

2021

Mind Wandering as a Result of Failed Self-regulation: An Examination of Novel Antecedents

Kent Etherton
Wright State University

Follow this and additional works at: https://corescholar.libraries.wright.edu/etd_all



Part of the [Industrial and Organizational Psychology Commons](#)

Repository Citation

Etherton, Kent, "Mind Wandering as a Result of Failed Self-regulation: An Examination of Novel Antecedents" (2021). *Browse all Theses and Dissertations*. 2437.
https://corescholar.libraries.wright.edu/etd_all/2437

This Dissertation is brought to you for free and open access by the Theses and Dissertations at CORE Scholar. It has been accepted for inclusion in Browse all Theses and Dissertations by an authorized administrator of CORE Scholar. For more information, please contact library-corescholar@wright.edu.

MIND WANDERING AS A RESULT OF FAILED SELF-REGULATION: AN
EXAMINATION OF NOVEL ANTECEDENTS

A dissertation submitted in partial fulfillment of the
Requirements for the degree of
Doctor of Philosophy

By

KENT ETHERTON
B.S. Purdue University, 2015
M.S. Wright State University, 2018

2021
Wright State University

WRIGHT STATE UNIVERSITY
GRADUATE SCHOOL

7/12/21

I HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER MY SUPERVISION BY Kent Etherton ENTITLED Mind Wandering as a Result of Failed Self-Regulation: An Examination of Novel Antecedents BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy

Debra Steele-Johnson, PhD
Dissertation Director

Debra Steele-Johnson, PhD
Chair, Psychology

Barry Milligan, Ph.D.
Vice Provost for Academic Affairs
Dean of the Graduate School

Committee on Final Examination:

Corey Miller, PhD.

Joan Rentsch, PhD.

Nathan Bowling, PhD

ABSTRACT

Etherton, Kent. PhD, Department of Psychology, Wright State University, 2021. Mind Wandering as a Result of Failed Self-Regulation: An Examination of Novel Antecedents.

The purpose of this study was to examine the role of self-regulatory mechanisms when predicting mind wandering. I collected data from a sample of undergraduate psychology students ($N = 168$) and full-time workers ($N = 660$). The hypothesized model did not produce acceptable fit. However, through alternative model testing, I discovered a well-fitting model of self-regulatory predictors of mind wandering. These results contributed to the literature by providing evidence that motivational mechanisms significantly predict mind wandering in both student and work contexts and raise issues relating to 1) the uni- versus multi-dimensionality of approach and avoid-motivational temperaments, 2) distinctions between goal level, goal commitment, and other motivational variables, and 3) the need to integrate motivational mechanisms and predictors into existing models of mind wandering.

TABLE OF CONTENTS

INTRODUCTION.....	1
Mind Wandering.....	1
History.....	1
Definitions and distinctions from related constructs.....	3
Measurement.....	5
Models.....	8
Outcomes assessed by prior research.....	14
Antecedents assessed by prior research.....	17
Theories of Self-Regulation.....	21
Goal setting.....	24
Self-efficacy.....	27
Allocation of attentional resources.....	28
Mind Wandering as a Failure of the Self-regulatory Process.....	28
METHOD.....	39
Student Sample.....	39
Participants.....	39
Measures for Demographics and Tests of Predictions.....	39
Measures to Test Alternative Explanations.....	43
Procedure.....	45

Work Sample	46
Participants.....	46
Measures for Demographics and Tests of Predictions.....	46
Measures to Test Alternative Explanations	50
Procedure	51
RESULTS.....	53
Descriptive Statistics.....	53
Psychometric Properties of Measures.....	57
Hypothesis Testing.....	58
Testing Alternative Models.....	63
DISCUSSION	76
Overview.....	76
Theoretical and Practical Implications.....	76
Limitations	82
Future Research	82
Conclusions.....	83
REFERENCES.....	85
Appendices	
A. Demographics.....	98
B. Personality.....	99

C. Affectivity.....	101
D. Generalized Self-efficacy.....	102
E. Goal Orientation.....	103
F. Trait Anxiety.....	106
G. Goal Level.....	107
H. Goal Commitment.....	108
I. Work Engagement.....	109
J. Mind Wandering.....	111
K. Task-specific Self-efficacy.....	112
L. Mindfulness.....	114
M. Boredom.....	115
N. Metacognition.....	116
O. In-Role Behavior Performance.....	117
P. Consent Form.....	118
Q. Debriefing Form.....	128

LIST OF FIGURES

Figure	Page number
1. Hypothesized model.....	32
2. Results for Hypothesized Model (Student sample).....	61
3. Results for Hypothesized Model (Work sample).....	62
4. Alternative Model 1 (Student sample)	67
5. Alternative Model 1 (Work sample).....	68
6. Alternative Model 2 (Student sample).....	69
7. Alternative Model 2 (Work sample).....	70
8. Alternative Model 3 (Student sample).....	72
9. Alternative Model 3 (Work sample).....	73

LIST OF TABLES

Table	Page number
1. Means, SDs, and Correlations (Student sample).....	55
2. Means, SDs, and Correlations (Work sample)	56
3. Confirmatory Factor Analysis (Both samples).....	65

Introduction

Mind wandering is a potentially dangerous psychological phenomenon estimated to occur during 50% of conscious thought (Killingsworth & Gilbert, 2010). Previous research has attempted to address the notion of consciousness by examining how the mind wanders between multiple, often unrelated, thoughts. This wandering can be detrimental to performance as less attention is directed toward one's current task. Researchers have found evidence of mind wandering using behavioral markers, physiological measures, and brain activity (Schooler et al., 2014). Using such measures, research has examined the nomological net surrounding mind wandering, including important outcomes (e.g., cognitive performance, reading comprehension, mood) and antecedents (e.g., mindfulness, cognitive ability) of the behavior. However, prior research has failed to consider the role of self-regulation. Theories of self-regulation describe the process through which one allocates attentional resources toward a goal (Bandura, 1986; Carver & Scheier, 1982), and mind wandering reflects the allocation of attentional resources inward, away from goal-relevant tasks (Andrews-Hanna, Smallwood, & Spreng, 2014; Smallwood & Schooler, 2006). Thus, mind wandering might be considered a form of self-regulatory failure, and consequently be predicted by self-regulatory variables unaddressed by the mind wandering literature. Thus, the purpose of my study is to create and test a self-regulatory model of mind wandering.

Mind Wandering

History. In 1892, William James coined the phrase 'stream of consciousness' to describe the continuous, unending progression of thoughts. This notion served as a framework that was used for nearly a century as the dominant way of thinking about consciousness. This framework reflected several assumptions. One assumption of James' (1892) stream of consciousness was

that thoughts were occurring in a conscious mind. Another assumption was that the stream consisted of rich and detailed experiences. Both assumptions were controversial and caused James' (1892) stream of consciousness to lose favor as a model of thought. With the discovery of brain waves in the 1920s, researchers believed James' (1892) metaphor was insufficient to capture the oscillatory rhythm observed with brain waves. With the renewed criticism in combination with a recognition for how difficult it would be to study consciousness empirically, research on the topic became scarce until the 1980s.

Giambra (1980) was one of the first to study daydreaming, which would eventually be known as mind wandering. Initially, he measured daydreaming as self-report using three dimensions. The three dimensions were (1) how vivid the thoughts were, (2) how many thoughts were guilt/fear based, and (3) how deep into the thought one went. Giambra was interested in age effects and the changing rate of daydreaming as one progresses through life. Largely though, researchers ignored daydreaming research until several decades later when it was renamed mind wandering.

In the early 2000s, neuroimaging renewed researchers' interest in the process of thought and consciousness. A burgeoning interest in the topic birthed several theories and definitions. Of interest was the emergence of the default mode network, a pattern of brain activity activated during 'wakeful rest' (Raichle et al., 2001). The default mode network is active while someone engages in mind wandering (Christoff et al., 2009; Mason et al., 2007). This area of the brain was theorized to be the location of mind wandering in the brain.

More recently, researchers have produced evidence that mind wandering might not be exclusively associated with the default mode network (Fox et al., 2015). Engaging in mind wandering also seems to activate non-default mode network areas such as the rostralateral

prefrontal cortex, dorsal anterior cingulate cortex, insula, temporopolar cortex, secondary somatosensory cortex, and lingual gyrus. This finding demonstrated that mind wandering might not be isolated in a single area of the brain as previously thought.

Also, research on mind wandering has begun to cross into new fields of research, such as I/O psychology. Researchers have begun to apply mind wandering to the workplace and examine what effect it might have on job performance (Dane, 2011). The topic of mind wandering is somewhat complicated because it can be both helpful and harmful to important outcomes such as performance and creativity (Baird et al., 2012; Randall, Oswald, & Beier, 2014). To reconcile this incongruence, Dane (2018) proposed that it is not the presence of mind wandering that matters but the content. Dane's (2018) mind wandering content model proposed a distinction between problem-focused mind wandering and emotion-focused mind wandering, strongly echoing the similar distinction in the stress and coping literature. That is, Dane (2018) proposed that the content of a mind wandering episode moderated the effect mind wandering has on important work-related outcomes.

Definitions and distinctions from related constructs. Researchers have defined mind wandering in several ways. Smallwood and Schooler (2006) defined mind wandering as the shifting of attentional resources from an external primary task to an internal alternative task. Andrews-Hanna, Smallwood, and Spreng (2014) proposed an alternative definition of mind wandering as the shifting of attentional resources from external goals to internal self-generated thought. Importantly, Smallwood and Schooler (2006) believed mind wandering was a goal-directed activity whereas Andrews-Hanna and colleagues (2014) did not. This incongruence is particularly odd given that Smallwood was an author on both papers. I believe the incongruence is a result of the blurry distinction between conscious and unconscious goal directed cognition.

For example, fantasizing about what one might do the upcoming weekend might be considered goal-directed activity by some, but not all, researchers. Also, Smallwood (2013) expanded upon the definition of mind wandering to describe a process-occurrence framework that distinguishes the onset from the continuance of a mind wandering episode. That is, he defined mind wandering as both an initial shift and a continual stream of redirected attentional resources.

Two constructs closely related to mind wandering are mindfulness and boredom. Mindfulness is defined as conscious awareness of both internal and external sources of information at the current moment (Dane 2011; Dane & Brummel 2014; Good et. al. 2016). Researchers have defined mindfulness as a related, yet distinct opposing construct to mind wandering (Dane, 2011). A key difference between mindfulness and mind wandering is that mindfulness includes attending to external stimuli whereas mind wandering does not. Exclusively, mind wandering is defined as attending to internal stimuli (i.e., self-generated thoughts). That is, mindfulness refers to a broader attentional range and mind wandering a narrower range. Often, mindfulness is described and tested as an antecedent to mind wandering, such that those high in mindfulness are less likely to engage in mind wandering (Mrazek, Smallwood, & Schooler 2012; Good et. al. 2016). A key similarity between mind wandering and mindfulness is that both describe how one may allocate his/her attentional resources. Both mindfulness and mind wandering involve attentional resources being directed toward internal stimuli (either to the exclusion or inclusion of external stimuli). Unsurprisingly, mindfulness and mind wandering are related to similar outcomes such as reading comprehension and cognitive performance (Good et. al. 2016).

Originally, boredom was defined as an emotion (Farmer & Sundberg, 1986) and later redefined as a transient, emotional state that results from one wanting but being unable to

participate in some desired activity (Fisherl, 1993). In research using either definition, boredom was significantly related to depression and negative affectivity. Boredom was described as a result of either (1) failure to retrieve appropriate information, (2) failure to participate, and/or (3) attributing the cause of one's boredom to the environment (thus reinforcing a preexisting bored state; Eastwood et. al., 2012). A key similarity between boredom and mind wandering is that both have malleable components associated with negative affectivity and lower mood (Farmer & Sundberg, 1986; Fisherl, 1993; Killingsworth & Gilbert, 2010). A key difference between boredom and mind wandering is that researchers consider boredom a state of cognition but mind wandering a behavior. Because of this distinction, boredom often is considered an antecedent of mind wandering. That is, when people are disinterested in their current task, they are more likely to shift their attention inward.

Measurement. There are numerous methods of measuring mind wandering which can be categorized as either physiological, cognitive, or behavioral.

Researchers have assessed mind wandering using three physiological measures: pupil dilation, heart rate, and neuroimaging. Researchers use pupillometry and heart rate less often than neuroimaging, but all provide unique information. In attention research, it is common to observe larger pupils when participants are paying attention and/or working hard (Unsworth & Robison, 2018). So, researchers associate a smaller pupil diameter with a greater likelihood that the participant is mind wandering. Similarly, participants typically have lower heart rates when they are either bored or mind wandering (Cummings, Gao, & Thornburg, 2016).

Neuroimaging is a physiological measure of mind wandering in which researchers typically use fMRI to study neurological activation in the brain. This method is important because it displays both the frequency and duration of a mind wandering episode. Neuroimaging

studies have discovered that mind wandering occurs primarily within the default mode network with a few exceptions (e.g., Christoff et al., 2009; Mason et al., 2007). The default mode network is the area of the brain associated with a state of ‘wakeful rest’ or when people are conscious yet inattentive to a specific task. Additionally, McVay and Kane (2010) distinguished patterns of activation associated with proactive versus reactive responses to mind wandering. Thus, the authors proposed distinct antecedents of each response (i.e., proactive: intrinsic motivation, interest; reactive: personal resources, perceived cost of mind wandering). McVay and Kane’s (2010) findings illustrated an important advantage of neuroimaging, such that it can provide physiological evidence of discriminant validity for related psychological constructs. Another advantage is that activation of the default mode network is related to self-reported mind wandering (Christoff et. al., 2009), demonstrating convergent validity such that there is no longer a large inferential leap that must be made to assume activation of the default mode network is representative of mind wandering. An important disadvantage of neuroimaging is the cost associated with purchasing and maintaining the equipment.

Cognitive measures of mind wandering include state and trait self-report measures. There are two state measure types: self-caught and experience sampling, and one trait measure type: self-report. The self-caught method involves asking participants to “press a key whenever you catch yourself mind wandering.” Self-caught measures capture mind wandering *during* tasks and capture only mind wandering of which the participant is consciously aware. A strength of the self-caught method is that it captures the exact moment one realizes he is mind wandering. However, self-caught measures interrupt the task at hand, which can introduce error to any behavioral performance data being captured.

Experience sampling involves asking participants to retrospectively report the extent to which they were mind wandering immediately prior. For example, researchers might ask participants “In previous trials, how aware were you of where your attention was focused?” Experience sampling does not require participants to be meta-aware of their experience of mind wandering while it is happening, merely able to report it having happened earlier. For example, Killingsworth and Gilbert (2010) used an app which participants could download onto their cell phones that would randomly notify them to report whether they were mind wandering immediately prior. Using experience sampling removes the issue of awareness because the notification the participants received on their phones shocked them out of their mind wandering states. This allowed conscious awareness of how little attention they were paying to the task at hand. Another advantage is that self-reported mind wandering is significantly related to activation of the default mode network (Christoff et. al., 2009), demonstrating convergent validity. A common limitation of both state self-report measure types is that they cannot capture the *duration* of a mind wandering episode in the way neuroimaging can.

Trait self-reported data involves simply asking participants how frequently they engage in mind wandering in their day-to-day lives. An advantage of trait measures of mind wandering is that they provide information about one’s general tendency to mind wander. Such measures can be written to be situation-specific to capture one’s tendency to mind wander in particular settings. Another advantage is that, similar to experience sampling, trait measures do not require people to be consciously aware of their mind wandering *during* the episode. If participants become retrospectively aware of the occurrence of mind wandering, trait measures can capture that information. However, it is likely that people do not remember all instances of mind wandering. That is, trait measures of mind wandering are conservative, such that the actual

frequency of mind wandering will be higher than the frequency participants can remember. A disadvantage of trait measures of mind wandering is that they attempt to measure a less salient mental experience, compared to self-caught or experience sampling, which ask participants about their recently experienced mind wandering.

Researchers have used many behavioral measures to study mind wandering. Such measures include gaze duration, reaction time, and performance errors (Schooler et al., 2014). An issue associated with these measures is the extent to which one can infer these behavioral symptoms are representative of a specific type of mental activity. That is, perhaps participants are not engaging in mind wandering when researchers assume they are. This is a considerable limitation of behavioral measures. However, behavioral measures have advantages such that they can capture the frequency, and sometimes even the duration, of a mind wandering episode. Finally, behavioral measures do not interrupt participants when they are completing a task.

Models. There are many key models/theories of how mind wandering occurs. One of the first, James' (1892) stream of consciousness metaphor, attempted to describe conscious processing as a linear progression of thought. Later, Teasdale and colleagues (1995) proposed the stimulus independent thought model, proposing that mind wandering depends on the amount of central executive resources. A decade later, this theory was expanded upon through a series of competing models each contesting the way in which cognitive resources might be related to mind wandering (McVay & Kane, 2009; Smallwood & Schooler, 2006; Thomson, Besner, & Smilek, 2015). More recently, researchers have described a distinction between the onset and the continuance of a mind wandering episode in Smallwood's (2013) process-occurrence framework theory. Focusing on the onset, models have proposed an important distinction such that mind wandering might be initiated either intentionally or unintentionally (Carriere, Seli, & Smilek,

2013). Largely, research had focused on *what* mind wandering is, but Smallwood (2013) described four key hypotheses for *how* mind wandering occurs. Then, Mittner and colleagues (2016) proposed a neural model of mind wandering, which makes a neurological distinction between an off-focus state and an active mind wandering state. Finally, researchers have begun to consider the importance of thought content when mind wandering, especially in workplace settings (Dane, 2018). Next, I will describe each of these models in greater detail.

James' (1892) stream of consciousness is not a testable model but served as a conceptual metaphor from which many researchers drew inspiration (e.g., Haynes & Rees, 2005; McKiernan et al., 2006; Wegner et al., 1991). James claimed consciousness was a stream of continuous experiences, including thoughts, feelings, ideas, sensations, etc. James claimed such experiences appeared before the conscious mind and then faded. Additionally, he claimed such experiences had substantial overlap, such that there is no discrete beginning/end to any particular experience. Rather, each experience fades in or out in such a way that people likely do not notice the change in focus. As mentioned earlier, the stream of consciousness was assumed to be occurring in a conscious mind and be full of rich and detailed experiences occurring sequentially. Researchers have challenged this metaphor with the criticism that thoughts are not always conscious and sometimes lack depth (Blackmore, 2002).

The stimulus independent thought model defined stimulus independent thoughts as “thoughts and images unrelated to immediate sensory input”, later becoming synonymous with mind wandering (Teasdale et al., 1995). Across four experiments, each using different difficult tasks, Teasdale and colleagues (1995) concluded that the production of stimulus independent thoughts is dependent on central executive resources. The authors' findings implied a negative linear relationship such that the fewer central executive resources one has, the more likely one is

to mind wander. Subsequent research has considered stimulus independent thoughts as a lack of central executive resources (e.g., Smallwood & Schooler, 2006). This assumption was not revisited until a decade later with the swift emergence of multiple theories contesting the role of cognitive resources in mind wandering.

Three more recent models have addressed the question of how cognitive resources might be related to mind wandering. Smallwood and Schooler (2006) proposed a resource-depletion theory, stating that mind wandering required and depleted cognitive resources. That is, the more cognitive resources available, the more likely one has resources left over from the primary task to indulge in mind wandering. So, Smallwood and Schooler (2006) suggested a positive relationship such that more cognitive resources would predict higher frequencies of mind wandering. McVay and Kane (2009; 2010) countered such a perspective by proposing an executive control theory, stating that mind wandering represents a failure of the executive control system. McVay and Kane's (2009; 2010) theory suggested a negative relationship between cognitive resources and mind wandering such that cognitive resources are considered the buffer against as opposed to the fuel for mind wandering. Most recently, Thomson, Besner, and Smilek (2015) proposed a resource-control theory, integrating the two previous models such that mind wandering is a result of *misallocation* of one's attentional resources. Indeed, mind wandering requires cognitive resources, but one must consciously or unconsciously allocate resources toward the mind wandering content instead of his primary task content. If one has a large amount of cognitive resources that are all being used on the primary task, it is less likely that he is mind wandering. However, if one has a large amount of cognitive resources that are being directed toward the mind wandering content, it is more likely he is mind wandering. That is, the effect of cognitive resources on mind wandering frequency is either positive or negative,

moderated by where the resources are being allocated (i.e., either to the mind wandering content or the primary task).

