79	14.58	127.00	89.00	163.00

Table 3.3: Participants' Reaction Times – Stroop Task*Panel A: ANOVA (H1 Test)*

<i>Source</i>	<i>Partial SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Model	282.634	162	1.745	28.900	0.000
Treatment	0.666	2	0.333	5.520	0.004
Participant	143.694	121	1.188	19.670	0.000
Question	140.308	39	3.598	59.580	0.000
Residual	281.304	4659	0.060		
Total	563.938	4821	0.117		
N	4822				
Adj. R ²	0.484				

Panel A: Repeated-Measures Regression (H1-H3 Tests)

<i>Variable</i>	<i>Prediction</i>	<i>Coeff (SE)</i>
<i>Intercept</i>	<i>N/A</i>	1.221*** (.035)
<i>Processing</i>	+/-	0.011 (.040)
<i>Vigilance</i>	+/-	0.054 (.052)
<i>Incongruent</i>	+	0.148*** (.019)
<i>Professional</i>	+/-	0.107** (.052)
<i>ProfSkep</i>	+/-	-0.519** (.210)
<i>StroopDiff</i>	+	.151*** (.061)
<i>StroopFam</i>	+/-	-.023 (.082)
<i>Gender</i>	+/-	-.055* (.030)
<i>T1Exp</i>	-	-.172** (.075)
<i>Mood</i>	+/-	-.011 (.036)
<i>TraitSC</i>	+/-	.282** (.144)
<i>Question</i>	-	-.009*** (.000)
<i>Processing*Incongruent</i>	+	.051** (.024)
<i>Vigilance*Incongruent</i>	+/-	.069*** (.025)
<i>Processing*Professional</i>	-	-.110* (.079)
<i>Vigilance*Professional</i>	+/-	.000 (.070)
<i>Processing*ProfSkep</i>	+	.903*** (.345)
<i>Vigilance*ProfSkep</i>	+	.685*** (.289)

N 4822
R² 0.1953
Adj. R² 0.1923

Note. *Processing* and *Vigilance* are dummy variables set to 1 (0) if an observation is (is not) within the Processing or Vigilance treatment. *Incongruent* and *Professional* are dummy variables set to 1 (0) if an observation is (is not) related to an incongruent trial and professional subject, respectively. *ProfSkep* is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. *StroopDiff* (*StroopFam*) is the participant's self-assessment, via seven-point Likert scale, of the difficult of (familiarity with) the Stroop task. *Gender* is 0 (1) for females (males). *T1Exp* is the individuals' self-reported experience with their depleting task. *Mood* is a 11-point Likert scale measure of the participant's mood, where -5 = very unpleasant and 5 = very pleasant. *TraitSC* is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. *Question* corresponds to the overall trial number for that individual for that observation. The remaining terms are interaction terms of previously described variables. All variables with (without) a directional prediction are presented with one- (two-) tailed p-values. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Table 3.4: Participants' Reasonableness Ratings*Panel A: ANOVA (H4a Test)*

<i>Source</i>	<i>Partial SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Model	234.166	7	33.452	14.300	0.000
Treatment	34.338	2	17.169	7.340	0.001
Trend	177.678	4	44.420	18.990	0.000
Professional	22.517	1	22.517	9.630	0.002
Residual	1442.897	617	2.339		
Total	1677.062	624	2.688		
N	625				
Adj. R ²	0.1299				

Panel B: Repeated-Measures Regression (H4a Test)

<i>Variable</i>	<i>Prediction</i>	<i>Coeff. (SE)</i>
<i>Intercept</i>	<i>N/A</i>	3.991*** (.150)
<i>Processing</i>	<i>+/-</i>	0.704*** (.113)
<i>Inhibition</i>	<i>+/-</i>	0.514** (.240)
<i>Professional</i>	<i>+/-</i>	-0.447** (.186)
<i>ProfSkep</i>	<i>-</i>	-2.660 (3.577)
<i>Gender</i>	<i>+/-</i>	-0.078 (.207)
<i>T1Exp</i>	<i>-</i>	0.373 (.268)
<i>Mood</i>	<i>+/-</i>	0.0574 (.398)
<i>TraitSC</i>	<i>+/-</i>	1.425 (2.094)
<i>N</i>	625	
<i>R²</i>	0.0387	
<i>Adj. R²</i>	0.0263	

Note. *Rating* is the dependent variable, and measures participants' reasonableness ratings for the CFO's explanations of trends. *Processing* (*Inhibition*) are dummy variables indicating whether the observation came from the *Processing* or *Inhibition* treatment. *Professional* is a dummy variable for status a professional or student. *ProfSkep* is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. *Gender* is a dummy variable indicating whether the participant is male (1) or female (0). *T1Exp* represents participants' self-assessed experience with the initial task. *Mood* is a 10-point Likert scale measure of the participant's mood, where -5 = very unpleasant and 5 = very pleasant. *TraitSC* is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. All variables with (without) a directional prediction are presented with one- (two-) tailed p-values. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Table 3.5: Participants' Alternative Explanations (H4b Test)

Panel A: Raw Alternatives

<i>Variable</i>	<i>Prediction</i>	<i>Coeff. (SE)</i>
<i>Intercept</i>	<i>N/A</i>	2.487*** (.111)
<i>Processing</i>	+/-	0.206 (.130)
<i>Inhibition</i>	+/-	0.146 (.119)
<i>Professional</i>	+/-	-0.176 (.115)
<i>ProfSkep</i>	+/-	-3.030*** (1.184)
<i>Rating</i>	-	-0.515*** (.198)
<i>Gender</i>	+/-	-0.040 (.058)
<i>T1Exp</i>	+	0.280** (.143)
<i>Mood</i>	+/-	1.090*** (.371)
<i>TraitSC</i>	+/-	-0.020 (.936)