The process-occurrence framework proposed a distinction between the onset and continuance of a mind wandering episode (Smallwood, 2013). This framework suggested that mind wandering research should consider the two processes separately. Often in previous experimental settings, researchers operationally defined general mind wandering tendencies as task error, conflating the two. Such conflation raises validity issues regarding the performance error behavioral measures mentioned earlier. The process-occurrence framework proposed that the phenomenon of one's attention drifting away from the current task cannot be considered the same as task error. Disentangling task error from mind wandering can only be done if researchers consider attentional shifting (i.e., the onset) and continued failure to correct one's distracted attention (i.e., the continuance) as distinct. Another important consideration suggested by this framework is the context in which one mind wanders. This framework acknowledged that mind wandering can be harmful and beneficial and that the difference depends on the cost/benefit of mind wandering in various contexts. For example, mind wandering on the walk to one's car might be beneficial because so few resources are required. However, mind wandering might be harmful if it is done while operating dangerous machinery and taking exams (Smallwood, 2013). Largely, subsequent research has ignored such recognition of contextual factors.

Another distinction in the research is the difference between intentional and unintentional mind wandering (Carriere, Seli, & Smilek, 2013). Researchers have defined intentional mind wandering as purposeful 'zoning out', associated with one enjoying, accepting, and tolerating his experience of mind wandering. Unintentional mind wandering is accidental such that it might

interfere with productivity and cause unwanted distractions from the current task. Both types of mind wandering were related to a facet of mindfulness: non-reactivity to inner experience (Seli, Carriere, & Smilek, 2015). However, the relationship was different for intentional versus unintentional mind wandering, demonstrating the importance of such a distinction. Intentional mind wandering was positively related whereas unintentional mind wandering was negatively related. In a follow-up study exploring the possible role of metacognition in this strange phenomenon, researchers provided evidence that intentional mind wandering is distinct from metacognition (Seli et al., 2017).

Prior theories/models largely focused on what mind wandering *is*, but Smallwood (2013) described four hypotheses attempting to explain *why* one mind wanders. The hypotheses were the decoupling hypothesis, executive failure hypothesis, current concerns hypothesis (Klinger, 1971), and meta-awareness hypothesis (Smallwood, 2013). The decoupling hypothesis stated that attentional resources ‘decouple’ from their current target to be redirected toward internal, task-irrelevant thought. Meaning, one’s executive control system redistributes attentional resources away from a current task and toward the mind wandering content. The executive failure hypothesis stated that the shifting of attentional resources does *not* occur while executive control is engaged, thus implying mind wandering is a failure of one’s executive control system. So, the decoupling hypothesis stated that executive control *is* engaged at the onset of mind wandering whereas the executive failure hypothesis stated that executive control is *not* engaged at the onset. The current concerns hypothesis stated that mind wandering occurs insofar as it allows people to cycle between multiple goals. So, the current concerns hypothesis considered mind wandering as a potentially beneficial activity to maintain progress when pursuing multiple goals. Finally, the meta-awareness hypothesis stated that mind wandering is a result of failed

metacognition. That is, any occurrence of mind wandering must be associated with a lack of meta-awareness because meta-awareness is required to remedy a mind wandering state.

Subsequent research often cited these four hypotheses for *why* one's mind might wander (e.g., Seli et al., 2017; Smallwood & Schooler, 2015).

In addition to the cognitive models, other researchers have focused on modeling the neurological structures and activation associated with various mental processes. In Mittner and colleagues' (2016) Neural Model, the authors proposed a link between two brain systems associated with mind wandering: the default mode network and the locus coeruleus norepinephrine system. Using neurological observations and theorizing, the authors proposed a distinction between an uncontrolled off-focus state and a controlled mind wandering state. This distinction was proposed because brain networks associated with cognitive control are sometimes activated during mind wandering. Such activation suggests the control networks help maintain a preexisting train of thought and prevent external distractions. Other times, the networks associated with cognitive control are *not* activated during mind wandering. A lack of cognitive control describes a form of mind wandering described as 'mental drifting'. This suggests the possibility of unwanted noise in the study of mind wandering, in which off-focus attention is conflated with active mind wandering states. Additionally, no research has attempted to integrate the cognitive intentionality theory (Carriere, Seli, & Smilek, 2013) with the neurological model (Mittner et al., 2016). One might map intentionality onto Mittner and colleagues' (2016) model such that intentional mind wandering reflects the active mind wandering state whereas unintentional mind wandering might reflect the uncontrolled 'mental drifting' state.

Other models have focused on the content of mind wandering. Dane's (2018) mind wandering content model specified which types of mind wandering might be detrimental to task performance and which types might be productive. Dane (2018) distinguished between problem-focused and emotion-focused mind wandering content. He proposed that problem-focused content leads to more positive effects of mind wandering on performance whereas emotion-focused leads to more negative effects. For each form of mind wandering content, Dane (2018) theorized three subcategories: current concerns, mental time travel, and imagination. These three types of mind wandering manifest in different ways between problem-focused and emotion-focused content. For example, a problem-focused current concern might be work-related, goal-directed concerns facilitating memory and goal pursuit, leading to better performance. However, an emotion-focused current concern might result in insufficient allocation of cognitive resources and avoidance behavior, leading to worse task performance. Also, Dane (2018) was focused particularly on the occurrence of mind wandering in the workplace. Often, such contextual considerations are absent from mind wandering research. This mind wandering content model provides a possible explanation for conflicting results regarding the effect of mind wandering on performance.

Most theories of mind wandering have assessed the behavior in certain contexts. Most assess mind wandering in the context of sustained attention tasks. Other theories take a generalized (i.e., non-situation-specific) approach. However, few have considered mind wandering's prevalence in workplace settings, specifically (excluding Dane, 2018).

Outcomes assessed by prior research. There are many key outcomes associated with mind wandering. Mooneyham and Schooler (2013) categorized mind wandering outcomes as either costs or benefits. Some of the key costs are performance (i.e., reading comprehension,

cognitive ability tests, task performance), mood, and inability to control automatized behavior. Some key benefits are creative performance and autobiographical planning. Additionally, researchers have theorized that mind wandering might be adaptive such that it can result in (a) relief from boredom, (b) attentional cycling, and (c) dishabituation (Andrews-Hanna, Smallwood, & Spreng, 2014; Mooneyham & Schooler, 2013). That is, mind wandering might facilitate needed (a) stimulation, (b) multiple-goal pursuit, and/or (c) mental breaks. Mind wandering to positive content might increase stimulation and make one feel better than she was before if she was previously bored. Also, mind wandering can allow one to think prospectively about how he might work toward a secondary goal he is not currently working on. Indeed, prospective planning is associated with mind wandering (Andrews-Hanna, Smallwood, & Spreng, 2014). Finally, mind wandering can allow people a mental break if they are currently feeling overwhelmed by task demands, allowing dishabituation. Such a break likely reduces the chances of burnout.

As mentioned earlier, researchers have found evidence that mind wandering significantly impacts performance (Mrazek et al., 2012; Randall, Oswald & Beier, 2014). In a meta-analysis examining relationships between mind wandering, cognition, and performance, researchers provided evidence that mind wandering was negatively related to task performance (Randall, Oswald & Beier, 2014). Also, the negative relationship was stronger for more complex tasks. The more complex the task, the more important it becomes to maintain on-task focus and attention. Such results highlight the importance of task characteristics when examining the effect of mind wandering on performance outcomes to highlight boundary conditions in which mind wandering might *not* adversely affect performance. Additionally, mind wandering has detrimental effects on multiple types of performance, such as reading comprehension and

cognitive ability performance. In laboratory settings, people reporting more frequent mind wandering do more poorly on comprehension and the effect is moderated by the complexity of the reading material (Feng, D'Mello, & Graesser, 2013). Research has demonstrated the effect of mind wandering on cognitive performance in tasks involving sustained attention, working memory capacity, intelligence testing, and aptitude testing (Mooneyham & Schooler, 2013). Unsurprisingly, across tasks that require sustained attention, mind wandering is negatively related to performance.

Research has demonstrated that mind wandering is associated with lower mood (Carriere, Cheyne, & Smilek, 2008; Killingsworth & Gilbert, 2010). Despite people mind wandering to pleasant topics more often than unpleasant and neutral topics, there is a negative main effect of mind wandering on one's happiness (Killingsworth & Gilbert, 2010). Ruminating on non-present thoughts appears to affect mood regardless of the content one ruminates about. Also, research has demonstrated that ruminative mental states focusing on non-present stimuli are associated with mental health problems (e.g., Burnette et al., 2009; Papageorgiou & Wells, 2004). Indeed, research has linked mind wandering to states of boredom and/or depression (Carriere, Cheyne, & Smilek, 2008).

Mind wandering can result in a loss of attentional control. In sustained attention to response tasks (SART), mind wandering is associated with lower performance (Cheyne et al., 2009). That is, mind wandering can lead people to fail to notice new stimuli as well as fail to withhold automatized responses. SART is so strongly associated with mind wandering that it is often used as a behavioral indicator of mind wandering.

However, there are also several positive outcomes associated with mind wandering, such as creative performance. When given a divergent thinking task, participants provided more

creative solutions after mind wandering (Baird et al., 2012). However, it is difficult to determine whether participants mind wander about the task at hand or about other life concerns. If participants mind wander to irrelevant concerns, perhaps there would be no effect of mind wandering on creativity. Regardless, such results have demonstrated that creative and cognitive performance are different. That is, cognitive performance often benefits linearly from attentional resources whereas creative performance might require an ‘incubation period’ during which one must take a break from the creative task and return later. These findings highlight the importance of mind wandering content when predicting important outcomes.

Another positive outcome associated with mind wandering is autobiographical planning. Often when mind wandering, people think prospectively about future events (D’Argembeau, Renaud, & Van der Linden, 2011). Neuroimaging research has supported such claims by demonstrating that the default mode network is in areas of the brain associated with self-referential or autobiographical mental activity (i.e., core region; Andrews-Hanna, Smallwood, & Spreng, 2014). Mind wandering allows people to plan for future events and consider other responsibilities or duties they have to the exclusion of their current task. Whereas this function might have adverse effects on performance, mind wandering may promote healthy prospective planning within individuals.

Antecedents assessed by prior research. There are many key antecedents associated with mind wandering. Research has identified mindfulness, cognitive resources, metacognition, and Big Five factors as being negatively related with mind wandering. Additionally, research has identified boredom as being positively related with mind wandering.

Mindfulness is defined as conscious awareness of both internal and external sources of information at the current moment (Dane, 2011; Dane & Brummel, 2014; Good et. al., 2016).

Researchers have defined mindfulness as a related, yet distinct, opposing construct to mind wandering (Dane, 2011). Often, mindfulness is described and tested as an antecedent to mind wandering, such that those high in mindfulness are less likely to engage in mind wandering (Good et. al., 2016; Mrazek, Smallwood, & Schooler, 2012). Mindfulness is positively related to outcomes such as reading comprehension and cognitive performance (Good et. al., 2016). Given that mindfulness refers to one's ability to attend to both external and internal stimuli simultaneously, mindfulness should be related to the frequency with which one's mind wanders to internal, task-irrelevant stimuli. Also, based on prior experimental and correlational evidence, researchers often refer to mindfulness training as the best way to reduce mind wandering (Jazaieri et. al., 2016; Mrazek, Smallwood, & Schooler, 2012). Research has demonstrated that both state-induced mindfulness and dispositional mindfulness are negatively related with mind wandering (Jazaieri et al., 2016; Mrazek, Smallwood, & Schooler, 2012).

Often, research cites cognitive resources as a predictor of mind wandering (e.g., McVay & Kane, 2009; Randall, Oswald & Beier, 2014; Smallwood & Schooler, 2006; Thomson, Besner, & Smilek, 2015). However, as mentioned earlier, several competing theories have disputed whether the relationship is positive, negative, or both (depending on how many resources are being allocated to either the primary task or the mind wandering content; Smallwood & Schooler, 2006; McVay & Kane 2009; Thomson, Besner & Smilek, 2015). Research addressing this inconsistency has highlighted 'cognitive flexibility' (i.e., one's ability to transform task *unrelated* thoughts into task *related* thoughts; Rummel & Boywitt, 2014) and time on task (Randall, Oswald, & Beier, 2014) as key moderators of the relationship between cognitive resources and mind wandering. Further, models of attention regulation highlight the

interactive nature of cognitive resources and task characteristics when predicting mind wandering behaviors (e.g., Randall, Oswald, & Beier, 2014).

Also, researchers have cited a lack of meta-awareness as a reason why one's mind might wander (Schooler et al., 2011; Seli et al., 2017; Smallwood, 2013; Smallwood & Schooler, 2015). As mentioned earlier, researchers have attributed mind wandering to a failure of one's metacognition to monitor thoughts continuously, called the meta-awareness hypothesis. Further, metacognition is a critical component in the process of mind wandering such that it can determine which *type* of mind wandering occurs: tune outs versus zone outs (Seli et al., 2017). Tune-outs are made with conscious awareness and intent whereas zone-outs occur without such awareness. Unsurprisingly, zone-outs are more strongly related to performance decrements. Also, researchers have learned that incentivizing participants led to greater instances of self-caught mind wandering and also improved the validity of the self-reported information (Zedelius, Broadway, & Schooler, 2015). Such findings have demonstrated the importance of metacognition when predicting mind wandering.

Moreover, researchers have investigated whether the Big Five factors of personality are related to mind wandering. Indeed, research has demonstrated significant relationships between mind wandering and conscientiousness ($r = -.31$ to $-.58$, $p < .01$) and neuroticism ($r = .22$ to $.41$; $p < .01$) across multiple studies (Carciofo et al., 2016). Thus, research has suggested main effects of personality factors when predicting mind wandering frequency. However, other research has addressed how personality might influence the content of one's mind wandering episode. For example, openness is associated with positive daydreaming content whereas neuroticism is associated with negative daydreaming content (Zhiyan & Singer, 1997). Thus, personality is an important predictor of mind wandering, both in frequency and content.

Originally, researchers defined boredom as an emotion (Farmer & Sundberg, 1986), which researchers later refined to a transient, emotional state that results from one wanting but being unable, to participate in some desired activity (Fisherl, 1993). Using either definition, research suggested boredom was significantly related to depression and negative affectivity. Researchers have described boredom as a result of (1) failure to retrieve appropriate information, (2) failure to participate, and/or (3) attributing the cause of one's boredom to the environment (thus reinforcing a preexisting bored state; Eastwood et. al. 2012). Both boredom and mind wandering are associated with negative affectivity and lower mood (Farmer & Sundberg, 1986; Fisherl, 1993; Killingsworth & Gilbert, 2010). Often, researchers have described ways in which a bored state might lead to greater instances of mind wandering (Cummings, Gao, & Thornburg, 2016). Cummings, Gao, and Thornburg (2016) proposed a process model such that boredom leads to frustration and complacency that then leads to performance decrements. However, the effect of frustration/complacency on performance was moderated by task unrelated thoughts, or mind wandering. Indeed, researchers have established boredom as a critical antecedent of mind wandering.

In summary, prior research considered individual differences and correlates of mind wandering but scarcely attempted to integrate the construct within preexisting theoretical frameworks. As previously described, many researchers attempted to describe what mind wandering *is* and *how* or *why* it occurs, but few tried invoking preexisting frameworks and investigating whether mind wandering would fit within such frameworks. Integrating mind wandering within preexisting models may change how researchers consider the involved mental processes. Researchers have attempted to integrate mind wandering into both neurological (Mittner et al 2016) and cognitive (i.e., boredom; Cummings, Gao, & Thornburg, 2016) models.

However, the cognitive models focus exclusively on monotonous tasks and their effects on attentional lapses. However, there are more comprehensive models addressing all forms of task difficulty, within which mind wandering should fit. One such framework is the thoroughly researched domain of self-regulation.

Theories of Self-Regulation

Self-regulation describes the process through which one alters one's behavior. Self-regulation is the motivational process that guides the allocation of time to and effort applied toward attaining a goal (e.g., Bandura, 1991; Carver & Scheier, 1982). An unmotivated person is unlikely to allocate the appropriate amount of mental resources required to accomplish some goal.

Two theories describing self-regulatory processes are Control Theory and Social Cognitive Theory. Control Theory originated in the engineering field and was modified for human behavior by Carver and Scheier (1982). The process underlying Control Theory is a negative feedback loop, in which people allocate attentional resources to reduce perceived discrepancies between current states and desired states.

Control Theory has three main components: standards, monitoring, and operation (Carver & Scheier, 1982). Standards are ideals or goals a person holds. Monitoring is the process by which a person compares his actual state to his standards. Operation is the process through which effort is exerted to reduce perceived discrepancies between the person's actual state and his/her standards. The Operation stage assumes appropriate allocation of attentional resources such that one is actively working to reduce the perceived discrepancy. Also, the Operation stage assumes one's efforts lead to behavioral outcomes that cause an observable effect on the

environment. These three components are considered the primary mechanisms through which people reduce perceived discrepancies and self-regulate their behavior.

In Social Cognitive Theory, Bandura (1991) suggested that human behavior is regulated by the ongoing exercise of self-influence (Bandura, 1991). Within self-regulation, there are three principal subfunctions: self-monitoring of one's behaviors, judgement of one's behavior compared to personal standards and environmental circumstances, and affective self-reactions (Bandura, 1991). These three subfunctions constitute the structure of this self-regulatory system and are all influenced by self-efficacy, the belief in one's ability to execute a particular behavior successfully (Bandura, 1977). Bandura (1991) claimed self-efficacy is the most central mechanism of human agency because it influences the subfunctions of the self-regulatory system.

The self-monitoring subfunction describes the role of self-reflection in the self-regulatory process. Bandura (1991) described self-monitoring as having a self-diagnostic function, allowing people to notice patterns about their own behaviors, and a self-motivating function, allowing people to set realistic goals for themselves as well as monitor their progress toward accomplishing goals. Self-monitoring can be influenced by many factors such as preexisting cognitive structures, self-beliefs, perception of one's functioning, how performance information is organized for memory encoding, and mood. The likelihood of self-monitoring causing change in an individual depends on the temporal proximity of the self-monitoring to behavior and the informativeness of the performance feedback (Bandura, 1991). Similar to an assumption of the Operation stage in Control theory, the self-monitoring subfunction assumes that one's behaviors leave an observable effect on the environment.

The judgmental subfunction involves a comparison between one's current state and various standards. People use this subfunction to determine whether they have achieved their goal or need to continue allocating resources toward its accomplishment. People acquire information regarding their goal progress from the self-monitoring subfunction whereas standards can be acquired through various sources depending on the person's self-monitoring orientation (Snyder, 1987). Standards are obtained from an interaction between self-generated and external sources of influence. Standards represent one's ideal/ought state (i.e., one's goal), which is compared with one's current state to gauge the discrepancy. The resulting discrepancy will be used either to exert effort or to cease performing the activity.

The affective self-reaction subfunction is the emotional response to perceiving a discrepancy between current and ideal/ought states. Self-reactions are considered the consequences of behavior that cue continued self-regulation. Self-reactions are the outcomes of the self-monitoring and judgement subfunctions. A person needs to monitor her performance and compare it to her given standards before knowing how she should feel about her performance level. Also, self-reactions depend on the perceived performance determinants, or what factors led to a person's success or failure. If the person succeeds due to external determinants, he will be less likely to derive self-satisfaction from his accomplishment. When a positive self-reaction is anticipated from achieving a given goal, a person becomes more motivated to accomplish said goal. People pursue activities that produce positive self-reactions and avoid activities that produce negative self-reactions (Bandura, 1991).