N	625
R ²	0.0459
Adj R ²	0.0319

Panel B: Valid Alternatives

<i>Variable</i>	<i>Prediction</i>	<i>Coeff.</i> <i>(SE)</i>
<i>Intercept</i>	<i>N/A</i>	2.120*** (.077)
<i>Processing</i>	+/-	0.212 (.135)
<i>Inhibition</i>	+/-	0.198* (.120)
<i>Professional</i>	+/-	-0.178** (.122)
<i>ProfSkep</i>	+/-	-0.859 (1.323)
<i>Rating</i>	-	-0.518*** (.184)
<i>Gender</i>	+/-	-0.078 (.049)
<i>T1Exp</i>	+	0.367** (.147)
<i>Mood</i>	+/-	0.868** (.424)
<i>TraitSC</i>	+/-	-0.713 (1.487)

N	625
R ²	0.0476
Adj R ²	0.0337

Note. *RawAlternatives (ValidAlternatives)* is the dependent variable in Panel A (B), and measures the number of (plausible) alternative explanations that participants generate for a given trend. *Processing (Inhibition)* are dummy variables indicating whether the observation came from the *Processing* or *Inhibition* treatment. *Professional* is a dummy variable for status a professional or student. *ProfSkep* is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. *Rating* represents participants' reasonableness rating for the given trend. *Gender* is a dummy variable indicating whether the participant is male (1) or female (0). *T1Exp* represents participants' self-assessed experience with the initial task. *Mood* is a 10-point Likert scale measure of the participant's mood, where -5 = very unpleasant and 5 = very pleasant. *TraitSC* is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. All variables with (without) a directional prediction are presented with one- (two-) tailed p-values. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

Table 3.6: Participants' Confidence Ratings
Panel A: ANOVA (H5 Test)

<i>Source</i>	<i>Partial SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Model	18.746	3	6.248	4.780	0.004
Treatment	10.201	2	5.101	3.910	0.023
Professional	8.761	1	8.761	6.710	0.011
Residual	150.191	115	1.306		
Total	168.937	118	1.432		
N	119				
Adj. R ²	0.088				

Panel B: Multiple Linear Regression (H5 Test)

<i>Variable</i>	<i>Prediction</i>	<i>Estimate</i>
<i>Intercept</i>	<i>N/A</i>	1.144 (1.067)
<i>Processing</i>	+/-	-0.403 (.250)
<i>Inhibition</i>	+/-	-0.742** (.291)
<i>Professional</i>	+	0.489** (.226)
<i>Gender</i>	+	0.345** (.191)
<i>T3Familiarity</i>	+	0.200*** (.066)
<i>T1Exp</i>	+/-	-0.144** (.066)
<i>Mood</i>	+/-	0.192*** (.054)
<i>TraitSC</i>	+/-	0.022 (.014)
<i>ProfSkep</i>	+/-	0.013* (.007)

N	119
R ²	0.4035
Adj R ²	0.3543

Note. *Confidence* is the dependent variable, and measures participants' confidence regarding their performance on the explanation-rating task. *Processing* (*Inhibition*) are dummy variables indicating whether the observation came from the *Processing* or *Inhibition* treatment. *Professional* is a dummy variable for status a professional or student. *ProfSkep* is the participant's score on Hurtt's (2010) trait measure of professional skepticism, out of a possible score of 180. *T3Familiarity* represents participants' self-assessed familiarity with tasks similar to the explanation rating and alternative generation task. *Gender* is a dummy variable indicating whether the participant is male (1) or female (0). *T1Exp* represents participants' self-assessed experience with the initial task. *Mood* is a 10-point Likert scale measure of the participant's mood, where -5 = very unpleasant and 5 = very pleasant. *TraitSC* is the participant's score on the Brief Self-Control measure (Tangney et al. 2004) out of a maximum of 65. Question controls for learning effects. The remainder are interaction terms of previously described variables. All variables with (without) a directional prediction are presented with one- (two-) tailed p-values. *, **, and *** represent significance at the .10, .05, and .01 levels, respectively.

8. Figures

Figure 1: Graphical Representation of the Strength Model of Ego Depletion

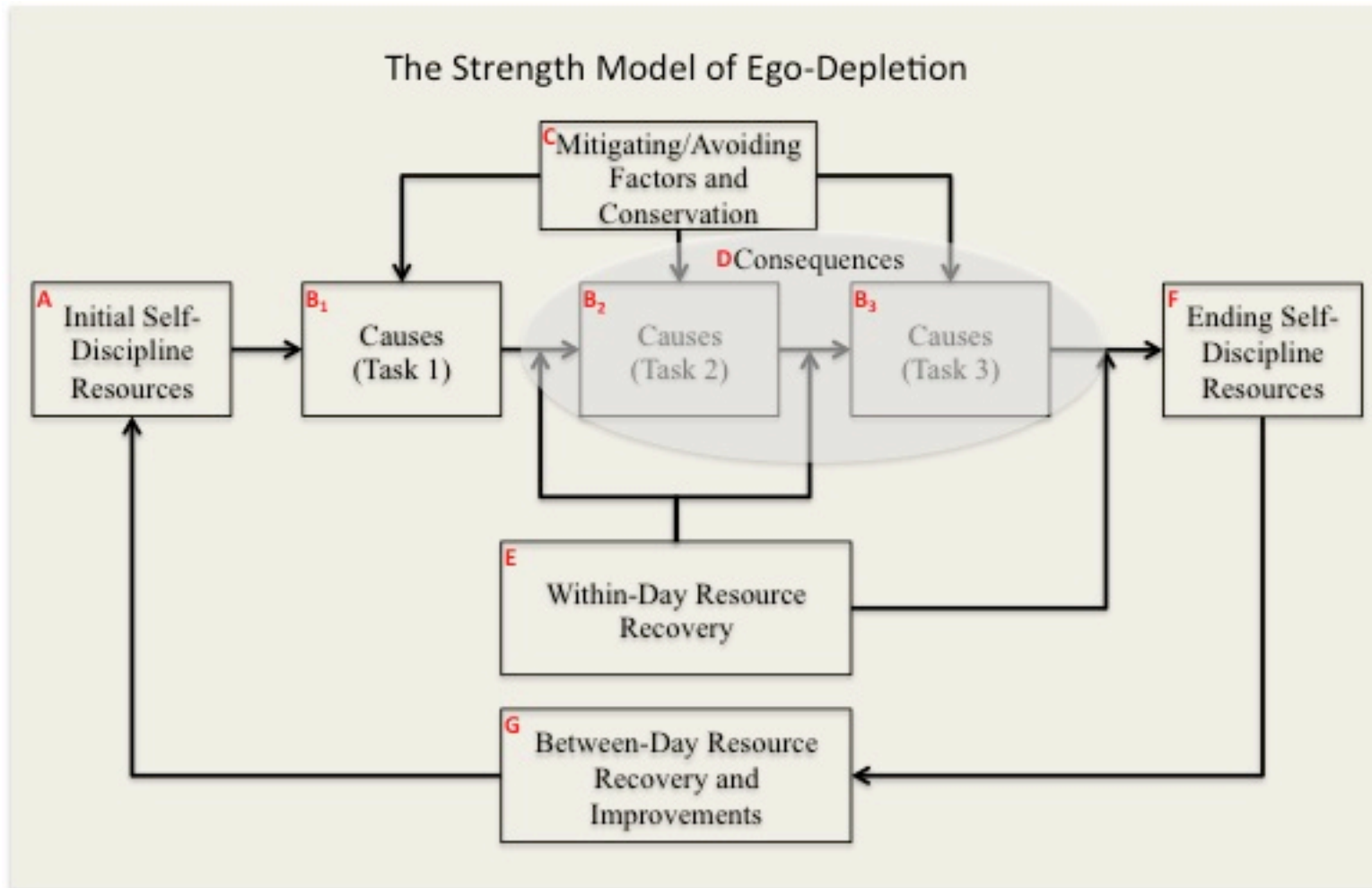


Figure 2: Examples of Stroop Color-Word Interference Task Trials

Incongruent Stroop Trial: Participants should respond to this trial by pressing the “g” button on their keyboard, to indicate a response of GREEN.

ORANGE

Red Green Orange Blue Purple Yellow

Congruent Stroop Trial: Participants should respond to this trial by pressing the “o” button on their keyboard, to indicate a response of ORANGE.

ORANGE

Red Green Orange Blue Purple Yellow

Figure 3: Adjusted Average Reaction Times (All Participants)

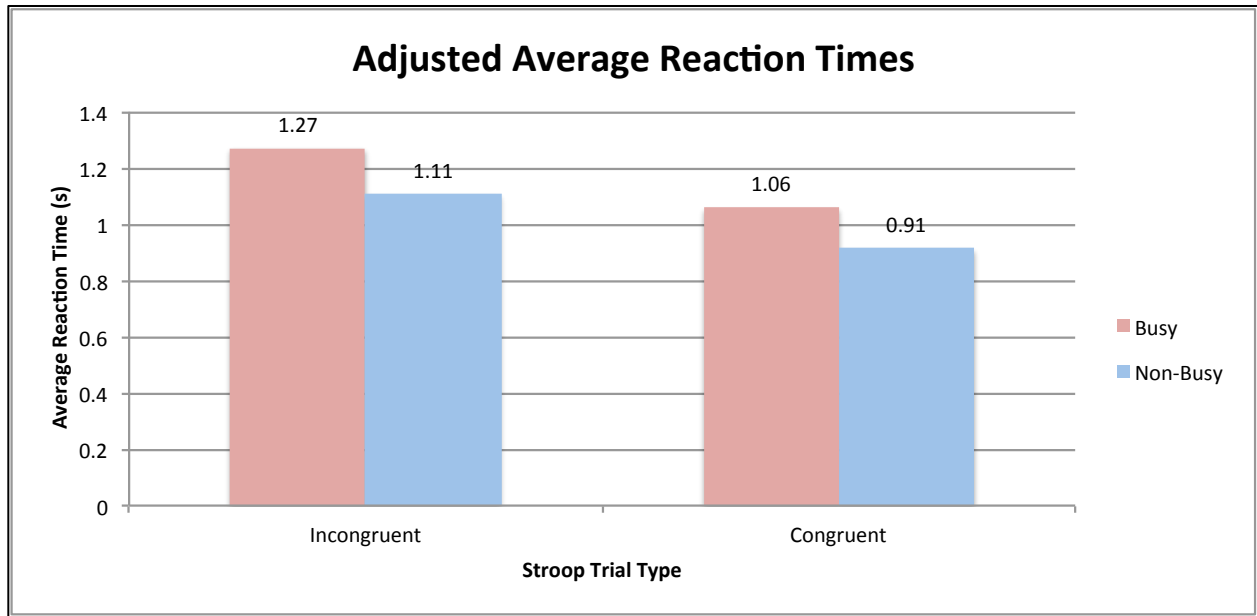
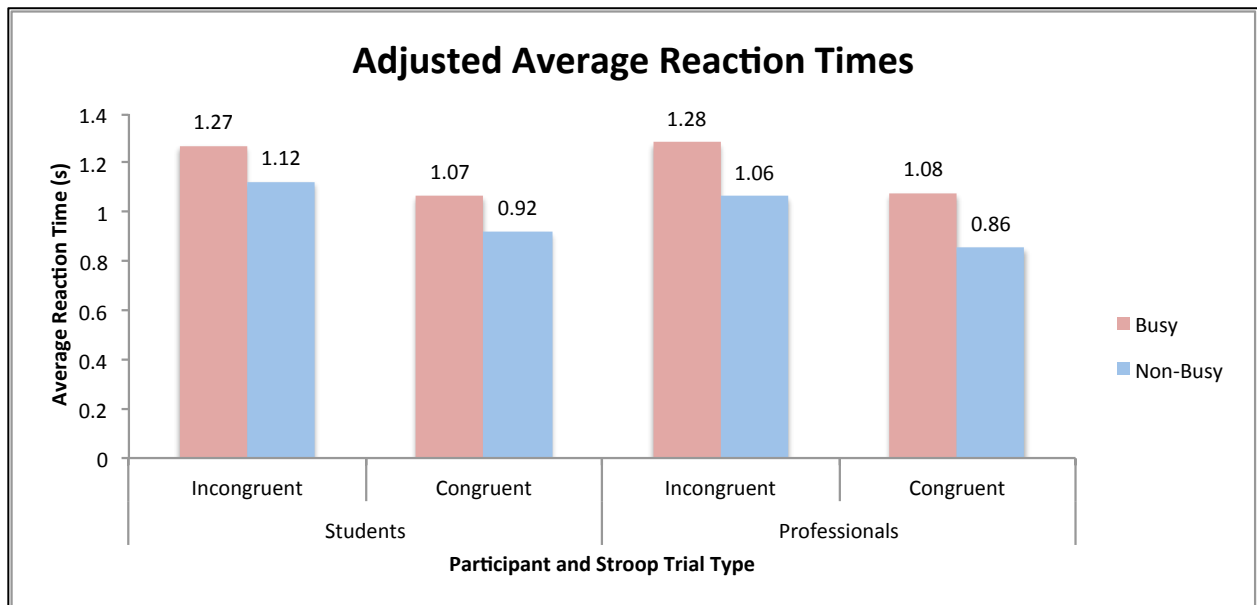