Generally, both theories of self-regulation share a similar structure. That is, through the process of monitoring one's current state and judging its similarity to some ideal/ought state, one perceives a discrepancy that is then minimized through the exertion of effort and attentional

resources. Then, the resulting state is compared to the ideal/ought state again to see if a discrepancy still exists. Such processes describe the fundamental discrepancy creation and reduction process of self-regulation, invoking two critical components of self-regulation: goal setting and self-efficacy.

Goal setting. Research into goal setting began with the psychological construct level of aspiration. Dembo (1931) found that when required goals are too difficult, people set intermediate goals (as referenced in Ricciuti, 1951). She called these intermediate goals the momentary level of aspiration. The first major study of level of aspiration was done by Hoppe (1930), who examined the nature of level of aspiration, finding it to fluctuate in response to perceived success and/or failure (as referenced in Ricciuti, 1951). Often, researchers have examined how people perceive success and failure when they compare their performance levels to their levels of aspiration (Lewin et al., 1944; Sears, 1940). Hoppe (1930) conceptualized level of aspiration as an abstract combination of constantly shifting expectations, goals, and demands (as referenced in Ricciuti, 1951). Lewin and colleagues (1944) describe the process through which levels of aspiration affect subsequent performance. One has a prior performance level that may be acceptable or not, which prompts the setting of a level of aspiration. Setting such a level produces an “attainment discrepancy” which prompts the exertion of effort. Finally, one experiences a reaction to their efforts, whether it be a feeling of success, failure, relinquishment of the level of aspiration, or continuing with a new level of aspiration. Largely, this sequence of events has remained consistent through subsequent motivational models. Empirically, level of aspiration was studied as a point of comparison with performance levels. Later, researchers questioned whether the process of setting goals might engage motivational behavior (Locke, 1968; Locke & Latham, 1990).

Locke (1968) argued that goals themselves motivate people to take action. Locke (1968) proposed that goal difficulty is related positively to performance. Also, goals should be specific because people with specific hard goals typically outperform those with vague or “do your best” goals. Finally, Locke (1968) argued that behavioral intentions regulate choice behavior. Often, goals and intentions mediate the effects of external incentives on outcomes.

Locke and Latham extended Locke’s (1968) assertions with Goal-Setting Theory, suggesting that goals are regulators of human action (e.g., see Locke, 1968; Locke & Latham, 1990 for reviews). Locke and Latham (1990) classified variables that affect the goal setting process as goal content or goal intensity variables. Goal content variables were related to the outcome of the goal (e.g., goal level and goal specificity). Goal intensity variables consisted of factors like goal commitment and the importance of the goal. Research has found goals that are specific, difficult, and attainable, provided the person is committed to the goals, produce higher levels of performance (e.g., see Locke & Latham, 1990 for a review).

Prior research has characterized influences on one’s goal choice as consisting of both approach- and avoidance-based components (Elliot, 1999). Approach and avoidance orientations are distinct factors such that high/low levels of one does not preclude high/low levels of the other. Approach goal orientations reflect one’s disposition toward being motivated to pursue a perceived feeling of accomplishment. Avoidance goal orientations reflect one’s disposition toward being motivated to avoid stress and other aversive consequences of *not* accomplishing some goal. So, individuals with higher levels of approach-goal orientation might be more likely to set higher goals for themselves, to challenge themselves and produce a greater sense of accomplishment. Individuals with higher levels of avoidance-goal orientation might be more likely to adopt a more conservative goal, to minimize their chances of failure and mitigate

resulting negative affect. Once one adopts a goal, its effect on outcomes is influenced by several mediators and moderators.

There are four main mediators of the goal setting – performance relationship: effort, persistence, direction of attention, and requisite ability (Locke & Latham, 2006). Assuming adequate ability, greater effort is required to accomplish difficult goals, and exerting more effort leads to better performance (Locke & Latham, 1990). Setting specific, challenging goals leads to effort being exerted over a longer period of time, otherwise known as persistence (Bavelas & Lee, 1978). When people pursue goals, they direct their attention toward accomplishing the goals, which leads to retrieval of relevant task knowledge (Locke & Latham, 1990). Finally, goals prompt people to retrieve relevant task knowledge. If relevant task knowledge is unavailable, such as with a complex, novel task, the person with difficult goals will be motivated to seek new knowledge.

Key moderators of the goal setting – performance relationship are feedback, commitment, task complexity, and situational constraints (Locke & Latham, 2006). As the quality of feedback increases, goal setting will have a stronger positive relationship with performance. People will be able to more accurately monitor their progress toward accomplishing their goal. Commitment is required for effective goal setting because otherwise people would not be invested nor exert attentional resources toward accomplishing the goal. For complex tasks, it is more difficult to obtain task-relevant information, which means the effect of goal setting on performance is attenuated. Finally, research has found that situational constraints, such as completeness of task information, ease of use of materials, and similarity of the work environment to the training environment weakened the relationship between goal setting and performance (Peters et al., 1982).

Self-efficacy. Self-efficacy is defined as one's belief in his ability to accomplish some task (Bandura, 1977). Bandura (1977) claimed when individuals have a high level of self-efficacy, they are more likely to succeed at a given task. Stajkovic and Luthans (1998) found an average corrected correlation between self-efficacy and work-related performance of $\rho = .38$ with the relationship being moderated both by task complexity and type of study setting.

As mentioned earlier, self-efficacy influences each stage in Bandura's (1986) Social Cognitive Theory. Monitoring, judgement, and affective self-reactions are all influenced by self-efficacy, the belief in one's ability to perform a task or more specifically to execute a particular behavior successfully (Bandura, 1977). Self-efficacy influences performance through goal setting. Those with high self-efficacy tend to set higher goals for themselves. Also, the valuation aspect of the judgement subfunction, how much people value the task they are performing, is affected by self-efficacy. People show more interest in activities they believe themselves to be good at (Bandura & Schunk, 1981). Due to its wide applicability within the self-regulatory process, Bandura (1991) considered self-efficacy to be the most central mechanism of personal agency.

Bandura (1991) claimed self-efficacy is significant in both discrepancy production and discrepancy reduction systems. Discrepancy production involves goal setting, in which self-efficacy affects the goal level a person sets for him- or herself. Discrepancy reduction is the process of working toward a set goal, reducing the perceived discrepancy between current states and ideal/goal states. To reduce perceived discrepancies, people use self-efficacy to determine how much effort is needed to achieve their set goal. However, if one's self-efficacy is inflated, he might assume the task to be easier than it is and allocate insufficient attentional resources toward completion of the goal.

Allocation of attentional resources. One fundamental assumption of both theories of self-regulation is that upon detection of a negative discrepancy between current and ideal states, one will allocate attentional resources toward behaviors that will decrease the discrepancy. In Control Theory, commitment to a goal is followed by the allocation of attentional resources toward the goal (Carver & Scheier, 1982). Similarly, in Social Cognitive Theory, Bandura (1991) described how the exertion of effort or goal relinquishment follows the judgmental subfunction. Both theories assume attentional resources being allocated to the goal are being allocated in such a way that one might observe the effect of one's efforts. This assumption exists because self-regulation requires the capability to monitor changes in one's behavior and performance levels. However, if one's attentional resources are being directed toward *internal* stimuli, which are more difficult to observe, one cannot effectively self-regulate.

The behaviors one engages in response to a perceived discrepancy largely influence how successful one is at self-regulating. For one to successfully self-regulate, his behavioral response to the perceived discrepancy must produce an observable consequence, either positive or negative. That is, one must receive clear feedback about the results of one's actions if one is to continually monitor and alter behavior to progress toward a goal. If one does not possess the requisite ability or knowledge to pursue one's goals, one might allocate attentional resources incorrectly, or in a way that does not progress one further toward goal completion. Incorrect allocation of attentional resources results in several behaviors that do not progress one toward successful goal accomplishment.

Mind Wandering as a Failure of the Self-regulatory Process

Mind wandering might be considered a behavioral outcome of failed self-regulatory processes. In both Social Cognitive Theory (Bandura, 1991) and Control Theory (Carver &

Scheier, 1982), the two major theories of self-regulation, behaviors are defined as a result of a perceived discrepancy between one's current and ideal/ought state (Bandura, 1991; Carver & Scheier, 1982). Those who perceive a positive discrepancy, such that they have already surpassed their ideal state, might be more likely to mind wander because of a perceived surplus of attentional resources. However, those who perceive a negative discrepancy, such that their current state is deficient in comparison to their standards/goals, should be motivated to exert effort and reduce the perceived discrepancy through exertion of effort and attentional resources. Thus, mind wandering can be a result of both positive and negative discrepancies.

Both Social Cognitive Theory (Bandura, 1991) and Control Theory (Carver & Scheier, 1982) have described ways in which behaviors such as mind wandering derive from perceived discrepancies. In Control Theory, Operation is the process through which effort is exerted to reduce perceived discrepancies between one's actual state and her standards. Researchers have described such effort as the "output function", or the behavioral outcome. Similarly, in Social Cognitive Theory, Bandura (1991) considered affective self-reactions the final stage in self-regulation immediately preceding a behavioral outcome. In both theories, researchers have defined behaviors as a result of comparing a current state with an ideal/ought state. As a behavior, one might consider mind wandering to be the outcome of operation (in Control Theory) or the affective self-reaction (in Social Cognitive Theory). So, if one perceives his current state as exceeding his ideal/ought state, he has no affective self-reaction and the behavioral outcome may be to direct his attention inward toward task-irrelevant stimuli. This represents intentional mind wandering, wherein one purposefully directs his attentional resources toward internal stimuli due to a perceived lack of importance of allocating the resources toward external stimuli. Alternatively, if one perceives his current state to be *deficient* when compared

to his ideal/ought state, he should want to exert energy toward reducing the discrepancy. However, intention does not guarantee effective resource allocation. That is, perhaps some people have the best intention of reducing the discrepancy but are easily distracted due to internal stimuli and direct their attentional resources inward. This example represents unintentional mind wandering, wherein one may find themselves distracted from the current task.

Locke and Latham (2006) considered such misallocation of attentional resources to be a key mediator in the effect of goal setting on subsequent performance. In the context of self-regulation, goals are unique such that they not only spur motivation (like perceived negative discrepancies) but also guide one's attention toward goal-relevant tasks. Goals direct attentional resources toward goal-relevant tasks and away from goal-irrelevant tasks. Because mind wandering reflects the shifting of attentional resources toward non-goal-relevant stimuli, mind wandering might be considered a failure of the goal striving process.

Not only can one consider mind wandering to be an outcome of failed self-regulation or goal striving, but mind wandering additionally *stalls* the self-regulatory process such that progress and evaluative judgments are not possible for the individual until the mind wandering ceases, emphasizing the importance of understanding antecedents of a behavior with such dire side-effects. Control Theory's Operation stage assumes, in response to a perceived discrepancy, the behavioral outcome results in both (a) appropriate allocation of attentional resources and (b) an observable impact on the environment. Mind wandering represents a behavior that violates both assumptions. That is, mind wandering is a misallocation of attentional resources that does not have a direct impact on the environment. As mentioned earlier, mind wandering requires meta-awareness to detect and can persist for a long time if it remains undetected. In both Control theory and Social Cognitive Theory, one's behavioral outcome from a perceived discrepancy

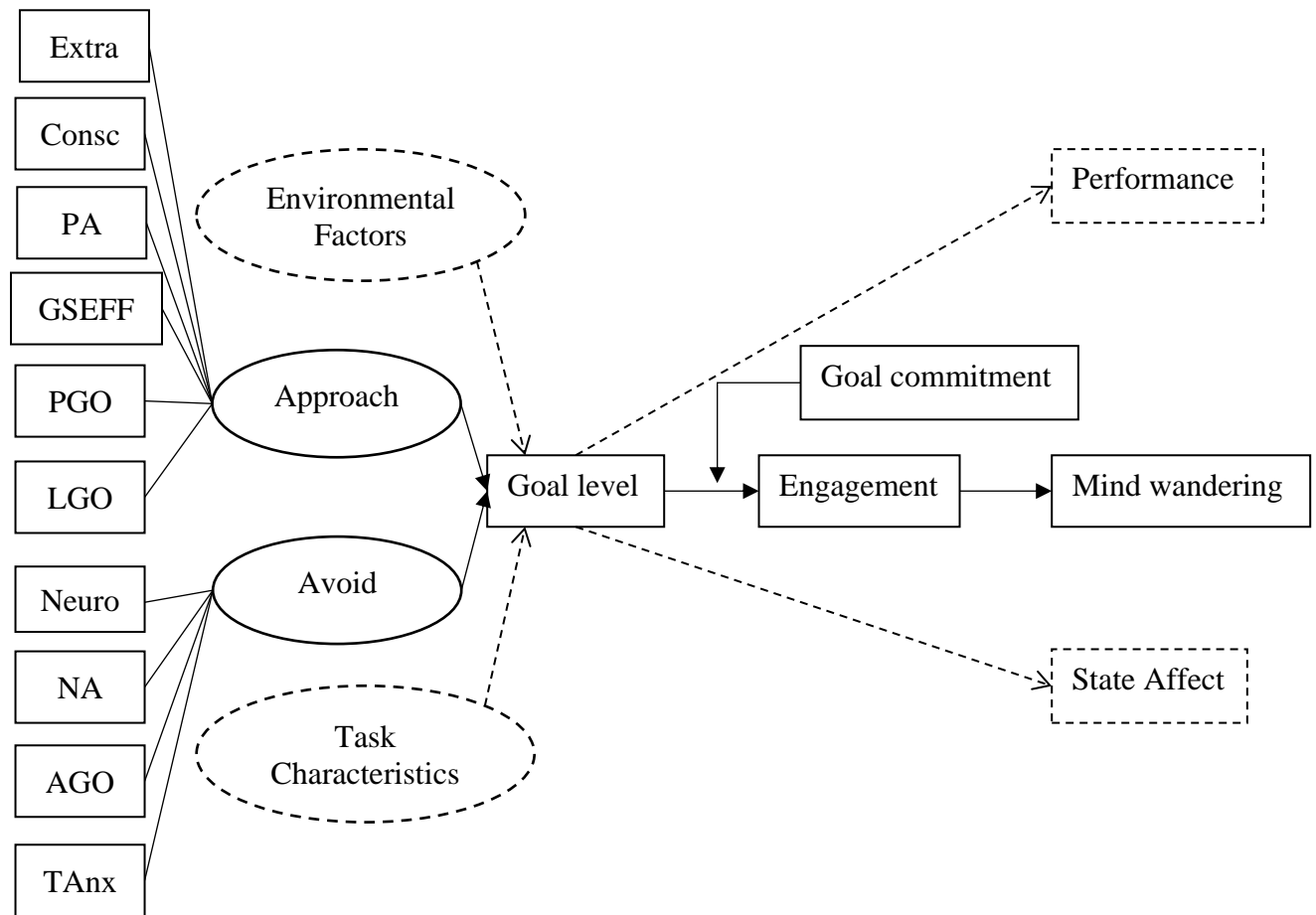
must be observable before it can be re-evaluated to determine if the result of the behavior has reduced the discrepancy at all. Thus, mind wandering can effectively stall the self-regulatory feedback loop indefinitely, wasting time and attentional resources on goal-irrelevant stimuli. It is immensely important to understand the predictors of such a dangerous behavioral outcome.

Thus far, research has considered mind wandering a failure of attention, but considering mind wandering as a consequence of failed self-regulation suggests the examination of unique antecedents to the literature. There is a plethora of research on self-regulatory antecedents of goal striving and performance (for a review, see Locke et al., 1981) that might also predict behavioral indicators of poor goal striving (i.e., mind wandering). Often, researchers have invoked both affective and motivational mechanisms through which self-regulatory antecedents influence important outcomes (e.g., Aarts, Custers, Veltkamp, 2008; Bandura, 1977; Seo, Barrett, & Bartunek, 2004). The mind wandering literature has considered affective predictors yet ignored motivational predictors. Likely, both predict mind wandering within a larger self-regulatory framework.

A self-regulatory model of mind wandering. One of the most salient research findings about mind wandering is how frequently people mind wander. Using experience sampling, Killingsworth and Gilbert (2010) estimated people mind wander approximately 50% of the time. That is, about 50% of the time, people are likely to be thinking about something other than their immediate, primary task. Moreover, Killingsworth and Gilbert (2010) found evidence that while people are at work, they are more likely to be mind wandering than those not at work. Thus, there is substantial need for an expanded model of mind wandering antecedents that might include self-regulatory mechanisms to explain such frequent occurrences of the behavior. Such a model is shown as Figure 1.

Figure 1

The hypothesized model of self-regulatory antecedents of mind wandering.



Note. Dotted lines represent theorized relationships that will not be tested in the current study.

Extra = Extraversion, Consc = Conscientiousness, PA = Positive Affectivity, GSEFF = Generalized Self-efficacy, PGO = Prove performance goal orientation, LGO = Learning mastery goal orientation, Neuro = Neuroticism, NA = Negative Affectivity, AGO = Avoid performance goal orientation, TAnx = Trait anxiety

The hypothesized model illustrates ways in which environmental, personal, and task characteristics might predict mind wandering among other important outcomes (i.e., performance, state affect). Indeed, self-regulatory theories describe how environment, task, and

person characteristics interact when predicting behaviors (i.e., reciprocal determinism; Bandura, 1978), and one such behavior is goal striving. Put simply, perceived discrepancies are a product of the observer (i.e., person characteristics) and the situation (i.e., task, environment characteristics). So, it is important to remember the role person, task, and environment characteristics might play when predicting mind wandering. However, the goal of the current study is to focus on person-level characteristics and how they might influence mind wandering through goal choice and goal striving processes.

More specifically, for the purposes of the hypothesized model, I will focus on *stable* personal characteristics and examine how they might predict mind wandering via self-regulatory mechanisms. That is, I want to examine preexisting levels of such characteristics and the role they play when predicting the frequency with which one's mind wanders. As mentioned previously, cognitive ability likely predicts mind wandering as the cognitive resources available to someone predict the way such resources are allocated (i.e., toward task-relevant or task-irrelevant stimuli). However, cognitive ability will not be tested in the current model, as my focus is to test self-regulatory, as opposed to cognitive, predictors of mind wandering. Additionally, important outcomes of goal setting such as performance and state affect are beyond the scope of the current study but should be considered when modelling self-regulatory mechanisms relating to mind wandering in future research. Indeed, performance and state affect may be considered outcomes of self-regulation, but they are not the outcomes of interest for the current study. My aim is to test self-regulatory antecedents of mind wandering.

Hypothesis 1. The hypothesized model shown in Figure 1 will provide acceptable fit.

Next, I will describe each part of the self-regulatory model of mind wandering shown in Figure 1. I will start with the factors loading onto either approach- or avoidance-based

temperament latent factors. Next, I will describe the way in which such temperaments influence the goal level one adopts. Then, I will discuss how goal level interacts with goal commitment when predicting engagement. Next, I will describe how engagement is related to subsequent mind wandering. Finally, I will describe several ways in which self-regulatory variables might have indirect effects on mind wandering.

As mentioned earlier, approach- and avoidance-based orientations are important to consider when predicting goal level, and such orientations are represented often as latent temperaments consisting of several manifest variables. Variables used in prior research to reflect an approach temperament include extraversion, positive affectivity, self-efficacy, prove-performance goal orientation, and learning goal orientation (Elliot, 1999; Elliot & Thrash, 2002; Kandemir, 2014). Variables used in prior research to reflect an avoidance temperament include neuroticism, negative affectivity, and avoidance goal orientation (Elliot, 1999; Elliot & Thrash, 2002; Kandemir, 2014). Also, trait anxiety is associated closely with an avoidance temperament, as indicated by several items on Elliot and Thrash's (2010) measure of avoidance temperament (e.g., "I feel anxiety and fear very deeply"). Thus, such variables should represent a latent approach and avoidance temperament.