Figure 4: Raw versus Adjusted Average Reaction Times (Professionals versus Students)



9. Appendices

Appendix A: Manipulated Audit Planning – Processing Treatment

AUDIT PLANNING TASK

INSTRUCTIONS: Please read carefully. In this task you will be asked to read through this document, identify risk factors, and make various risk assessments required by professional standards. The questions are included in a separate document (that is paper clipped to this document) so that you can complete them as you read through the case. Please unclip the attached document and work through it as you read through the case. Also note that you can work on all parts of the attached document as you go through the case (i.e., you do not have to do the first page prior to starting the second page). You have 20 minutes to complete as much of the case as possible. Upon completing the task Please record the time you finish on the last page of this document. Please record the time you begin this task below.

Start Time: _____

Assume that you have been assigned to **the audit** of Precision Equipment, Inc. (Precision) for the year ended December 31, 2013. Please read the following information, which includes descriptions of the company's business and industry, management, the control environment, and the revenue cycle, as well as selected ratios and summary financial statements. After you read the information, you will be asked to make various risk assessments required by professional standards.

BACKGROUND INFORMATION

Client Background

Precision, a manufacturer of medical equipment, is a publicly traded corporation that employs about 20,000 people and maintains operations in nine countries outside the United States. The company develops, manufactures and markets medical measurement products including digital and analog thermometers, blood pressure kits, CAT scanners, MRI machines and glucometers.

Precision's principal customers are hospitals, physicians, nursing homes, and mass merchandisers. The company's products and services are marketed both through independent distribution channels and directly to end-users. The segments of the industry in which Precision does business continue to be characterized by significant competition between suppliers, both in the United States and abroad. Primary competitive factors are product performance, technology, customer service, product availability and price. The company believes that its reputation for high quality in the marketplace is a significant positive competitive factor.

Since the late 1990s, the company has been undergoing substantial changes and faces major strategic challenges. The company's business historically had centered on the sale of analog instruments. However, beginning around 2010, digital instruments gained popularity. In fact, sales of analog instruments industry-wide have fallen about 8% each year since 2010. Precision was a late entrant into the digital market and remains behind other industry leaders in converting its production and sales to digital. Accordingly, the company is working to increase its sales in this critical and growing market segment. At the same time, the company seeks to maximize its traditional analog devices sales, which—while diminishing over time—continue to account for 70% of its revenues.

Prior and Current Years' Audits

Your firm has audited Precision since 1984 and has issued standard unqualified reports in each of those years. A review of prior years' workpapers indicates that only a few material adjusting entries were required. These adjustments related to LIFO inventory liquidations. The client has always been cooperative in handling these errors. Based on a review of current standards, you have determined that there were no significant changes in any accounting or auditing standards that would affect this year's audit.

INDUSTRY ANALYSIS

Considered the most complex and diversified area in the health-care industry, the medical products and devices category encompasses more than 130,000 different items, ranging from gauze pads to sophisticated electronic diagnostic machines that can cost several million dollars each. Standard and Poors projects that the industry growth rate will slow in the coming years. Other industry characteristics are:

- Decreasing growth rate of sales. Total dollar shipments of all medical products and devices are expected to increase only 5.4% to \$40 billion in 2013, following increases of 8.2% and 12.9% in 2012 and 2011 respectively. The principal culprits are

- o Cost-containment pressures in primary markets.
- o Heightened scrutiny by the FDA in its approval of new products.
- o Controls imposed by managed care providers.
- Proposed cutbacks in Medicare coverage and payment policies represent another negative factor confronting the industry.
- Steady declines in stock share prices since 2011.

While the US remains the world's largest supplier of medical products by a wide margin, this dominance is slipping. It is expected that customers (independent distributors and hospitals) are likely to be big winners as manufacturers provide innovative and lucrative incentives to market their products in what is becoming a very competitive field.

Selected industry ratios are presented below:

	2013	2012
Profit margin on sales	8.36	8.42
Current ratio	1.93	1.96
Inventory turnover	2.33	2.41
A/R turnover	5.92	6.45

ASSESSMENT OF MANAGEMENT, JUDGMENT OF MATERIALITY, AND THE CONTROL ENVIRONMENT

Management. Your firm's past experience with Precision indicates that management conscientiously prepares accounting estimates and uses sound judgment in the preparation of the financial statements. Top management is compensated through a base salary (50%), an earnings-based bonus plan (30%) and stock options (20%). As with most public companies in the industry, there is significant pressure for management to meet analysts' earnings forecasts. Management places great importance on achieving or exceeding sales and other financial forecasts. The company has met or exceeded sales goals for 12 consecutive quarters. The management team is well respected in the business community and turnover among top management has been infrequent.

Materiality. After reviewing last year's financial statements and the current year unaudited financial statements, materiality for planning purposes has been set at \$8,000,000.

Control Environment. Management appears to have a positive attitude about developing a reliable control environment and relies on the information generated from the accounting system to make management decisions. In general, the control system is reliable in recording routine transactions and the segregation of duties is adequate. The board of directors and the audit committee meet regularly. The audit committee is made up of three non-management directors. The president of the company maintains a high degree of control over management and over financial reporting.

Your firm is currently testing Precision's controls company-wide, and so far testing has revealed one material weakness. This material weakness relates to the control processes related to debt transactions. Your firm identified several instances where there was a lack of timely communication between purchasing and the accounting department about debt contracts. Specifically, Precision lacked controls to insure that agreements, contracts, and other documents relating to debt transactions, including new debt issuances, were provided to and reviewed by accounting and financial reporting personnel on a timely basis. This

resulted in new debt not being recorded on a timely basis or disclosed adequately. Your firm is still determining how frequently this happened and the degree of the problem. However, because of the potential to cause current or future material misstatements of liabilities, this internal control weakness will be classified as a material weakness.

As you know, the identification of this material weakness will require your firm to issue an adverse audit opinion on the effectiveness of Precision's internal controls as of December 31, 2013.

OVERVIEW OF THE REVENUE CYCLE

Precision's products and services are marketed both through independent distribution channels and directly to end-users. Revenue is recognized when products are shipped to customers. Highlights of the revenue cycle follow.

Order Entry

- Orders are received by mail, telephone, fax or EDI.
- Orders from pre-approved customers are batched in groups of approximately 50 items for entry into the computerized order file by a clerk in the order processing function.
- Data are entered into the system through a standardized entry interface, which requests all the key information contained on the customer order form. The company logs all transactions by terminal and reconciles the total input by terminal with the sales order list generated that day. Any differences are promptly investigated.

Credit

- The system generates a total for the order and compares that total with the customer's outstanding accounts receivable balance and credit limit. If the total of the order plus outstanding amounts due would put the customer over the credit limit, the transaction is transmitted to the credit department for review.
- The company's normal payment terms have been similar to the industry, i.e., n/45 days.
- Bad debts estimates have also been close to the industry average.

Inventory

- The order-entry application accesses the inventory file to determine whether the goods are on hand. If they are on hand, the system requests the quantity ordered, thus restricting the items from being shipped to another customer.
- The company prides itself on maintaining next-day shipment on 98% of its orders as part of its commitment to customer service. Order backlog is minimal.
- The system generates a picking ticket with a pre-numbered packing slip. Items are packed in the warehouse for shipment according to the specified shipping date.
- The invoice is not printed or recorded until the shipping department acknowledges shipment of the order by entering the packing slip number into a terminal located at the shipping dock and making any adjustments to items actually shipped.
- Differences between the packing slip and actual orders are rare because shortages occur only when the perpetual inventory record is inaccurate, but any differences are immediately resolved by a supervisor and internal audit monitors difference reports.

Roll-Forward Tests

Discussions with the controller and interim tests of controls indicate that there have been no changes in the revenue cycle since the prior year. The only change since interim was the implementation of a marketing program in November, which increased revenue and net income by \$84 million and \$35.2 million, respectively. Discussions with key company personnel revealed that Precision felt it was necessary to take this action in response to market changes and competitor actions. You have gathered the following information about the company's November marketing strategy.

November Marketing Strategy

In November 2013, Precision launched a new marketing program under which all distributors were asked to purchase a minimum number of analog systems. The minimum was based on the inventory of analog devices (1.8 million units) divided by the pro-rata share of overall distributor sales. To encourage the distributors to participate, Precision offered end-user incentives (discussed below) to buy analog systems from distributors. These incentives would help distributors resell the inventory they were purchasing from the promotion. Precision also offered several incentives, including profit-sharing opportunities, directly to distributors to encourage them to participate in the program.

As part of the promotion program, Precision required that each distributor sign a promissory note for program purchase amounts. Under the terms of the promissory note, all amounts owed to Precision, including the November program purchases, would have to be satisfied in full within six months. The note also required distributors to make payments on their November program balances calculated to coincide with expected product sell-through. After six months, the note required distributors to make a "balloon" payment for their remaining balances, which Precision estimated would be approximately 70% of the November program purchases.