Hypothesis 2a: Extraversion, conscientiousness, positive affectivity, generalized self-efficacy, prove-performance goal orientation, and learning goal orientation will load onto a single latent factor.

Hypothesis 2b: Neuroticism, negative affectivity, avoidance-goal orientation, and trait anxiety will load onto a single latent factor.

Subsequently, such temperament factors influence the goal level one chooses to adopt. Again, approach and avoidance temperament factors are distinct and consequently have unique

effects on goal level. Indeed, research has suggested both approach and avoidance factors and orientations influence the goals one sets for oneself (Heimerdinger & Hinsz, 2008; Payne et al., 2007). If one is more inclined to approach success, one might be more motivated by the idea of accomplishing a difficult goal and set higher goals for oneself. However, if one is less motivated by the idea of accomplishing a difficult goal, one might be content with setting and pursuing a lower goal level. If one is more inclined to avoid failure, one might set lower goals for oneself to minimize the possibility of failed goal pursuit. Yet, if one is less inclined to avoid failure, one might be more willing to set higher goals due to a lesser fear of failure.

Hypothesis 3a: The latent factor of approach-based temperament will be positively related to goal level.

Hypothesis 3b: The latent factor of avoidance-based temperament will be negatively related to goal level.

Goal setting theory states a key moderator of goal level's effect on outcomes is goal commitment (Locke & Latham, 2006). The success of goal setting is contingent on the amount of effort and attentional resources allocated to goal-related tasks, which is dually influenced by the perceived difficulty of the goal as well as how committed one is to the completion of said goal. If a goal has been assigned to an individual, or if other concerns take priority in his life, he should be less likely to allocate attentional resources toward its completion. Such a reduction in one's allocation of attentional resources toward goal completion often precedes goal relinquishment, wherein one stops trying and gives up on the goal. Higher levels of goal commitment increase the likelihood that an individual will continue exerting effort toward completion of a difficult goal, thus suggesting its moderating role on the relationship between goal level and engagement.

Hypothesis 4: Goal level and goal commitment interact when predicting engagement, such that the positive relationship between goal level and engagement is strengthened with increasing goal commitment.

Next, motivational factors such as work engagement likely are related to mind wandering. Work engagement is defined as a positive, affective-motivational state of work-related well-being (Bakker et al., 2008). Such a state is defined as applying to multiple tasks which, together, constitute the working environment. Often, theories of engagement have included facets such as ‘absorption’, a characteristic associated with people who are fully concentrated on and happily engrossed in their work (Bakker et al., 2008; Rothbard, 2001). Facets sharing conceptual similarity with attentional control might influence the likelihood and extent of mind wandering. Indeed, researchers have suggested that increased task engagement can reduce the frequency of mind wandering (Smallwood & Schooler, 2015). This relationship might translate to *work* engagement, such that individuals experiencing greater work-related well-being should be less likely to mind wander, in part because these individuals have a lower need to ameliorate states of boredom or exhaustion (as proposed by the ‘relief from boredom’ and ‘dishabituation’ explanations for mind wandering). People who are either disengaged or unmotivated at work are likely to let their mind wander at a higher frequency than those engaged and motivated at work.

Hypothesis 5: Engagement will be negatively related to mind wandering.

Finally, several of the self-regulatory variables previously described likely have indirect effects on mind wandering. For example, if an individual sets a more difficult goal for herself, she should be more likely to allocate attentional resources to the goal and fewer toward internal stimuli. As mentioned earlier, both models of self-regulation state that goal-oriented behavior is

contingent on a perceived discrepancy between current and ideal states (Bandura, 1991; Carver & Scheier, 1982). The difficulty of one's goal can be directly mapped onto self-regulatory theories as the magnitude of one's discrepancy between a current and ideal state. Both theories state that the larger the discrepancy, the greater amount of attentional resources which should be allocated to goal-related tasks. The more attentional resources allocated toward goal-related tasks indicates higher engagement and leaves fewer in reserve to be allocated toward internal stimuli (Smallwood & Schooler, 2006). That is, when one's goal performance level is high, one must be more strongly engaged in the task to facilitate successful goal accomplishment. Engagement facilitates attentional resource allocation, and without engagement one should be more likely to allocate attentional resources to non-task related internal stimuli (i.e., to mind wander). Thus, the difficulty of one's goal should have an indirect effect on mind wandering through engagement.

Hypothesis 6: Goal level will have an indirect effect on mind wandering through engagement.

Another implication of mind wandering applies to personal concerns. Often, researchers theorized that one's current concerns might predict mind wandering (Klinger, 1971; Seli et al., 2016; Smallwood, 2013). Current concerns theory (Klinger, 1971) described how often people have high-priority secondary tasks that cannot be immediately accomplished and often compete with the priority of the primary task for attentional resources. Indeed, research has demonstrated that one's current concerns (i.e., the importance of some secondary task) are related to the content within a mind wandering episode (Andrews-Hanna et al., 2014). However, researchers have failed to consider primary task importance as an antecedent when predicting mind wandering *frequency*. If one is executing a task that he perceives to be highly important, he

should be less likely to mind wander to secondary tasks. In the context of goal setting, executing goal-related tasks which one perceives to be highly important is considered a component of one's goal commitment (Hollenbeck & Klein, 1987).

If one is highly committed to a goal, she should be more likely to pay attention to the tasks associated with achieving said goal and less likely to be distracted by task-irrelevant information. Goal commitment is required for continued goal engagement and subsequent performance. Indeed, research demonstrates a positive relationship between goal commitment and performance ($\rho = .23$, Klein et al., 1999). As mentioned earlier, research has operationalized mind wandering as performance errors (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013; Smallwood et al., 2004), so it is likely that goal commitment is related to mind wandering through its effect on one's engagement. If one no longer feels committed to her goal, she would have little reason to remain engaged in allocating attentional resources toward its completion.

Hypothesis 7: Goal commitment will have an indirect effect on mind wandering through engagement.

If a goal is perceived to be too difficult and one is no longer committed to the goal, one should be more likely to become disengaged and let their mind wander. Indeed, researchers suggest goal difficulty interacts with goal commitment when predicting effort and performance (Erez & Zidon, 1984; Martin & Manning Jr, 1995), and mind wandering is often operationalized as performance errors (Mrazek et al., 2013; Smallwood et al., 2004). However, such performance errors are likely a result of a disengaged mental state. So, goal level and goal commitment should interact when predicting engagement and subsequent mind wandering.

Hypothesis 8: The interaction between goal level and goal commitment will have an indirect effect on mind wandering through engagement.

Method

I proposed two data collection activities for the current study. One was taken from a student sample whereas the other was taken from a sample of full-time working employees. I tested my hypotheses within both samples, inferring that a hypothesis has received stronger support if the results replicated across samples. Largely, the measures used for each sample were the same, with a few exceptions described below.

Student Sample

Participants

Participants in the student sample were students in an undergraduate psychology course at a mid-sized Midwestern university. Participation in this study counted toward students' overall psychology course grade.

Measures for Demographics and Tests of Predictions

Demographics. I measured demographics in a questionnaire asking participants about sex, age, year, major, GPA, ethnicity, employment status, and employment type (i.e., full-/part-time; see Appendix A).

Insufficient effort responding. To account for insufficient effort responding, I inserted the items “Please answer ‘Disagree’ if you are reading these instructions”, “I have never used a computer”, “I work twenty-eight hours in a typical work day”, and “Please answer ‘Strongly disagree’ if you are reading these instructions” between various measures in the survey. The items were inserted before the measures of personality, goal orientation, goal commitment, and task-specific self-efficacy. All items were rated on a 7-point graphic rating scale from (1) Strongly disagree to (7) Strongly agree obtained from Huang and colleagues' (2015) list of infrequency items used to detect careless responding.

Personality. I measured personality using the 50-item measure of the Big Five personality factors from Costa and McCrae's (1992) NEO-PI-R IPIP (International Personality Item Pool, 2013). For the five domains, Costa and McCrae (1992) reported Cronbach's alphas of 0.86 (Extraversion), 0.86 (Emotional Stability), 0.82 (Openness), 0.77 (Agreeableness), and 0.81 (Conscientiousness). Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Very Inaccurate) to 5 (Very Accurate). Sample items included "make friends easily" (Extraversion), "often feel blue" (Emotional Stability), "have a vivid imagination" (Openness), "respect others" (Agreeableness), and "am always prepared" (Conscientiousness). Item responses were averaged to provide an overall score for each factor. Higher scores indicated higher levels of the corresponding domain of the Big Five. See Appendix B for scale items.

Affectivity (positive, negative). I measured affectivity using Watson, Clark, and Tellegen's (1988) positive and negative affective schedule (PANAS). The PANAS is a 20-item scale. For each item, participants rate on a 5-point scale the frequency with which they have experienced the listed emotions in the past few weeks (1, *very slightly or not at all*; 5, *extremely*). The scale is scored by summing the responses to both the positive and negative affective words, generating distinct scores for both positive and negative affectivity. Higher scores indicate higher positive or negative affectivity. An example positive affective item is "Enthusiastic", and an example negative affective item is "Nervous". Watson and colleagues (1988) found the Cronbach's alpha of both the positive and negative affectivity scales to be .87. See Appendix C for scale items.

Generalized self-efficacy. I measured generalized self-efficacy using the New Generalized Self-Efficacy (NGSE) scale (Chen, Gully, & Eden, 2001). The NGSE is an 8-item

scale. For each item, participants rate on a 5-point scale the degree to which they disagree (1, *strongly disagree*) or agree (5, *strongly agree*) with the item. The scale is scored by taking an average of the item responses. Higher scores indicate higher generalized self-efficacy. An example generalized self-efficacy item is: “I will be able to achieve most of the goals that I have set for myself.” Chen and colleagues (2001) found the NGSE to have an internal consistency of $\alpha = .86$, demonstrating the unidimensionality of the scale, and found the scale to be stable ($r = .67$). See Appendix D for scale items.

Goal orientations (learning, prove-performance, avoidance). I measured learning goal orientation, prove-performance goal orientation, and avoid-performance goal orientation using a 13-item scale developed by VandeWalle (1997). Responses for each item on the scales ranged from *strongly disagree* (1) to *strongly agree* (6). The scale is scored by analyzing the average of the item responses. A higher score on each scale indicates a higher goal orientation of that dimension. An example learning goal orientation item is: “I am willing to select a challenging work assignment that I can learn a lot from.” An example prove-performance goal orientation item is: “I’m concerned with showing that I can perform better than my coworkers.” An example avoid-performance goal orientation item is: “I would avoid taking on a new task if there was a chance I would appear rather incompetent to others.” The internal consistency reliabilities of the learning, prove, and avoid goal orientation scales were $\alpha = .89$, $\alpha = .85$, and $\alpha = .88$, respectively (VandeWalle, 1997). The test-retest reliability for each scale studied at two separate times were $r = .66$, $r = .60$, and $r = .57$. The scale in its current form was specific to the work environment and was reworded to fit an academic environment for the current study. See Appendix E for the 13 items. Items were revised to indicate “class” or “student” in place of “work” and “coworker”.

Trait anxiety. I measured trait anxiety using the 6-item abbreviated version of Spielberger's (1983) State/Trait Anxiety Inventory (STAI) scale developed by Marteau and Bekker (1992). Typically, the STAI measures trait and state anxiety by asking participants to respond to six items given two separate sets of instructions (one set for trait and one set for state). I used only the trait anxiety instructions, which ask participants to respond to the items by indicating how they "generally feel". Responses were rated on a graphic ratings scale from 1 (Not at All) to 4 (Very Much). I scored the measure by taking the average of item responses. Marteau and Bekker (1992) reported a Cronbach's alpha of .82 for their abbreviated 6-item scale. Higher scores on the scale indicate higher levels of trait anxiety. An example item is "I feel tense". See Appendix F for scale items.

Goal level. I measured self-set goal level using two questions asking the participant to state his or her goal for the final exam score and for the final score in the course on a 0-100 percentage scale. See Appendix G for a list of items.

Goal commitment. Commitment to the previous goals was measured using a measure developed by Hollenbeck, Klein, O'Leary, and Wright (1989). The scale consists of four items with responses ranging from *strongly disagree* (1) to *strongly agree* (5). The four items are negatively keyed and are reverse-scored to calculate the scale score. The scale score is the average of the item responses, and higher scores indicate higher commitment to the goal. The internal consistency reliability for this scale was $\alpha = .80$ (Hollenbeck et al., 1989). An example item is: "It's hard to take this goal seriously." See Appendix H for a list of items.

Engagement. I measured engagement using Schaufelli and colleagues' (2002) 17-item measure. Schaufelli and colleagues (2002) wrote two versions of the measure: one for student samples and one for work samples. For my student sample, I used the student version. The

authors did not report the Cronbach's alpha for the measure, but they did report the Cronbach's alpha for each facet within the engagement measure. Internal consistencies ranged from .73 - .84 for the student sample. Participants were asked to rate all items using a graphic rating scale, ranging from 0 (Never) to 6 (Always) regarding how frequently they experience each item in relation to a specific courses and in relation to their classes in general. An example item for the student measure is "I am immersed in my studies". Items were averaged to provide an overall score. Higher scores indicate higher engagement with one's class. See Appendix I for scale items.

Mind wandering. I measured academic setting mind wandering by adapting the 5-item Mind Wandering Questionnaire developed by Mrazek, Phillips, Franklin, Broadway, and Schooler (2013). I altered the instructions to ask about the respondents' behaviors in their undergraduate psychology course and in college classes in general. Mrazek and colleagues (2013) reported a Cronbach's alpha of .85 for the measure. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Almost never) to 6 (Almost always) regarding how frequently they experience each item in each of the two contexts, e.g., in this class and my classes in general. An example item is "I have difficulty maintaining my focus on simple or repetitive work". Items were averaged to provide an overall score. Higher scores indicate higher frequency of mind wandering in the academic setting. See Appendix J for scale items.

Measures to Test Alternative Explanations

Task-specific self-efficacy. I measured task-specific self-efficacy using a 10-item personal efficacy scale developed by Riggs, Warka, Babasa, Betancourt, and Hooker (1994). Responses are rated on a scale of *strongly disagree* (1) to *strongly agree* (5). The measure is scored by taking an average of the item responses. Higher scores on the scale indicate higher

self-efficacy for the class. The internal consistency reliability for the personal efficacy scale was found to be $\alpha = .86$ (Riggs et al., 1994). Items on the scale were reworded to reference tasks specific to the participants' introductory psychology class. An example item is "I am a great student". See Appendix K for scale items.

Mindfulness. I measured mindfulness using Walach and colleagues' (2006) 14-item Freiburg Mindfulness Inventory (FMI). Walach and colleagues (2006) reported a Cronbach's alpha of .86. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Rarely) to 4 (Almost always). An example item is "I am open to the experience of the present moment." Items were averaged to produce an overall score. Higher scores indicate higher levels of mindfulness. See Appendix L for scale items.

Boredom. I measured boredom using van Hooft and van Hooft's (2014) 5-item revised work-related boredom measure, revised from Lee's (1986) measure to eliminate conflating boredom with its causes or consequences. Van Hooft and van Hooft (2014) reported a Cronbach's alpha of the scale of .91. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Almost never) to 5 (Almost always). For the student sample, I adapted the measure to reflect their feelings of boredom while in a specific undergraduate psychology courses and in their classes in general. An example item is "This psychology class goes by slowly". Items were averaged to produce an overall score. Higher scores indicate higher levels of boredom. See Appendix M for scale items.

Metacognition. I measured metacognition using one subsection of the measure developed by Wells and Cartwright-Hatton (2004, $\alpha = .92$). This measure consisted of six items with responses on a 4-point scale, ranging from *Do not agree* (1) to *Agree very much* (4). Scores

were averaged, and a higher average indicated a higher level of metacognition. An example item is “I pay close attention to the way my mind works.” See Appendix N for scale items.

Performance. For the student sample, performance was measured in relation to a specific undergraduate class (using the participants’ percentage score on the final exam and percentage of the course total points) and in relation to the participant’s classes in general (cumulative GPA).

Procedure

The surveys were administered online using SONA software partway through the semester. The survey was administered partway through the semester to allow students enough experience with the course to develop reasonable impressions of their ability level relative to the course difficulty and experiences of mind wandering during class. Students logged into their SONA account and signed up to participate in the study. Participants completed the surveys in one session at a time and location of their own choosing. In order to avoid missing data, participants were forced to answer each item to continue to the next page of items. First, participants completed an informed consent process (see Appendix P). Those individuals agreeing to participate completed the measures of demographics, personality, affectivity, generalized self-efficacy, goal orientations, trait anxiety, goal level, goal commitment, engagement, mind wandering, task-specific self-efficacy, mindfulness, boredom, and metacognition. Participants completed the surveys in the above order to measure predictor variables before outcome variables, and all key study variables before measures meant to test alternative explanations. The exception is the demographics survey which was administered at the beginning as part of the screener survey. After participants completed the surveys, they were debriefed (see Appendix Q). Once data collection was completed, professors of the psychology

class that participants wanted their participation credited to sent me the final exam grades and final grades of participants. I paired the grades to each participant submission and removed any identifying information from the dataset.

Work Sample

Participants

Data was collected online from participants recruited from the Mechanical Turk (MTURK) service provided by Amazon.com, Inc. Participants received a payment of \$0.50 for participating in this study.

Measures for Demographics and Tests of Predictions

Demographics. I measured demographics in a questionnaire asking participants about sex, age, year, major, GPA, ethnicity, employment status, and employment type (i.e., full-/part-time; see Appendix A).

Insufficient effort responding. To account for insufficient effort responding, I inserted the items “Please answer ‘Disagree’ if you are reading these instructions”, “I have never used a computer”, “I work twenty-eight hours in a typical work day”, and “Please answer ‘Strongly disagree’ if you are reading these instructions” between various measures in the survey. The items were inserted before the measures of personality, goal orientation, goal commitment, and task-specific self-efficacy. All items were rated on a 7-point graphic rating scale from (1) Strongly disagree to (7) Strongly agree obtained from Huang and colleagues’ (2015) list of infrequency items used to detect careless responding.

Personality. I measured personality using the 50-item measure of the Big Five personality factors from Costa and McCrae’s (1992) NEO-PI-R IPIP (International Personality Item Pool, 2013). For the five domains, Costa and McCrae (1992) reported Cronbach’s alphas of

0.86 (Extraversion), 0.86 (Emotional Stability), 0.82 (Openness), 0.77 (Agreeableness), and 0.81 (Conscientiousness). Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Very Inaccurate) to 5 (Very Accurate). Sample items include “make friends easily” (Extraversion), “often feel blue” (Emotional Stability), “have a vivid imagination” (Openness), “respect others” (Agreeableness), and “am always prepared” (Conscientiousness). Item responses were averaged to provide an overall score for each factor. Higher scores indicate higher levels of the corresponding domain of the Big Five. See Appendix B for scale items.

Affectivity (positive, negative). I measured affectivity using Watson, Clark, and Tellegen’s (1988) positive and negative affective schedule (PANAS). The PANAS is a 20-item scale. For each item, participants rate on a 5-point scale the frequency with which they have experienced the listed emotions in the past few weeks (1, *very slightly or not at all*; 5, *extremely*). The scale is scored by summing the responses to both the positive and negative affective words, generating distinct scores for both positive and negative affectivity. Higher scores indicate higher positive or negative affectivity. An example positive affective item is “Enthusiastic”, and an example negative affective item is “Nervous”. Watson and colleagues (1988) found the Cronbach’s alpha of both the positive and negative affectivity scales to be .87 See Appendix C for scale items.