On November 13, 2013, Precision held a meeting with its distributors to present them the program. The marketing initiative was largely successful with distributors signing up for large orders of analog systems. About 70 percent of the distributors signed immediately with the rest being undecided. Follow-ups with the undecided distributors proved successful with only 4 not signing by year-end.

On December 10, 2013, the controller prepared a summary memorandum requesting credit limit increases for 11 distributors. The memorandum described the results of the November marketing strategy, the potential strategic benefits of the program, the intended reliance on promissory notes to secure the distributors' credit balances, and the payment history and status of the 11 distributors. Top management approved the requested credit limit increases based upon this summary memorandum.

Finally, several distributors indicated, during and after the November 13 meeting, that they did not have sufficient capacity to store additional products in their warehouses. As an accommodation to these distributors, Precision arranged to hire freight forwarders and warehouse facilities.

At this point, management was quite pleased with the success of the marketing strategy.

RATIO ANALYSIS AND FINANCIAL STATEMENTS

Selected financial statement ratios are presented below, along with the unaudited consolidated financial statements for 2013 and the audited financial statements for 2012.

SELECTED RATIOS:	12/31/13	12/31/12
Current ratio: current assets / current liabilities	2.23	2.20
Debt to assets: total debt / total assets	59.20%	47.91%
Long term debt-to-equity: long-term debt / stockholders' equity	81.40%	39.96%
Inventory turnover: cost of sales / inventory	2.85	2.64
A/R turnover: net sales / accounts receivable	4.35	5.85
Gross margin: (net sales – cost of sales) / net sales	55.4%	54.4%
Return on equity: net income / stockholders' equity	16.29%	16.76%

CONSOLIDATED STATEMENTS OF OPERATIONS FOR THE YEARS ENDED (IN THOUSAND OF DOLLARS EXCEPT PER SHARE DATA)

	12/31/13 (unaudited)	% of Net Sales	12/31/12 (audited)	% of Net Sales	% Change (Year over Year)
Net Sales	\$1,914,318		\$1,709,086		12.0
Cost and Expenses					
Cost of products sold	853,975	44.61	778,684	45.56	9.7
Selling, general, Administrative	725,608	37.90	606,889	35.51	19.6
Research and development	57,864	3.02	53,268	3.12	8.6
Total Expenses	<u>1,637,447</u>	<u>85.54</u>	<u>1,438,841</u>	<u>84.19</u>	13.8
Operating Earnings	<u>276,871</u>	<u>14.46</u>	<u>270,245</u>	<u>15.81</u>	2.4
Other (Income) Expense	<u>13,561</u>	<u>0.71</u>	<u>13,700</u>	<u>0.80</u>	-1.0
Earnings before income taxes	263,310	13.75	256,545	15.01	2.6
Provision for income taxes	<u>89,118</u>	<u>4.66</u>	<u>85,125</u>	<u>4.98</u>	4.7
Net Earnings	174,192	9.10	171,420	10.03	1.6
Retained Earnings at Beginning of Year	909,728		785,866		
Cash Dividends– Common Stock	<u>52,266</u>		<u>47,558</u>		9.9
Retained Earnings at Year End	1,031,654		909,728		
Earnings Per Common Share	\$2.89		\$2.84		1.9

CONSOLIDATED BALANCE SHEETS (IN THOUSANDS OF DOLLARS)

	12/31/13 (unaudited)	12/31/12 (audited)	% Change (Year over Year)
ASSETS			
Current Assets:			
Cash and cash equivalents	\$546,036	\$416,773	31.0
Accounts receivable - net	439,807	292,338	50.4
Inventories	299,662	294,825	1.6
Other current assets	<u>233,844</u>	<u>167,779</u>	39.4
Total Current Assets	1,519,349	1,171,715	29.7
Property, plant and equipment – net	541,061	503,922	7.4
Goodwill and other intangibles	456,944	217,791	109.8
Other assets	<u>103,505</u>	<u>70,261</u>	47.3
Total Assets	<u>2,620,859</u>	<u>1,963,689</u>	33.5
LIABILITIES AND SHAREHOLDERS' EQUITY			
Notes payable	222,642	198,197	12.3
Current portion of long-term debt	21,935	10,657	105.8
Accrued liabilities	366,646	286,160	28.1
Federal and foreign income taxes	<u>70,168</u>	<u>37,100</u>	89.1
Total Current Liabilities	681,391	532,114	28.0
Long-term debt	870,312	408,707	112.9
Total Liabilities	1,551,703	940,821	64.9
Common stock	24,154	24,150	0.0
Capital in excess of par value	88,101	89,088	-1.1
Retained earnings	1,031,654	909,728	13.4
Cumulative translation adjustment	8,915	63,465	-85.9
Treasury stock	(83,668)	(63,563)	31.6
Total Shareholders' Equity	<u>1,069,156</u>	<u>1,022,868</u>	4.5
Total Liabilities & Shareholders' Equity	<u>2,620,859</u>	<u>1,963,689</u>	33.5

**CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS FOR THE YEARS ENDED
(IN THOUSAND OF DOLLARS)**

	12/31/13 (unaudited)	12/31/12 (audited)
CASH FLOW FROM OPERATING ACTIVITIES		
Net earnings	\$174,192	\$171,420
Adjustments to cash provided (used) by operations:		
Depreciation expense	72,001	63,849
Amortization of goodwill and other intangibles	12,595	8,681
Net effect of change in current assets/ current liabilities	<u>(116,533)</u>	<u>(51,733)</u>
Net cash provided (used) by operations	142,255	192,217
Net cash provided (used) by investing activities	(387,567)	(152,553)
Net cash provided (used) by financing activities	400,348	(19,702)
Effect of exchange rate changes	<u>(25,773)</u>	<u>(14,933)</u>
Net Increase (decrease) in cash and cash equivalents	129,263	5,029
Cash and cash equivalents at beginning of period	<u>416,773</u>	<u>411,744</u>
Cash and cash equivalents at end of period	546,036	416,773

Please record the time that you completed the task (or were told to stop) here: _____

Risk Factors

Please **list as many important risk factors as possible, in a numbered list**, that came to your attention while reading the Precision case. With each risk factor that you identify, please provide a one sentence explanation of **why** that factor poses a risk. Risk factors are events or circumstances that significantly heighten the likelihood of the presence of material unintentional or intentional misstatements. Please also complete the next page by making risk assessments for the revenue cycle.