Generalized self-efficacy. I measured generalized self-efficacy using the New Generalized Self-Efficacy (NGSE) scale (Chen, Gully, & Eden, 2001). The NGSE is an 8-item scale. For each item, participants rate on a 5-point scale the degree to which they disagree (1, *strongly disagree*) or agree (5, *strongly agree*) with the item. The scale is scored by taking an average of the item responses. Higher scores indicate higher generalized self-efficacy. An example generalized self-efficacy item is: “I will be able to achieve most of the goals that I have

set for myself.” Chen and colleagues (2001) found the NGSE to have an internal consistency of $\alpha = .86$, demonstrating the unidimensionality of the scale, and found the scale to be stable ($r = .67$). See Appendix D for scale items.

Goal orientations (learning, performance, avoidance). I measured learning goal orientation, prove-performance goal orientation, and avoid-performance goal orientation using a scale developed by VandeWalle (1997). Responses for each item on the scales ranged from *strongly disagree* (1) to *strongly agree* (6). The scale is scored by analyzing the average of the item responses. A higher score on each scale indicates a higher goal orientation of that dimension. An example learning goal orientation item is: “I am willing to select a challenging work assignment that I can learn a lot from.” An example prove-performance goal orientation item is: “I’m concerned with showing that I can perform better than my coworkers.” An example avoid-performance goal orientation item is: “I would avoid taking on a new task if there was a chance I would appear rather incompetent to others.” The internal consistency reliabilities of the learning, prove, and avoid goal orientation scales were $\alpha = .89$, $\alpha = .85$, and $\alpha = .88$, respectively (VandeWalle, 1997). The test-retest reliability for each scale studied at two separate times were $r = .66$, $r = .60$, and $r = .57$. See Appendix E for the 13 items.

Trait anxiety. I measured trait anxiety using the 6-item abbreviated version of Spielberger’s (1983) State/Trait Anxiety Inventory (STAI) scale developed by Marteau and Bekker (1992). Typically, the STAI measures trait and state anxiety by asking participants to respond to six items given two separate sets of instructions (one set for trait and one set for state). I used only the trait anxiety instructions, which ask participants to respond to the items by indicating how they “generally feel”. Responses were rated on a graphic ratings scale from 1 (Not at All) to 4 (Very Much). I scored the measure by taking the average of item responses.

Marteau and Bekker (1992) reported a Cronbach's alpha of .82 for their abbreviated 6-item scale. Higher scores on the scale indicate higher levels of trait anxiety. An example item is "I feel tense". See Appendix F for scale items.

Goal level. I measured self-set goal level by asking participants to consider their job performance on a 0-100 scale and state their target performance level as if it were a grade in school. The item is "Job performance "grade" goal (0-100%): _____". See Appendix G for full measure instructions.

Goal commitment. Commitment to the previous goals was measured using a measure developed by Hollenbeck, Klein, O'Leary, and Wright (1989). The scale consists of four items with responses ranging from *strongly disagree* (1) to *strongly agree* (5). The four items are negatively keyed and are reverse-scored to calculate the scale score. The scale score is the average of the item responses, and higher scores indicate higher commitment to the goal. The internal consistency reliability for this scale was $\alpha = .80$ (Hollenbeck et al., 1989). An example item is: "It's hard to take this goal seriously." See Appendix H for a list of items.

Engagement. I measured engagement using Schaufelli and colleagues' (2002) 17-item measure. Schaufelli and colleagues (2002) wrote two versions of the measure: one for student samples and one for employee samples. I used the employee version for my work sample. The authors did not report the Cronbach's alpha for the measure, but they did report the Cronbach's alpha for each facet within the engagement measure. Internal consistencies ranged from .72 - .89 for the work sample. Participants were asked to rate all items using a graphic rating scale, ranging from 0 (Never) to 6 (Always) regarding how frequently they experience each item. An example item is "I am immersed in my work". Items were averaged to provide an overall score. Higher scores indicate higher engagement with work. See Appendix I for scale items.

Mind wandering. I measured workplace mind wandering by adapting the 5-item Mind Wandering Questionnaire developed by Mrazek and colleagues (2013). I altered the instructions to ask about the respondents' behaviors *in the workplace*. Mrazek and colleagues (2013) reported a Cronbach's alpha of .85 for the measure. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Almost never) to 6 (Almost always) regarding how frequently they experience each item. An example item is "I have difficulty maintaining my focus on simple or repetitive work". Items were averaged to provide an overall score. Higher scores indicate higher frequency of mind wandering in the workplace. See Appendix J for scale items.

Measures to Test Alternative Explanations

Task-specific self-efficacy. I measured task-specific self-efficacy using a 10-item personal efficacy scale developed by Riggs, Warka, Babasa, Betancourt, and Hooker (1994). Responses are rated on a scale of *strongly disagree* (1) to *strongly agree* (5). The measure is scored by taking an average of the item responses. Higher scores on the scale indicate higher self-efficacy for job-related tasks. The internal consistency reliability for the personal efficacy scale was found to be $\alpha = .86$ (Riggs et al., 1994). See Appendix K for scale items. Items on the scale were reworded to reference generic work-related tasks that might generalize across jobs. An example item is "I have confidence in my ability to do well at my job."

Mindfulness. I measured mindfulness using Wallach and colleagues' (2006) 14-item Freiburg Mindfulness Inventory (FMI). Wallach and colleagues (2006) reported a Cronbach's alpha of .86. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Rarely) to 4 (Almost always). An example item is "I am open to the experience of the present

moment.” Items were averaged to produce an overall score. Higher scores indicate higher levels of mindfulness. See Appendix L for scale items.

Boredom. I measured boredom using van Hooft and van Hooft’s (2014) 5-item revised work-related boredom measure, revised from Lee’s (1986) measure to eliminate conflating boredom with its causes or consequences. Van Hooft and van Hooft (2014) reported a Cronbach’s alpha of the scale of .91. Participants were asked to rate all items using a graphic rating scale, ranging from 1 (Almost never) to 5 (Almost always). An example item is “My job goes slowly”. Items were averaged to produce an overall score. Higher scores indicate higher levels of boredom. See Appendix M for scale items.

Metacognition. I measured metacognition using one subsection of the measure developed by Wells and Cartwright-Hatton (2004, $\alpha = .92$). This measure consisted of six items with responses on a 4-point scale, ranging from *Do not agree* (1) to *Agree very much* (4). Scores were averaged, and a higher average indicated a higher level of metacognition. An example item is “I pay close attention to the way my mind works.” See Appendix N for scale items.

Performance. For the work sample, I measured performance using the first seven items of Williams and Anderson’s performance scale (1991). The internal consistency reliability for this scale was .91 (Williams & Anderson, 1991). Responses range from (1) “strongly disagree” to (7) “strongly agree.” Responses were averaged. Higher scores on the scale indicate higher levels of in-role behavior performance. A sample item from the scale is “I adequately complete assigned duties.” See Appendix O for a complete list of items.

Procedure

The surveys were administered online using Amazon’s Mechanical Turk software. Participants completed the surveys in one session at a time and location of their own choosing.

In order to avoid missing data, participants were forced to answer each question to continue participating. First, participants completed a demographics screening survey. Individuals who were under the age of 18, did not speak English as their primary language, were not United Citizens and had not resided in the United States for at least ten years, defined their occupation as either retired, family manager/stay at home parent, unemployed, or other, or had not been employed in their current position for at least six months were unable to complete the rest of the survey. Participants who passed the screening survey completed an informed consent process (see Appendix P). Those individuals agreeing to participate completed the measures of demographics, personality, affectivity, generalized self-efficacy, goal orientations, trait anxiety, goal level, goal commitment, engagement, mind wandering, task-specific self-efficacy, mindfulness, boredom, metacognition, and performance. Participants completed the surveys in the above order to measure predictor variables before outcome variables, and all key study variables before measures meant to test alternative explanations. The exception is the demographics survey which was administered at the beginning as part of the screener survey. After participants completed the surveys, they were debriefed (see Appendix Q).

Results

Data cleaning. Of the 168 student sample participants, 32 participants had partial survey response data removed due to insufficient effort responding. Of the 660 work sample participants, 584 had partial survey response data removed due to insufficient effort responding. To retain as much data as possible, if a participant were to trigger an IER item, I only removed his responses that preceded the triggered IER item. For example, if a participant triggered the IER item following goal commitment, engagement, and mind wandering, I removed his goal commitment, engagement, and mind wandering responses. I did this to retain as much data as possible. As a result of this partial data removal process, I had differing numbers of usable responses for different measures. I report the number of usable responses for each measure in the psychometrics properties of measures section below.

I used multiple methods to detect insufficient effort responding, and I checked for impossible responses, duplicate responses, and outliers. I checked whether participants failed the insufficient effort responding items. Also, I removed participants whose time spent per item did not reflect at least 2 seconds being spent attending to each item. If the participant spent an average of less than 2 seconds per item on a given page, his data were removed. For example, if there were ten items on a single page and the individual spent less than 20 seconds on the page, his responses to those ten items were removed. All impossible values were deleted and became missing values. Further, I checked for duplicate participants finding one instance, so I removed the data of the second response entirely. I checked for outliers by searching for scores higher or lower than four standard deviations away from the mean score. Any scores farther than four standard deviations away from the mean were removed.

Descriptive Statistics

The mean age in the student sample was 19.46 years with a standard deviation of 2.48 whereas the mean age in the work sample was 38.57 years with a standard deviation of 12.14. In the student sample, 32.5% were male, 66.9% of participants were female, and .6% identified as non-binary/third gender. In the work sample, 53.5% were male, 46.3% were female, and .2% identified as non-binary/third gender. The most common self-reported ethnicity in the student sample was White/Caucasian (71.2%), followed by African American (13.5%), Asian (6.1%), Hispanic (4.3%), Other (4.3%), and Native American (.6%). The most common self-reported ethnicity in the work sample was White/Caucasian (72.3%), followed by African American (13.3%), Hispanic (5.7%), Native American (4.4%), Asian (3.9%), and Other (.3%). The most common self-reported completed education level for the student sample was unsurprisingly Some College (51.5%), followed by High School (44.2%; note: as these participants were all currently enrolled in a college course, they likely misinterpreted the question. A large percentage of PSY1010 students are freshmen in college and might not have considered how they have indeed completed 'Some College'), College (3.1%), and Graduate School (1.2%). The most common self-reported completed education level for the work sample was College (62.4%), followed by Graduate School (20.5%), Some College (11.2%), and High School (5.9%).

I obtained the means, standard deviations, and correlations of key study variables (see Tables 1 and 2).

Table 1*Means, Standard Deviations, and Correlations of Key Study Variables in the Student Sample*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Extra	3.05	.72	-													
2. Consc	3.33	.65	.31**	-												
3. PA	30.86	8.62	.38**	.38**	-											
4. GSEFF	3.88	.68	.37**	.57**	.33**	-										
5. PGO	3.14	1.19	.16	.02	.09	.17*	-									
6. LGO	4.15	1.03	.29**	.40**	.39**	.56**	.14	-								
7. Neuro	2.87	.83	-.27**	-.60**	-.23	-.46**	.12	-.27**	-							
8. NA	20.99	8.26	-.01	-.41**	-.05	-.34**	.09	-.18*	.52**	-						
9. AGO	3.27	1.12	-.18*	-.33**	-.24**	-.41**	.16*	-.42**	.33**	.29**	-					
10. TAnx	2.11	.68	-.20*	-.43**	-.34**	-.44**	-.00	-.28**	.53**	.69**	.34**	-				
11. Goal	82.72	20.30	.06	.11	.12	.02	.04	.03	-.12	-.20*	-.03	-.16	-			
12. GCom	3.98	.72	.19*	.38**	.17*	.47**	-.10	.29**	-.32**	-.37**	-.27**	-.27**	-.01	-		
13. Eng	3.84	.99	.15	.39**	.48**	.40**	.05	.54**	-.34**	-.24**	-.29**	-.33**	.08	.37**	-	
14. MW	3.93	1.04	-.06	-.30**	-.30**	-.27**	.07	-.31*	.42**	.35**	.32**	-.10	-.10	-.24**	-.39**	-

Note. Extra = Extraversion, Consc = Conscientiousness, PA = Positive Affectivity, GSEFF = Generalized Self-efficacy, PGO = Prove performance goal orientation, LGO = Learning mastery goal orientation, Neuro = Neuroticism, NA = Negative Affectivity, AGO = Avoid performance goal orientation, TAnx = Trait anxiety, Goal = Goal level, GCom = Goal Commitment, Eng = Engagement, MW = Mind Wandering; * = $p < .05$, ** = $p < .01$.

Table 2*Means, Standard Deviations, and Correlations of Key Study Variables in the Work Sample*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Extra	3.23	.66	-													
2. Consc	3.69	.55	.25**	-												
3. PA	37.77	7.14	.52**	.38**	-											
4. GSEFF	4.08	.62	.42**	.62**	.54**	-										
5. PGO	4.06	1.12	.20*	.06	.32**	.18*	-									
6. LGO	4.69	.93	.40**	.48**	.52**	.66**	.35**	-								
7. Neuro	2.40	.74	-.41**	-.60**	-.38**	-.51**	.04	-.45**	-							
8. NA	19.43	8.00	-.19*	-.57**	-.21**	-.49**	.04	-.40**	.55**	-						
9. AGO	3.22	1.32	-.30**	-.39**	-.05	-.35**	.32**	-.28**	.49**	.41**	-					
10. TAnx	1.88	.64	-.32**	-.51**	-.48**	-.55**	-.01	-.42**	.61**	.72**	.35**	-				
11. Goal	82.26	17.74	.11	.35**	.16	.37**	-.03	.35**	-.29**	.48**	-.27**	-.33**	-			
12. GCom	2.97	1.17	.17*	.60**	.13	.47**	-.14	.42**	-.49**	-.68**	-.48**	-.49**	.33**	-		
13. Eng	5.02	.99	.35**	.31**	.67**	.38**	.27**	.52**	-.23**	-.20*	-.07	-.32**	.14	.08	-	
14. MW	3.36	1.36	-.17	-.54**	-.16*	-.32**	.02	-.29**	.52**	.62**	.27**	.44**	-.32**	-.75**	-.15*	-

Note. Extra = Extraversion, Consc = Conscientiousness, PA = Positive Affectivity, GSEFF = Generalized Self-efficacy, PGO = Prove performance goal orientation, LGO = Learning mastery goal orientation, Neuro = Neuroticism, NA = Negative Affectivity, AGO = Avoid performance goal orientation, TAnx = Trait anxiety, Goal = Goal level, GCom = Goal Commitment, Eng = Engagement, MW = Mind Wandering; * = $p < .05$, ** = $p < .01$.

Psychometric Properties of Measures

I tested internal consistency reliabilities for all measures used in both the student and work samples. Note that I reported the number of usable responses for each measure where I reported the observed reliabilities. The personality measures from the NEO-PI-R IPIP (Costa & McCrae, 1992) showed similar internal consistency estimates in both student and work samples, respectively (Neuroticism: .88, .78, 155 usable student responses, 237 usable work responses; Extraversion: .83, .72, 155 usable student responses, 237 usable work responses; Openness: .73, .75, 155 usable student responses, 237 usable work responses; Agreeableness: .77, .80, 155 usable student responses, 237 usable work responses; Conscientiousness: .88, .82, 155 usable student responses, 237 usable work responses). Positive affectivity from the PANAS (Watson, Clark, & Tellegen, 1988) had an internal consistency reliability of .90 in the student sample and .89 in the work sample (155 usable student responses, 173 usable work responses). Negative affectivity from the PANAS (Watson, Clark, & Tellegen, 1988) had an internal consistency reliability of .89 in the student sample and .94 in the work sample (155 usable student responses, 173 usable work responses). The New Generalized Self-Efficacy (NGSE) scale (Chen, Gully, & Eden, 2001) had an internal consistency reliability of .89 in the student sample and .87 in the work sample (161 usable student responses, 298 usable work responses). The goal orientation scale (VandeWalle, 1997) demonstrated similar internal consistency reliabilities in both student and work samples, respectively, for learning goal orientation (.89, .86, 153 usable student responses, 253 usable work responses), prove performance goal orientation (.83, .80, 153 usable student responses, 253 usable work responses), and avoid goal orientation (.82, .86, 153 usable student responses, 253 usable work responses). The internal consistency reliability for trait anxiety (Marteau & Bekker, 1992) was .86 for the student sample and .81 for the work sample

(155 usable student responses, 232 usable work responses). The internal consistency reliability for goal commitment (Hollenbeck, Klein, O’Leary, & Wright, 1989) was .69 in the student sample and .88 in the work sample (156 usable student responses, 595 usable work responses). The internal consistency reliability for engagement (Schaufelli et al., 2002) was .90 for the student sample and .94 for the work sample (151 usable student responses, 210 usable work responses). The internal consistency for mind wandering (Mrazek et al., 2013) was .87 for the student sample and .91 for the work sample (156 usable student responses, 447 usable work responses). The internal consistency reliability for task-specific self-efficacy (Riggs, Warka, Babasa, Betancourt, & Hooker, 1994) was .73 for the student sample and .69 for the work sample (162 usable student responses, 275 usable work responses). The internal consistency for mindfulness (Wallach et al., 2006) was .81 for the student sample and .82 for the work sample (157 usable student responses, 278 usable work responses). The internal consistency reliability for boredom (van Hooft & van Hooft, 2014) was .90 for the student sample and .93 for the work sample (159 usable student responses, 268 usable work responses). The internal consistency for metacognition (Wells & Cartwright-Hatton, 2004) was .86 for the student sample and .81 for the work sample (154 usable student responses, 251 usable work responses). The internal consistency reliability for self-reported performance (Williams & Anderson, 1991) was .73 for the work sample (245 usable work responses).

Hypothesis Testing

I completed tests of hypotheses within each sample, considering the hypothesis as having stronger support if the results replicated across samples. The following hypotheses were tested simultaneously within a single hypothesized structural equation model. Assuming adequate fit, various path coefficients within the model provided tests of Hypotheses 2-8. If the model did not

provide adequate fit, the path coefficients would be considered uninterpretable (Kenny, 2020; Kline, 2005).

Structural equation model hypothesis. Hypothesis 1 stated that the hypothesized model shown in Figure 1 would provide adequate fit. I used four recommended measures of model fit and their respective recommended cutoff levels (Hu & Bentler, 1999; Kline, 2005): chi-square, Bentler comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). I used the following criteria for each measure of model fit: a non-significant χ^2 , a CFI greater than or equal to .90, an RMSEA less than or equal to .06, and an SRMR less than or equal to .08 (Hu & Bentler, 1999). However, both χ^2 and RMSEA are affected by large sample sizes (Rose et al., 2017), so I considered either an acceptable RMSEA or SRMR in addition to an acceptable CFI evidence of appropriate model fit. Additionally, I used bootstrapping with 1000 replacements to evaluate indirect effects (Shrout and Bolger, 2002). Bootstrapping provides more accurate parameter estimates by resampling with replacement numerous times (Kenny, 2020; Preacher & Hayes, 2004; Shrout & Bolger, 2002). Bootstrapping is recommended for small sample sizes (Shrout & Bolger, 2002) and is a powerful test of indirect effects because it is less conservative and provides unbiased estimates in non-normal sampling distributions (Kenny, 2020; Preacher & Hayes, 2004; Shrout & Bolger, 2002). For the hypothesized model in the student sample, the chi-square statistic was significant, $\chi^2(87) = 734.84, p < .001$, the CFI statistic was .37, the RMSEA was .23, and the SRMR was .20. For the hypothesized model in the work sample, the chi-square statistic was significant $\chi^2(87) = 465.76, p < .001$, the CFI statistic was .44, the RMSEA was .24, and the SRMR was .28. Thus, the hypothesized model did not provide acceptable fit in either student or work samples (see Figures 2 and 3). So, Hypothesis 1 was not supported. Because Hypotheses

2-8 assumed an acceptably fitting model, the rest of my hypotheses were untestable, as originally conceived. However, I tested several alternative models to assess the hypothesized relationships in the context of alternative models.