Appendix B: Examples of Stroop Color-Word Interference Task Trials

The following is an example of an incongruent trial on the Stroop color-word interference task. This trial is incongruent because the word ORANGE is written in GREEN font. Participants should respond to this trial by pressing the “g” button on their keyboard, to indicate a response of GREEN, because that is the actual color of the word that is written (i.e., **not** the meaning of the word).

ORANGE

Red Green Orange Blue Purple Yellow

The following is an example of a congruent trial on the Stroop color-word interference task. This trial is congruent because the word ORANGE is written in ORANGE font. Participants should respond to this trial by pressing the “o” button on their keyboard, to indicate a response of ORANGE, because that is the actual color of the word that is written (i.e., **not** the meaning of the word).

ORANGE

Red Green Orange Blue Purple Yellow

Appendix C: Professional Skepticism Task

Task 3: Select account balances and financial ratios.

Account (\$ millions)	FYE 2012	FYE 2011	FYE 2010	FYE 2009	FYE 2008	FYE 2007
Net sales	38,185	46,943	46,202	50,892	40,287	40,493
Cost of goods sold	24,917	29,152	28,285	31,095	25,217	24,531
Gross profit	13,267	17,792	17,917	19,796	15,070	15,962
SG&A	10,653	10,792	10,066	10,064	8,544	8,090
Net income	1,977	4,494	5,157	6,222	4,494	5,448
Cash	1,664	3,323	4,188	6,147	5,219	2,111
Accounts receivable (net)	8,680	10,149	7,939	6,820	8,764	9,340
Inventory	9,763	9,374	9,924	10,522	7,596	7,315
Net PP&E	4,076	2,746	2,567	3,038	2,994	2,697
Current liabilities	3,619	5,587	4,130	9,149	6,034	3,480

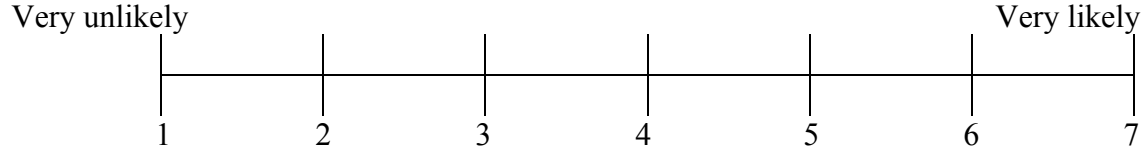
Ratios:

COGS/Sales	65%	62%	61%	61%	63%	61%
Gross profit %	35%	38%	39%	39%	37%	39%
SG&A/Sales	28%	23%	22%	20%	21%	20%
Net income /Sales	5%	10%	11%	12%	11%	13%
Accts. receiv./Sales	23%	22%	17%	13%	22%	23%
Inventory/Sales	26%	20%	21%	21%	19%	18%
Current liab./Sales	9%	12%	9%	18%	15%	9%

INSTRUCTIONS: On the sheet that is paper-clipped to this document you will see a list of financial trends for an electronics manufacturing company during an economic recession. Please refer to the attached document – which lists select account balances and ratios over the past six years – when completing this task. For each trend, the CFO of the company has provided an explanation. For each explanation, please rate how likely you believe that explanation accounts for the given trend by selecting a number from 1 (very unlikely) to 7 (very likely). **After rating each explanation, please list as many plausible alternative explanations for that specific trend (i.e., your explanations for one trend do not need to “make sense” for all of the trends, just the one you are currently explaining) as you can think of in the space provided.** For example, for the first trend, it is possible that an alternative explanation is that the company increased Research & Development, which decreased Cash.

Please list the time that you started this task: _____

Use the following scale to rate the likelihood that the explanation accounts for each trend:



Trend #1: Cash balances have declined to their lowest level since FYE 2008.

Explanation: Sales and A/R have declined due to the recession.

Explanation Rating (1 to 7 on above scale): _____

Plausible Alternative Explanations:

Trend #2: Sales increased over the period, but have returned to about FYE 2007 levels.

Explanation: The recession has led to decreased sales.

Explanation Rating (1 to 7 on above scale): _____

Plausible Alternative Explanations:

Trend #3: Cost of goods sold (COGS) as a percentage of sales has risen sharply over the period.

Explanation: Declining sales volume led to the inability to retain volume-purchase discounts from suppliers, which increased COGS.

Explanation Rating (1 to 7 on above scale): _____

Plausible Alternative Explanations:

Trend #4: SG&A as a percentage of sales has risen sharply over the period, especially from FYE 2011 to FYE 2012.

Explanation: These are mostly fixed costs, and this number has remained stable while sales have decreased due to the recession.

Explanation Rating (1 to 7 on above scale): _____

Plausible Alternative Explanations:

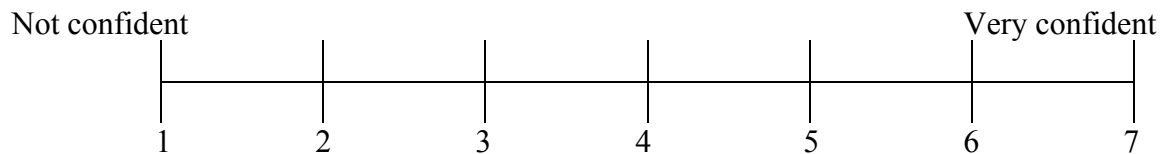
Trend #5: Accounts receivable as a percentage of sales has risen sharply over the past four years.