Figure 2

Results for the Hypothesized Model in the Student Sample

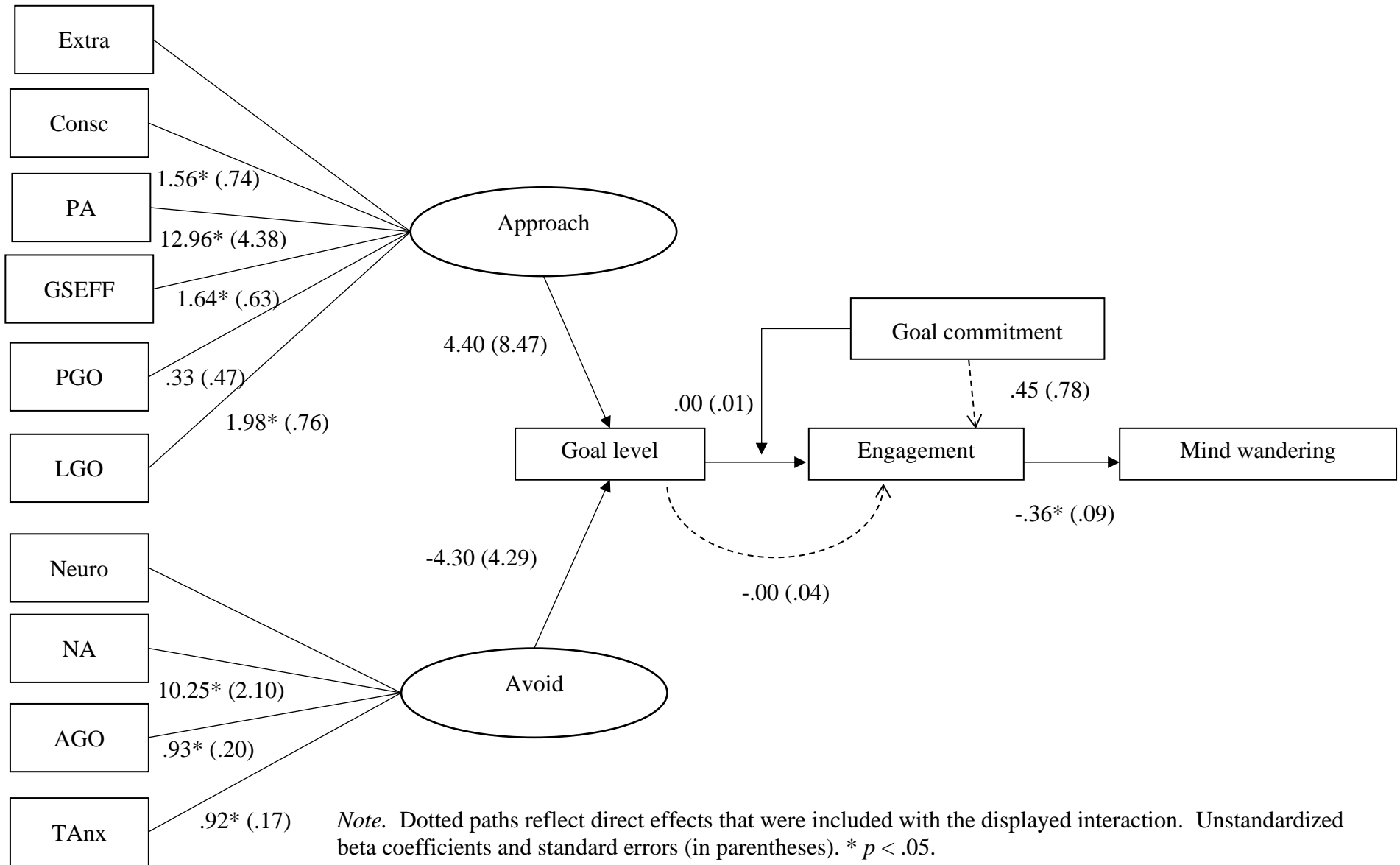
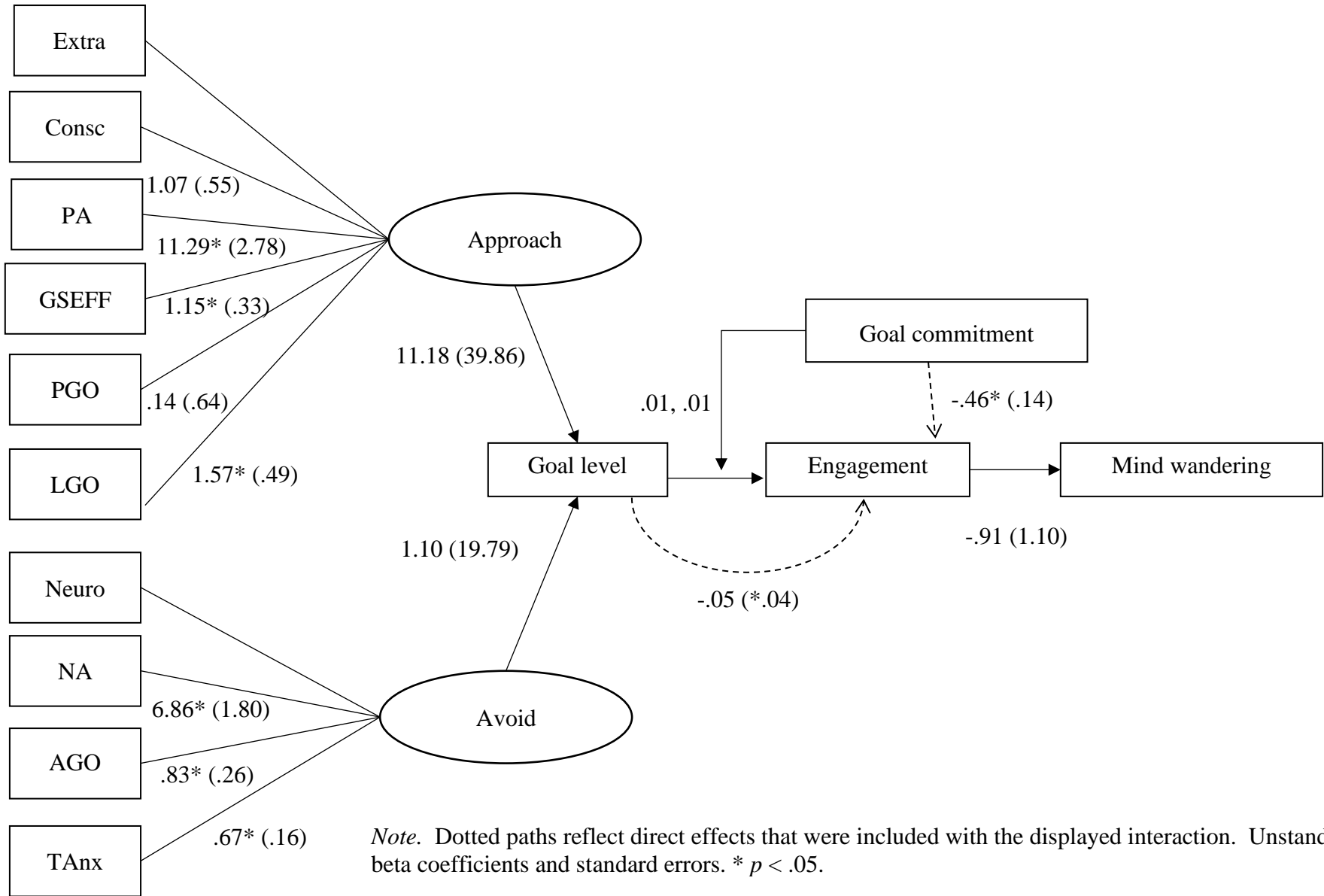


Figure 3

Results for the Hypothesized Model in the Work Sample



Note. Dotted paths reflect direct effects that were included with the displayed interaction. Unstandardized beta coefficients and standard errors. * $p < .05$.

Testing Alternative Models

Structural equation modeling hypothesis. First, I examined the descriptive statistics of the key study variables. Contrary to my prediction, prove-performance goal orientation was not correlated with the other approach-motivation temperament variables. However, this is consistent with some prior research that showed prove-performance goal orientation effects can be embedded in more complex relationships (e.g., involving self-assessed competence and group identification dynamics) in their effects on outcomes (e.g., Dietz et al., 2015). Next, I noticed that goal level was not related to the other key study variables such as goal commitment, engagement, or mind wandering, which was inconsistent with my hypothesized model. Further, modification indices strongly suggested several paths connecting negative affectivity with other variables in the model in such a way that would substantially complicate the model and reduce its parsimony.

These observations led me to reexamine relationships between manifest and latent approach and avoid variables as well as to re-conceptualize the structural equation model. First, I focused my attention on relationships between the manifest and latent approach and avoid variables. Specifically, I conducted a 2-factor CFA on these variables (using maximum likelihood estimation), examining the factor loadings of the dispositional manifest variables (excluding prove-performance goal orientation and negative affectivity) on their respective latent factors (student sample: $\chi^2(19) = 50.27, p < .05, CFI = .91, RMSEA = .11, SRMR = .06$; work sample: $\chi^2(19) = 45.62, p < .05, CFI = .92, RMSEA = .13, SRMR = .07$; see Table 3). Results indicated all variables had loadings with absolute values greater than .4. The 2-factor model provided adequate model fit. For comprehensiveness, I also conducted a 1-factor CFA (using maximum likelihood estimation). Results indicated that all variables had loadings with absolute

values greater than .4 (student sample: $\chi^2(20) = 57.59, p < .05, CFI = .89, RMSEA = .12, SRMR = .06$; work sample: $\chi^2(20) = 45.74, p < .05, CFI = .92, RMSEA = .12, SRMR = .07$; see Table 3). Thus, a 1-factor model also provided adequate model fit.

Table 3

Confirmatory Factor Analysis (2- and 1-factor) Loadings of Dispositional Variables in Student and Work Samples

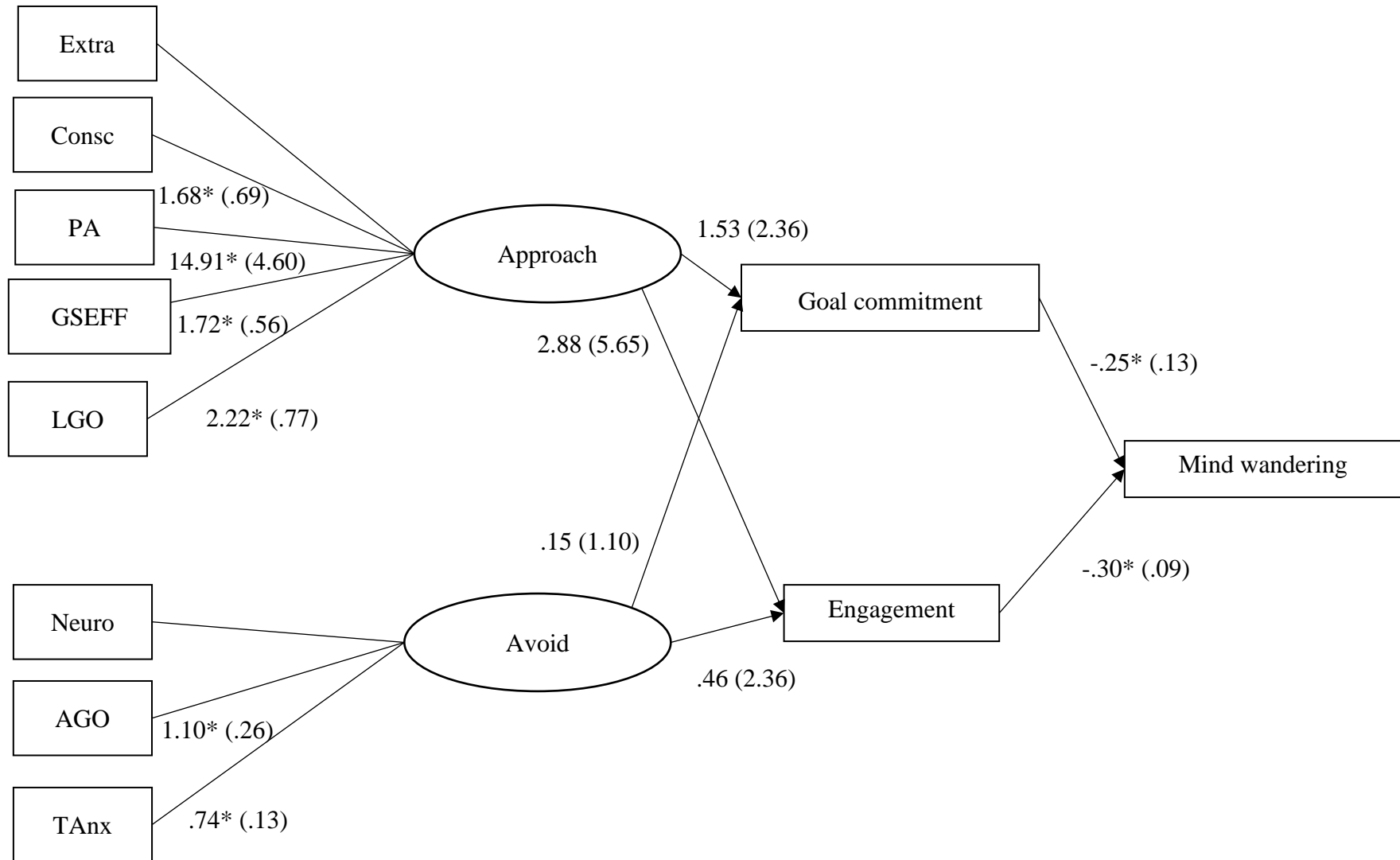
		Student Sample		Work Sample	
		Factor 1	Factor 2	Factor 1	Factor 2
2-factor solution					
	Extra	.47		Extra	.57
	Consc	.76		Consc	.76
	GSEFF	.79		GSEFF	.82
	PA	.50		PA	.63
	LGO	.61		LGO	.71
	Neuro		.74	Neuro	.83
	AGO		.52	AGO	.42
	TAnx		.67	TAnx	.69
1-factor solution					
	Extra	.46		Extra	.58
	Consc	.76		Consc	.76
	GSEFF	.77		GSEFF	.82
	PA	.49		PA	.64
	LGO	.59		LGO	.71
	Neuro	-.67		Neuro	-.84
	AGO	-.51		AGO	-.43
	TAnx	-.59		TAnx	-.69

Note. Extra = Extraversion, Consc = Conscientiousness, PA = Positive Affectivity, GSEFF = Generalized Self-efficacy, PGO = Prove performance goal orientation, LGO = Learning mastery goal orientation, Neuro = Neuroticism, AGO = Avoid performance goal orientation, TAnx = Trait anxiety. Loadings were estimated using maximum likelihood estimation.

Next, I proposed an alternative model in which I first eliminated goal level and then proposed paths from approach and avoid (either 1- or 2-factor CFA solutions) both to goal commitment and engagement and from both goal commitment and engagement to mind wandering. As mentioned above, goal level showed weak relationships with other model variables whereas goal commitment showed more consistent relationships. Given the adequate fit of both a 2- and 1-factor CFA, I tested first an alternative structural model in which the manifest dispositional variables (excluding prove-performance goal orientation and negative affectivity) loaded on two latent factors (i.e., approach and avoid), both of which predicted both goal commitment and engagement, which both then predicted mind wandering. The model did not provide acceptable fit (student sample: $\chi^2(40) = 116.30, p < .05, CFI = .84, RMSEA = .12, SRMR = .09$; work sample: $\chi^2(40) = 104.21, p < .05, CFI = .85, RMSEA = .14, SRMR = .08$; see Figures 4 and 5). Then, I tested a similar model with the manifest dispositional variables (excluding prove-performance goal orientation and negative affectivity) loading on one latent factor, which predicted both goal commitment and engagement, which both predicted mind wandering. The model did not provide acceptable fit (student sample: $\chi^2(43) = 124.33, p < .05, CFI = .83, RMSEA = .12, SRMR = .09$; work sample: $\chi^2(43) = 112.50, p < .05, CFI = .83, RMSEA = .14, SRMR = .09$; see Figures 6 and 7). I examined the modification indices of both the poorly fitting 1- and 2-factor SEM models previously described, but I did not observe any modification indices that provided theoretically defensible model revisions.

Figure 4

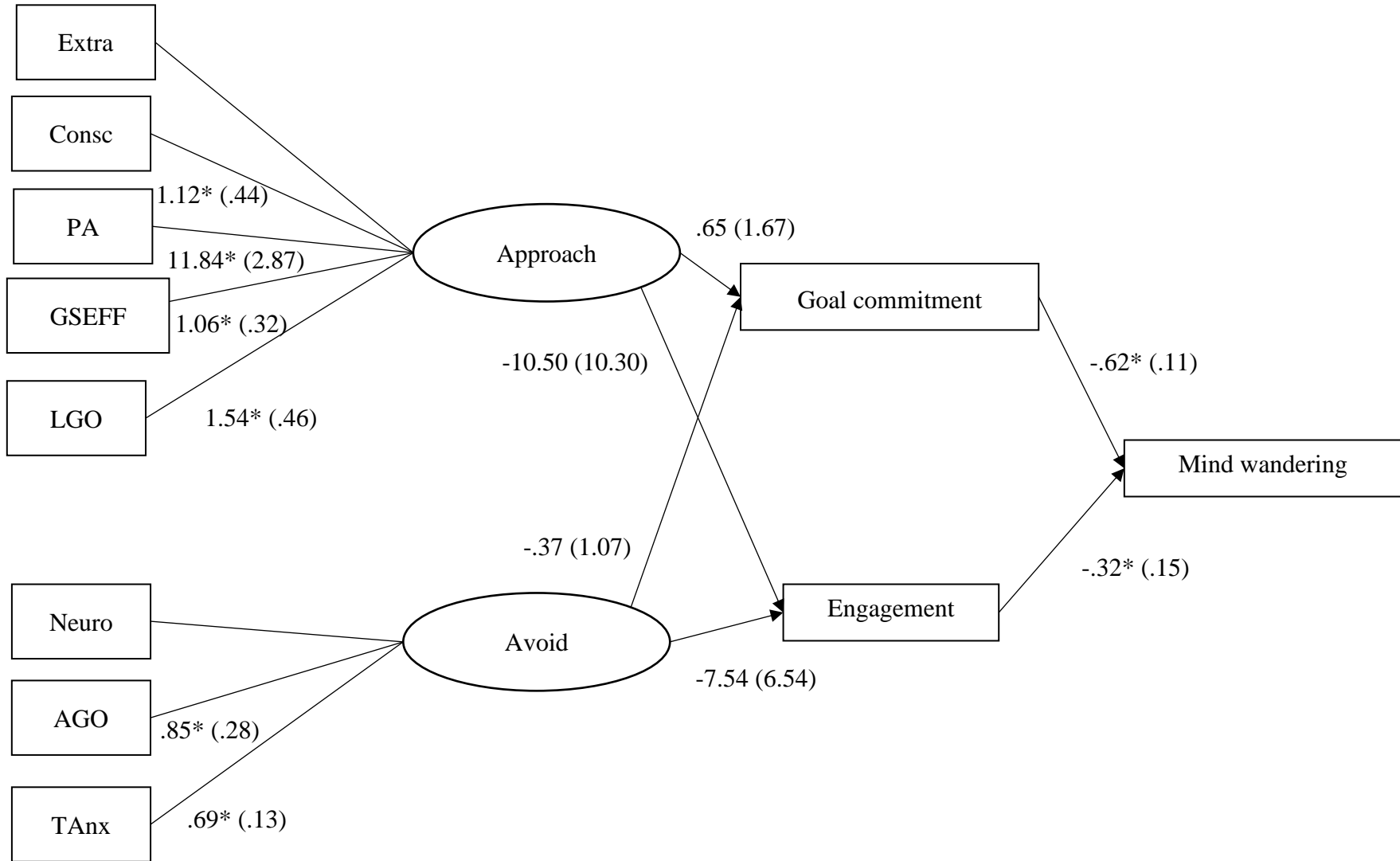
Results for an Alternative Model with Two Latent Factors in the Student Sample



Note. Unstandardized beta coefficients and standard errors. * $p < .05$.

Figure 5

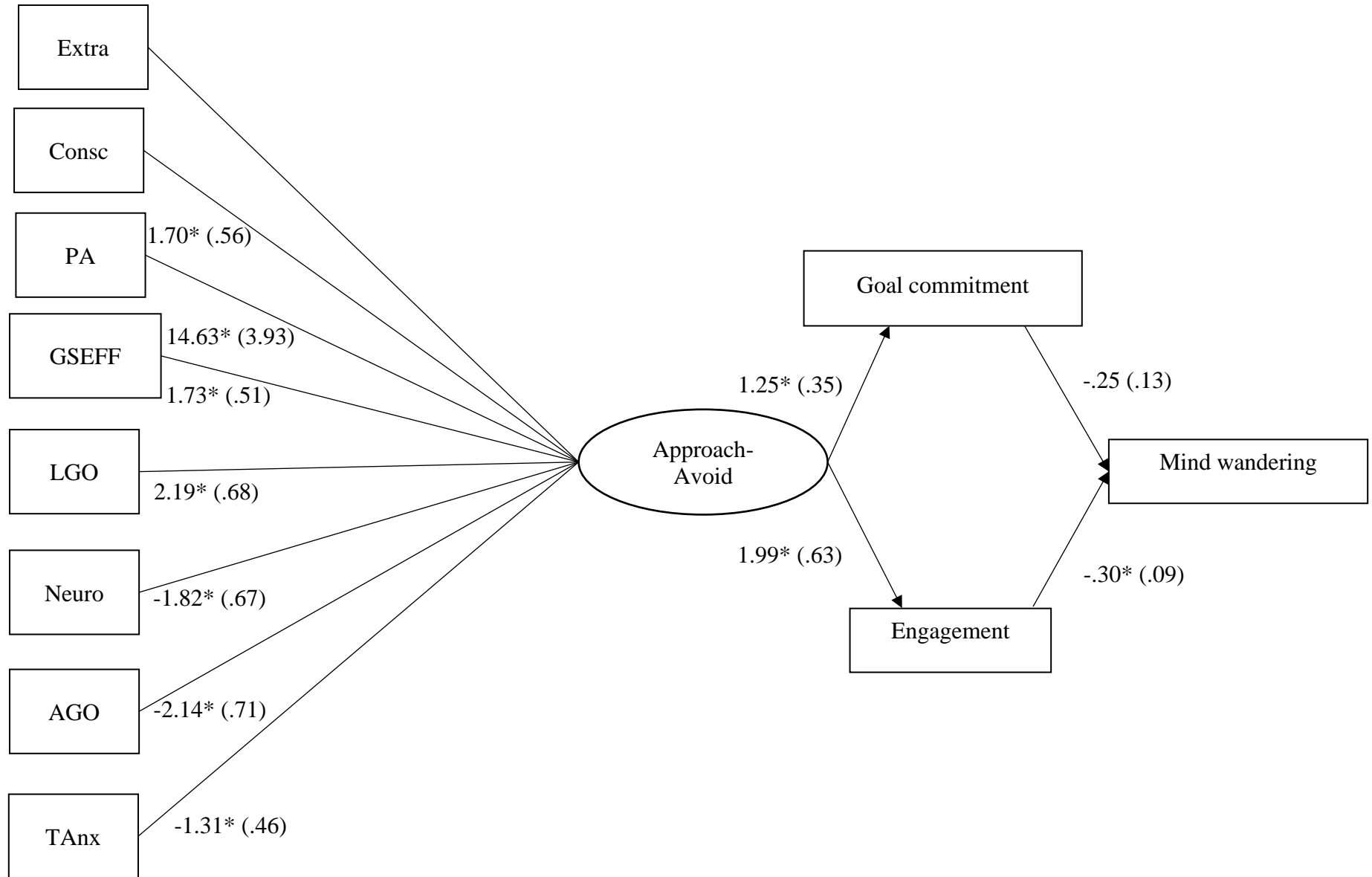
Results for an Alternative Model with Two Latent Factors in the Work Sample



Note. Unstandardized beta coefficients and standard errors. * $p < .05$.

Figure 6

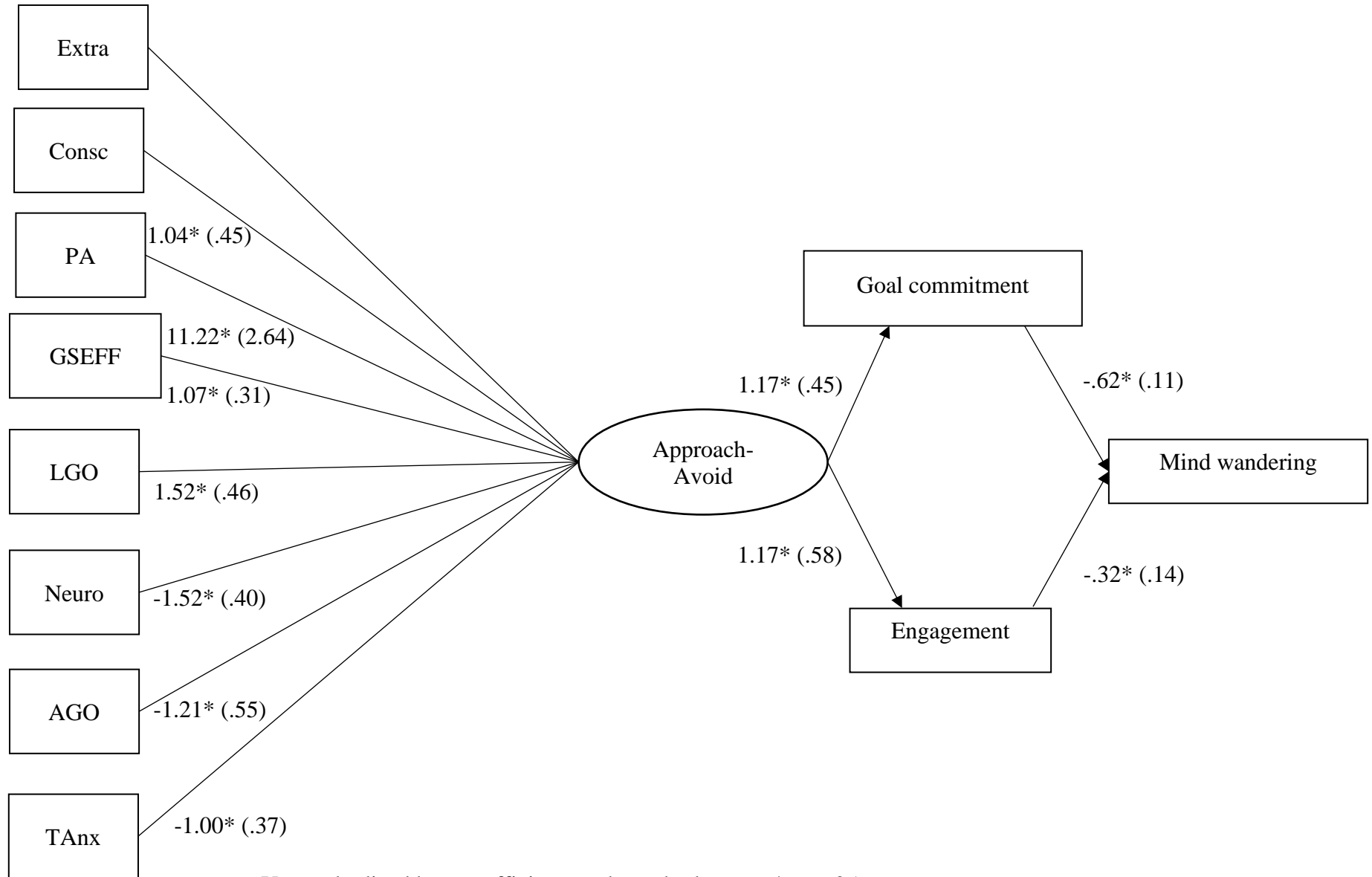
Results for an Alternative Model with One Latent Factor in the Student Sample



Note. Unstandardized beta coefficients and standard errors. * $p < .05$

Figure 7

Results for an Alternative Model with One Latent Factor in the Work Sample

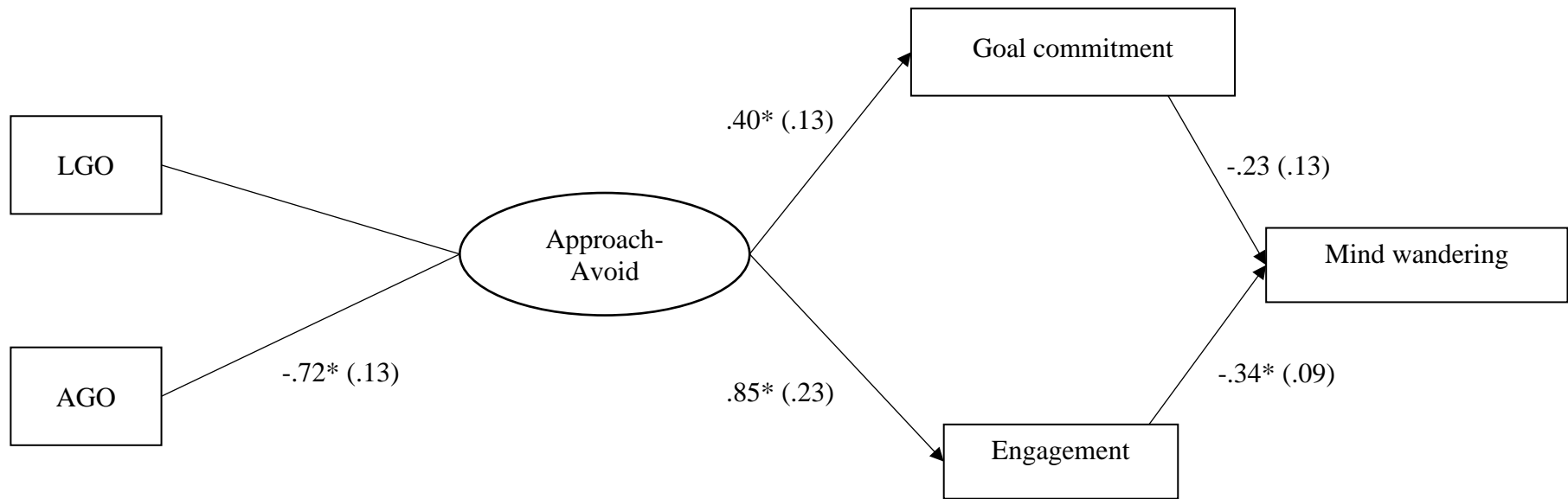


Note. Unstandardized beta coefficients and standard errors. * $p < .05$

Next, given the lack of fit of the hypothesized model and the 1-factor and 2-factor alternative structural models, I conducted additional exploratory analyses. Specifically, in the interest of parsimony, I used a one latent factor model because the previously mentioned CFAs provided evidence that approach and avoidance temperaments might reflect a singular construct (i.e., the absolute value of all factor loadings from approach and avoidance variables on the single factor were greater than .4), and I used dispositional variables I believed to most strongly represent the construct of a single approach-avoid motivational temperament instead of the longer list of eight dispositional variables. So, I tested a model in which learning goal orientation and avoidance goal orientation loaded onto a single approach-avoid latent factor, which then predicted both goal commitment and engagement, which both then predicted mind wandering. As mentioned above, I opted to use only goal commitment in the model because of the weaker relationships observed for goal level with other variables. This exploratory model provided acceptable fit (student sample: $\chi^2(4) = 14.37, p < .05, CFI = .92, RMSEA = .13, SRMR = .06$; work sample: $\chi^2(4) = 14.27, p < .05, CFI = .93, RMSEA = .14, SRMR = .07$; see Figures 8 and 9), and the modification indices did not suggest any new paths should be added to the model. Thus, I used the model to examine relationships related to Hypotheses 1, 2, 3, and 5. I used path coefficients I obtained from this exploratory model to examine these relationships, with modifications as required. Hypotheses 4, 6, 7, and 8 were untestable in the exploratory structural model displayed in Figures 8 and 9.

Figure 8

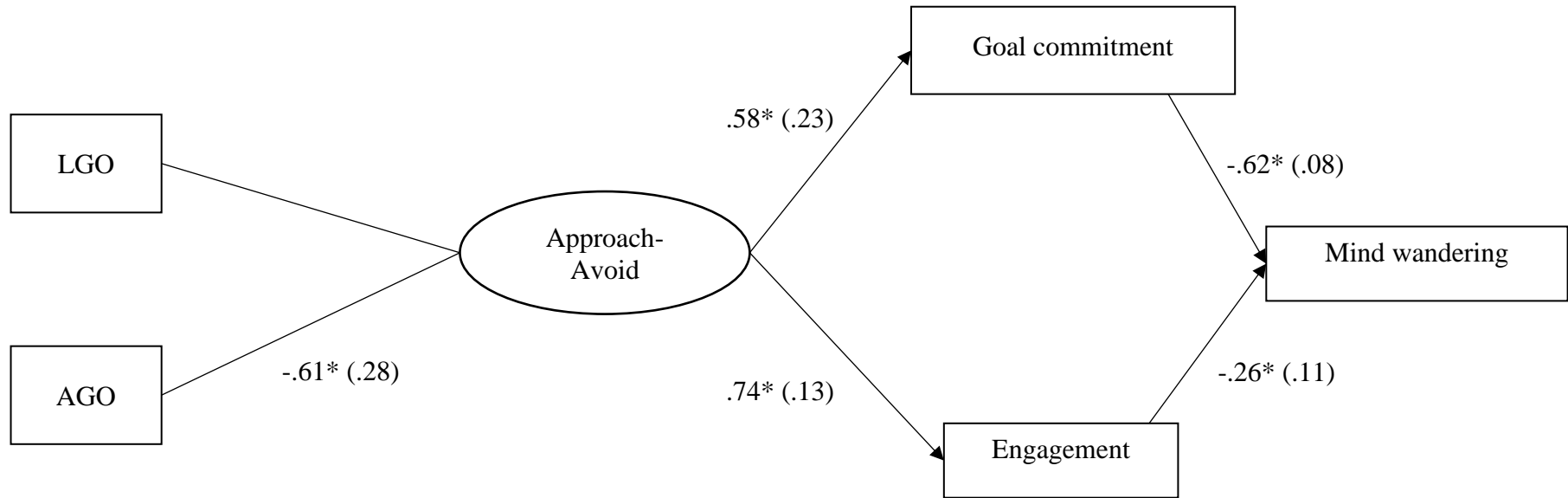
Results for an Alternative Model with Two Manifest Variables and One Latent Factor in the Student Sample



Note. Unstandardized beta coefficients and standard errors. * $p < .05$.

Figure 9

Results for an Alternative Model with Two Manifest Variables and One Latent Factor in the Work Sample



Note. Unstandardized beta coefficients and standard errors. * $p < .05$.

Factor loading hypotheses. Hypothesis 2a stated that extraversion, conscientiousness, positive affectivity, generalized self-efficacy, prove-performance goal orientation, and learning goal orientation would load onto a single latent factor representing an approach-motivational temperament. Hypothesis 2b stated that neuroticism, negative affectivity, avoidance-goal orientation, and trait anxiety would load onto a single latent factor representing an avoidance-motivational temperament. However, as described above, our hypothesized model that included all the manifest variables previously listed did not provide acceptable fit. Instead, I conducted exploratory analyses to examine relationships similar to those proposed in Hypothesis 2a and 2b. Specifically, I examined path coefficients from learning and avoid goal orientations to a single latent factor representing approach-motivational temperaments (see Figures 8 and 9). Because I used learning goal orientation as the indicator variable for the factor, the analysis produced a path coefficient for only the avoid goal orientation path. The path from avoid goal orientation to the latent factor was negative and statistically significant in both the student sample ($b = -.72$, $SE = .13$, $p < .01$) and the work sample ($b = -.61$, $SE = .28$, $p < .05$). So, both learning goal orientation and avoid goal orientation loaded onto a single approach motivational temperament factor. Thus, the relationship examined in the replacement analysis for Hypothesis 2 was supported.

Main effect hypotheses. Hypotheses 3a and 3b stated direct effects between approach-motivational and avoid-motivational temperaments, respectively, and goal level. However, neither goal level nor avoidance-motivational temperament were included in our alternative structural model and goal level was more weakly related to other variables relative to goal commitment, so instead I conducted exploratory analyses to examine relationships similar to those proposed in Hypothesis 3a and 3b. Specifically, I examined whether approach-

motivational temperament was positively related to goal commitment. The path coefficient was positive and statistically significant in both the student sample ($b = .40, SE = .13, p < .01$) and the work sample ($b = .58, SE = .23, p < .05$). Thus, the relationship examined in the replacement analysis for Hypothesis 3 was supported.

Hypothesis 5 stated that engagement would be negatively related to mind wandering. To test Hypothesis 5, I examined the sign and significance level of the path coefficient from engagement to mind wandering in the alternative model displayed in Figures 8 and 9. The path coefficient was negative and statistically significant in both the student ($b = -.34, SE = .09, p < .01$) and the work sample ($b = -.26, SE = .11, p < .05$). Thus, the revised version of Hypothesis 5 was supported.

Interaction hypothesis. Hypothesis 4 stated that goal level and goal commitment will interact when predicting engagement, such that high goal commitment will strengthen the positive relationship between goal level and engagement within the hypothesized model. Because the hypothesized model did not provide acceptable fit, Hypothesis 4 was not testable.

Indirect effect hypotheses. Hypotheses 6-8 described indirect paths through which more distal influences affect outcomes through proximal influences. Hypothesis 6 stated that goal level would have an indirect effect on mind wandering through engagement. Hypothesis 7 stated that goal commitment would have an indirect effect on mind wandering through engagement. Hypothesis 8 stated that the interaction between goal level and goal commitment would have an indirect effect on mind wandering through engagement. Because the revised model did not include the hypothesized indirect paths, Hypotheses 6-8 were not testable.

Discussion

Overview

The purpose of the current study was to create and test a self-regulatory model of mind wandering. Through exploratory model testing, I found consistent results between both student and work samples such that an exploratory self-regulatory model of mind wandering provided acceptable fit whereas the hypothesized model did not. I found evidence for both a 1- and 2-factor solution when loading manifest variables onto either distinct approach and avoidance motivational temperaments or a combined, single, approach-avoid motivational temperament. Further, the single approach-avoid motivational temperament was positively related to goal commitment in both student and work samples. Engagement was negatively related to mind wandering in both samples. These results contributed to the literature by providing evidence that motivational mechanisms significantly predict mind wandering in both student and work contexts and raise issues relating to 1) the uni- versus multi-dimensionality of approach and avoid-motivational temperaments, 2) distinctions between goal level, goal commitment, and other motivational variables, and 3) the need to integrate motivational mechanisms and predictors into existing models of mind wandering.