Explanation: Sales have decreased due to the recession.

Explanation Rating (1 to 7 on above scale): _____

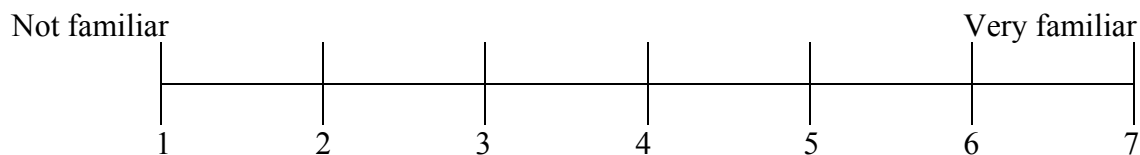
Plausible Alternative Explanations:

Please use the following scale to rate your confidence in your responses to this task:



My confidence in completing this task: _____

Please use the following scale to assess how familiar you are with this type of task:



My familiarity with this type of task: _____

Please list the time that you completed this task: _____

PLEASE CONTINUE TO TASK #4: POST-EXPERIMENTAL QUESTIONNAIRE

Appendix D: Post-Experimental Questionnaire

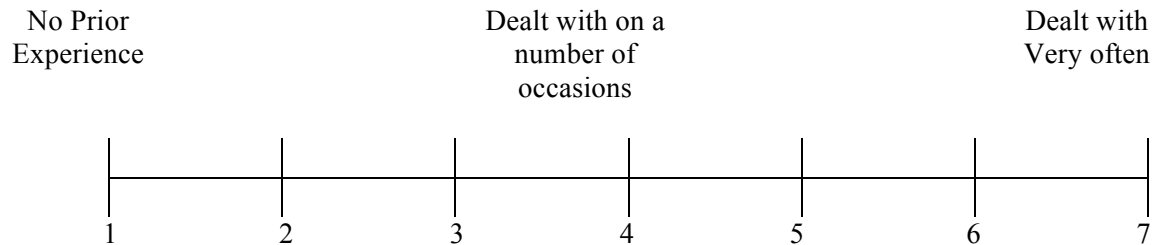
POST-EXPERIMENTAL QUESTIONNAIRE

Please answer the following questions about yourself and your experience in today's study.

1. What is your participant number? _____
2. Please indicate your gender (check one): Male _____ Female _____
3. Please indicate your age, in years (check one)
 - a. 21-24 years _____
 - b. 24-27 years _____
 - c. 27-30 years _____
 - d. > 30 years _____
4. How much auditing experience do you have (check one)?
 - a. 0-6 months _____
 - b. 6-12 months _____
 - c. 12-18 months _____
 - d. 18-24 months _____
 - e. 24-30 months _____
 - f. 30-36 months _____
 - g. 36-42 months _____
 - h. 42-48 months _____
 - i. > 48 months _____
5. Are you a Certified Public Accountant (check one)? Yes _____ No _____
6. Please indicate your position in the firm (check one)

Senior _____ Manager _____ Senior Manager _____ Partner _____

Please use the following scale to answer question 7:



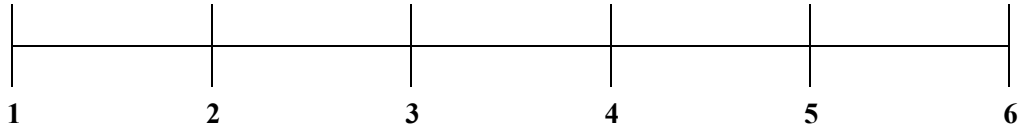
7. How much experience do you have with audit planning tasks, such as Task 1 in this study?

Experience with planning tasks (1-7): _____

Statements that people use to describe themselves are given below. Please use the scale below to choose the response that indicates how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement.

Strongly
Disagree

Strongly
Agree



22. I often accept other people's explanations without further thought. _____
23. I feel good about myself. _____
24. I wait to decide on issues until I can get more information. _____
25. The prospect of learning excites me. _____
26. I am interested in what causes people to behave the way that they do. _____
27. I am confident of my abilities. _____
28. I often reject statements unless I have proof that they are true. _____
29. Discovering new information is fun. _____
30. I take my time when making decisions. _____
31. I tend to immediately accept what other people tell me. _____
32. Other people's behavior does not interest me. _____
33. I am self-assured. _____
34. My friends tell me that I usually question things that I see or hear. _____
35. I like to understand the reason for other people's behavior. _____
36. I think that learning is exciting. _____
37. I usually accept things I see, read, or hear at face value. _____
38. I do not feel sure of myself. _____
39. I usually notice inconsistencies in explanations. _____
40. Most often I agree with what the others in my group think. _____
41. I dislike having to make decisions quickly. _____
42. I have confidence in myself. _____
43. I do not like to decide until I've looked at all of the readily available information. _____
44. I like searching for knowledge. _____
45. I frequently question things that I see or hear. _____
46. It is easy for other people to convince me. _____
47. I seldom consider why people behave in a certain way. _____
48. I like to ensure that I've considered most available information before making a decision. _____
49. I enjoy trying to determine if what I read or hear is true. _____
50. I relish learning. _____
51. The actions people take and the reasons for those actions are fascinating. _____

PLEASE PLACE ALL MATERIALS BACK IN THE ORIGINAL ENVELOPE AND TAKE IT TO THE RESEARCHER.

Thank you so much for participating!