Theoretical and Practical Implications

Dimensionality of approach and avoid-motivational temperaments. This study provided empirical evidence that latent motivational temperaments might not function as distinctly as previously thought. Prior research has suggested the existence of dispositions that distinctly influence the goals one chooses for oneself (Elliot, 1999). However, I discovered a well-fitting, single-factor model wherein all approach and avoid-motivational manifest variables

provided acceptable factor loadings. Such a finding raises issues relating to the discriminant validity of the two latent factors. Indeed, if the latent factors were distinct, a single-factor solution should not provide acceptable fit with such high factor loadings across all manifest variables. Perhaps approach and avoid-motivational temperaments might be more appropriately conceptualized as opposing ends along a single continuum. Such a unidimensional continuum might be defined as one's tendency to be motivated by consequences of goal-directed behavior (i.e., mastery of the subject/task, the absence of negative consequences). Perhaps individuals are more or less motivated by the consequences of goal directed behavior and that such a difference in disposition might lead to distinct behavioral outcomes. Such a conceptualization might reflect affective characteristics in individuals, such that some might be more excitable by perceived behavioral outcomes than others. Future research might investigate this unidimensional factor and test if affective variables (in addition to trait anxiety) similarly load onto the single factor along with goal orientations and other motivational variables. Doing so might inform subsequent research on motivational temperaments to better test the dimensionality of the latent factors. Indeed, if individuals fail to distinguish between approach and avoidance temperaments, perhaps practitioners do not need to consider distinct goal orientations when training people how to complete tasks. Rather, trainers might consider simply assessing a single construct of motivational temperament.

Alternatively, perhaps the single-factor solution represents the methodological limitations associated with the measures used to assess distinct temperaments. Prior research has suggested conceptual distinctions between approach and avoidance-motivation temperaments such that approach variables reflect one's sensitivity to goal accomplishment whereas avoidance-motivation reflects one's sensitivity to goal failure (Elliot, 1999). Although the distinction

between the two motivational temperaments is proposed by theory, items might not be created well enough to elicit distinct responses in participants. Thus, practitioners should consider distributing the items associated with the distinct motivational temperaments throughout surveys instead of close in proximity to each other. Doing so would reduce the likelihood of participants responding to approach and avoid-motivation temperament items similarly due only to the temporal proximity. Future research might investigate how methodological limitations associated with self-response measures (i.e., common method bias and temporal proximity of items) might demonstrate unidimensionality between other conceptually similar, yet distinct, constructs.

Unrelatedness of goal level to other motivational variables. The hypothesized model for the current study described motivational mechanisms that might predict mind wandering, focusing primarily on goal setting theory with goal level as a central component. However, goal level was unrelated to nearly all other motivational variables in both the student and work sample whereas goal commitment showed the significant relationships I expected. Such a discrepancy highlights the conceptual and methodological distinction between measures of self-set goal level and goal commitment. I assessed self-set goal level using a single-item measure (i.e., “Goal for total points in class (% of total points): _____”) meant to capture one’s target performance level for either her course or her work environment (depending on the sample). Perhaps unsurprisingly, nearly all participants set high goals for themselves such that observations for goal level were not normally distributed (student sample skew = -3.34, student sample kurtosis = 11.34; work sample skew = -2.18, work sample kurtosis = 6.03). However, I assessed goal commitment to capture how committed one is to her self-set goal using a four-item measure and

observed a more normal distribution of responses compared to goal level (student sample skew = -.47, student sample kurtosis = -.12; work sample skew = .37, work sample kurtosis = -1.11).

There are many reasons for participants to skew their self-set goal levels. Participants might be setting high goal levels as a target goal or as defense or self-presentation mechanism, demonstrating to themselves or others their high aspirations. Also, participants from both the student and work samples have a vested interest in producing high levels of performance. Setting goals is a motivational behavior one engages in to activate effortful behaviors to accomplish the goal. Likely, setting a low goal would result in fewer resources allocated toward such effortful behaviors, which participants might expect to result in poorer performance. Further, such poor performance that might result from setting low goals for oneself might lead to a perception of sunk costs such that one might perceive she had lost time, money, and effort that might not be regained. Such a finding highlights the need for goal setting research to carefully monitor the distribution of responses when participants are setting goals for themselves to ensure assumptions of normality are met when testing complex models.

In addition to the methodological implications of non-normally distributed goal level, my results might reflect differences in studying goal level as a between- versus a within-subject variable. That is, the current study used a between-subjects design. All data were collected at one point in time, and I examined goal level effects across participants. Perhaps, goal setting mechanisms would be more appropriately examined within-subject and longitudinally. A within-subjects design would allow the researcher to examine how changes in an individual's goal levels affect important outcomes. Although much research has demonstrated that goal effects are robust, large enough to detect across different people, other research has suggested that goal levels should be examined as a within-subject variable (e.g., Locke & Latham, 2013).

Motivational predictors of attentional behaviors. My study demonstrated significant relationships between motivational predictors and attentional behavior outcomes (i.e., mind wandering). Prior models of mind wandering have failed to address the influence of motivational effects on the extent to which one allocates attentional resources to her primary task. The exploratory models described in this study provided evidence that both goal commitment and engagement are significantly related to the frequency with which one's mind wanders. Goal commitment is defined as a motivational construct whereas work engagement is defined as an affective-motivational attitude (Bakker et al., 2008; Locke & Latham, 1990).

Further, exploratory analyses revealed significant indirect effects of approach-avoid motivational temperament on mind wandering through engagement in the student sample and through both engagement and goal commitment in the work sample. This finding suggests that one's motivational temperament affects mind wandering tendencies through multiple mechanisms. Such a distinction suggests engagement and goal commitment function differently as mechanisms through which motivational factors might influence mind wandering. Goal commitment is associated with motivational content whereas engagement is an attitude that consists of motivational, affective, and attentional components (i.e., dedication, vigor, absorption; Bakker et al., 2008). Further, goal commitment directly relates to goal setting processes and is required to engage goal striving behavior whereas engagement is less associated with goal setting processes and is more representative of a general attitude toward a task or working environment. Also, other attitudes might serve as mechanisms through which motivational antecedents predict outcomes via affective, cognitive, or behavioral intention (e.g., motivation) components.

Moreover, the results from this study suggest a conceptual distinction between goal commitment, a variable central to goal setting processes, and engagement, a more general attitude toward the school or work environment. Given that attitudes have motivational as well as affective and behavioral (intentional) components, one might have assumed that goal commitment would not account for unique variance in mind wandering. Possibly, the motivational aspect of engagement was less influential in the presence of the affective and behavioral components, thus not being redundant with the effects of goal commitment. Alternatively, perhaps the motivational aspect of engagement reflected more arousal or effort whereas goal commitment reflected more direction-based aspects of motivation, which would explain the unique variance accounted for by engagement and goal commitment in effects on mind wandering. Future research should assess the incremental variance in attentional outcomes accounted for by engagement attitudes beyond that accounted for by goal-related variables (i.e., goal commitment). Further, future research should consider such unique effects across multiple environments.

Although many implications of this study are theoretical, there are several practical implications. First, in jobs that require high attentional demand, practitioners should consider the role of motivational processes such as the trainee's motivational temperament, commitment to self-set goals, and engagement with the task itself. If trainees are not motivated properly, they might be more likely to experience attentional lapses, resulting in errors or even critical incidents. Second, motivational temperament variables such as avoidance goal orientation might be more sensitive to the type of job a trainee typically performs and should be accounted for when predicting the trainee's tendency to mind wander. That is, perhaps a job in which attentional lapses can have severe consequences (e.g., air traffic controller) produces workers

more motivated by a fear of failure and less likely to mind wander through motivational processes. Such job characteristics likely influence motivational antecedents to mind wandering.

Limitations

There were several limitations in the current study that should be addressed. First, all data was collected during the COVID-19 pandemic, which might limit the generalizability of these findings to samples not currently studying/working during a pandemic. The nature of work substantially shifted toward virtual environments, which might have produced observations of motivational and attentional variables that are not representative of a non-pandemic student/worker. Second, self-reported measures of mind wandering only report the frequency, not duration, of the behavior. That is, perhaps the length of one's mind wandering episode might be predicted by motivational factors such that one that is highly motivated might be more likely to engage self-monitoring behaviors to catch mind wandering. Third, all measures used in the models tested for the current study were self-report, which could lead to common method bias in the results. Perhaps the shared variance between predictors of mind wandering is simply due to the nature of the metric used to capture such predictors. However, given the unrelatedness of many variables, I expect common method bias did not substantially influence my results. Fourth, our work sample consisted of workers using Amazon's Mechanical Turk platform, wherein automated response 'bots' frequently respond to surveys posted and can even pass insufficient effort responding checks (e.g., Kennedy et al., 2020). However, we screened for careless responding using infrequency items to reduce the likelihood of obtaining non-human response data.

Future Research

Although I addressed some future research suggestions above, here I discuss more general suggestions for future research. First, the results from the current study provided evidence that there is a need to consider motivational processes and mechanisms in models of mind wandering. That is, perhaps future models of mind wandering antecedents should consider more than just the motivational variables assessed in the current study and expand to include additional well-established motivational variables (e.g., task-specific self-efficacy). Second, researchers should consider a more rigorous examination of the dimensionality of approach and avoidance motivational temperaments, including more variables that might be characteristic of approach and/or avoidance motivational temperaments. Such a synthesis of the two temperaments might lead to new conceptualizations of a single-factor goal orientation variable reflecting one's tendency to be motivated by outcomes of goal-directed behavior (i.e., mastery of the subject/task, the absence of negative consequences). Third, researchers should continue to test self-regulatory models of mind wandering using behavioral measures and/or neuroimaging that might capture both the frequency and duration of mind wandering episodes. Fourth, researchers should examine self-regulatory models of mind wandering at the within-person level of analysis using malleable self-regulatory variables. Further, at the within-person level of analysis, researchers might consider examining the stability of one's mind wandering frequency longitudinally. That is, perhaps one's mind wandering frequency changes over time or might be associated with changes in other malleable self-regulatory variables (e.g., task-specific self-efficacy).

Conclusions

The current study contributes to the existing literature by investigating how motivational processes predict one's tendency to mind wander. Through exploratory model testing, I

produced a structural equations model that provided acceptable fit modelling motivational processes as antecedents to the frequency with which one's mind wanders. Future research should investigate the nature of motivational antecedents of mind wandering and test alternative motivational theories to provide converging or diverging evidence of the role of motivation when predicting mind wandering. Trainers should consider motivational factors such as goal commitment and engagement when examining how likely a trainee is to mind wander. Overall, my results demonstrated that motivational processes significantly affect one's tendency to mind wander, providing further evidence of the need to integrate motivational and attentional literatures.

References

- Aarts, H., Custers, R., & Veltkamp, M. (2008). Goal priming and the affective-motivational route to nonconscious goal pursuit. *Social cognition, 26*(5), 555-577.
- Andrews-Hanna, J. R., Smallwood, J., & Spreng, R. N. (2014). The default network and self-generated thought: component processes, dynamic control, and clinical relevance. *Annals of the New York Academy of Sciences, 1316*(1), 29.
- Baird, B., Smallwood, J., Mrazek, M. D., Kam, J. W., Franklin, M. S., & Schooler, J. W. (2012). Inspired by distraction: Mind wandering facilitates creative incubation. *Psychological science, 23*(10), 1117-1122.
- Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. (2008). Work engagement: An emerging concept in occupational health psychology. *Work & stress, 22*(3), 187-200.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review, 84*(2), 191.
- Bandura, A. (1978). The self system in reciprocal determinism. *American psychologist, 33*(4), 344-358.
- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of social and clinical psychology, 4*(3), 359-373.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational behavior and human decision processes, 50*(2), 248-287.
- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of personality and social psychology, 41*(3), 586.

- Bavelas, J., & Lees, E. S. (1978). Effects of goal level on performance: A trade-off of quantity and quality. *Canadian Journal of Experimental Psychology*, 32, 219.
- Blackmore, S. (2002). There Is No Stream of Consciousness. What is all this? What is all this stuff around me; this stream of experiences that I seem to be having all the time?. *Journal of Consciousness Studies*, 9(5-6), 17-28.
- Burnette, J. L., Davis, D. E., Green, J. D., Worthington Jr, E. L., & Bradfield, E. (2009). Insecure attachment and depressive symptoms: The mediating role of rumination, empathy, and forgiveness. *Personality and Individual Differences*, 46(3), 276-280.
- Carciofo, R., Yang, J., Song, N., Du, F., & Zhang, K. (2016). Psychometric evaluation of Chinese-language 44-item and 10-item big five personality inventories, including correlations with chronotype, mindfulness and mind wandering. *PloS one*, 11(2).
- Carriere, J. S., Cheyne, J. A., & Smilek, D. (2008). Everyday attention lapses and memory failures: The affective consequences of mindlessness. *Consciousness and cognition*, 17(3), 835-847.
- Carriere, J. S., Seli, P., & Smilek, D. (2013). Wandering in both mind and body: Individual differences in mind wandering and inattention predict fidgeting. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, 67(1), 19.
- Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality–social, clinical, and health psychology. *Psychological bulletin*, 92(1), 111.
- Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational research methods*, 4(1), 62-83.

- Cheyne, J. A., Solman, G. J., Carriere, J. S., & Smilek, D. (2009). Anatomy of an error: A bidirectional state model of task engagement/disengagement and attention-related errors. *Cognition, 111*(1), 98-113.
- Christoff, K., Gordon, A. M., Smallwood, J., Smith, R., & Schooler, J. W. (2009). Experience sampling during fMRI reveals default network and executive system contributions to mind wandering. *Proceedings of the National Academy of Sciences, 106*(21), 8719-8724.
- Costa, P.T.,Jr. & McCrae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) manual*. Odessa, FL: Psychological Assessment Resources.
- Cummings, M. L., Gao, F., & Thornburg, K. M. (2016). Boredom in the workplace: A new look at an old problem. *Human factors, 58*(2), 279-300.
- Dane, E. (2011). Paying attention to mindfulness and its effects on task performance in the workplace. *Journal of management, 37*(4), 997-1018.
- Dane, E. (2018). Where is my mind? Theorizing mind wandering and its performance-related consequences in organizations. *Academy of Management Review, 43*(2), 179-197.
- Dane, E., & Brummel, B. J. (2014). Examining workplace mindfulness and its relations to job performance and turnover intention. *Human relations, 67*(1), 105-128.
- Dietz, B., van Knippenberg, D., Hirst, G., & Restubog, S. L. D. (2015). Outperforming whom? A multilevel study of performance-prove goal orientation, performance, and the moderating role of shared team identification. *Journal of Applied Psychology, 100*(6), 1811.
- D'Argembeau, A., Renaud, O., & Van der Linden, M. (2011). Frequency, characteristics and functions of future-oriented thoughts in daily life. *Applied Cognitive Psychology, 25*(1), 96-103.

- Eastwood, J. D., Frischen, A., Fenske, M. J., & Smilek, D. (2012). The unengaged mind: Defining boredom in terms of attention. *Perspectives on Psychological Science*, 7(5), 482-495.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational psychologist*, 34(3), 169-189.
- Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: approach and avoidance temperaments and goals. *Journal of personality and social psychology*, 82(5), 804.
- Elliot, A. J., & Thrash, T. M. (2010). Approach and avoidance temperament as basic dimensions of personality. *Journal of personality*, 78(3), 865-906.
- Erez, M., & Zidon, I. (1984). Effect of goal acceptance on the relationship of goal difficulty to performance. *Journal of applied psychology*, 69(1), 69.
- Farmer, R., & Sundberg, N. D. (1986). Boredom proneness--the development and correlates of a new scale. *Journal of personality assessment*, 50(1), 4-17.
- Feng, S., D'Mello, S., & Graesser, A. C. (2013). Mind wandering while reading easy and difficult texts. *Psychonomic bulletin & review*, 20(3), 586-592.
- Fisherl, C. D. (1993). Boredom at work: A neglected concept. *Human relations*, 46(3), 395-417.
- Fox, K. C., Spreng, R. N., Ellamil, M., Andrews-Hanna, J. R., & Christoff, K. (2015). The wandering brain: Meta-analysis of functional neuroimaging studies of mind-wandering and related spontaneous thought processes. *Neuroimage*, 111, 611-621.
- Giambra, L. M. (1980). Sex differences in daydreaming and related mental activity from the late teens to the early nineties. *The International Journal of Aging and Human Development*, 10(1), 1-34.

- Good, D. J., Lyddy, C. J., Glomb, T. M., Bono, J. E., Brown, K. W., Duffy, M. K., ... & Lazar, S. W. (2016). Contemplating mindfulness at work: An integrative review. *Journal of management*, *42*(1), 114-142.
- Haynes, J. D., & Rees, G. (2005). Predicting the stream of consciousness from activity in human visual cortex. *Current biology*, *15*(14), 1301-1307.
- Heimerdinger, S. R., & Hinsz, V. B. (2008). Failure avoidance motivation in a goal-setting situation. *Human Performance*, *21*(4), 383-395.
- Hollenbeck, J. R., & Klein, H. J. (1987). Goal commitment and the goal-setting process: Problems, prospects, and proposals for future research. *Journal of applied psychology*, *72*(2), 212.
- Hollenbeck, J. R., Klein, H. J., O'Leary, A. M., & Wright, P. M. (1989). Investigation of the construct validity of a self-report measure of goal commitment. *Journal of Applied Psychology*, *74*(6), 951.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, *6*(1), 1-55.
- Huang, J. L., Bowling, N. A., Liu, M., & Li, Y. (2015). Detecting insufficient effort responding with an infrequency scale: Evaluating validity and participant reactions. *Journal of Business and Psychology*, *30*(2), 299-311.
- James, W. (1892). The stream of consciousness. *Psychology*.
- Jazaieri, H., Lee, I. A., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2016). A wandering mind is a less caring mind: Daily experience sampling during compassion meditation training. *The Journal of Positive Psychology*, *11*(1), 37-50.

- Kandemir, M. (2014). Predictors of Approach/Avoidance Achievement Goals: Personality Traits, Self-Esteem and Academic Self-Efficacy. *International Online Journal of Educational Sciences*, 6(1).
- Kennedy, R., Clifford, S., Burleigh, T., Waggoner, P. D., Jewell, R., & Winter, N. J. (2020). The shape of and solutions to the MTurk quality crisis. *Political Science Research and Methods*, 8(4), 614-629.
- Kenny, D. (2020, June 5). Measuring Model Fit. Retrieved April 15, 2021, from <http://davidakenny.net/cm/fit.htm>
- Klein, H. J., Wesson, M. J., Hollenbeck, J. R., & Alge, B. J. (1999). Goal commitment and the goal-setting process: conceptual clarification and empirical synthesis. *Journal of applied psychology*, 84(6), 885.
- Kline, T. J. (2005). *Psychological testing: A practical approach to design and evaluation*. Sage Publications.
- Klinger, E. (1971). *Structure and functions of fantasy*. New York, NY: Wiley.
- Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science*, 330(6006), 932-932.
- Lee, T. W. (1986). Toward the development and validation of a measure of job boredom. *Manhattan College Journal of Business*, 15(1), 22-28.
- Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). *Level of aspiration*. In J. M. Hunt, *Personality and the behavior disorders* (p. 333–378). Ronald Press.
- Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational behavior and human performance*, 3(2), 157-189.

- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall, Inc.
- Locke, E. A., & Latham, G. P. (2006). New directions in goal-setting theory. *Current directions in psychological science, 15*(5), 265-268.
- Locke, E. A., & Latham, G. P. (Eds.). (2013). *New developments in goal setting and task performance*. Routledge.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal setting and task performance: 1969–1980. *Psychological bulletin, 90*(1), 125.
- Marteau, T. M., & Bekker, H. (1992). The development of a six-item short-form of the state scale of the Spielberger State—Trait Anxiety Inventory (STAI). *British journal of clinical Psychology, 31*(3), 301-306.
- Martin, B. A., & Manning Jr, D. J. (1995). Combined effects of normative information and task difficulty on the goal commitment-performance relationship. *Journal of Management, 21*(1), 65-80.
- Mason, M. F., Norton, M. I., Van Horn, J. D., Wegner, D. M., Grafton, S. T., & Macrae, C. N. (2007). Wandering minds: the default network and stimulus-independent thought. *Science, 315*(5810), 393-395.
- McKiernan, K. A., D'Angelo, B. R., Kaufman, J. N., & Binder, J. R. (2006). Interrupting the “stream of consciousness”: an fMRI investigation. *Neuroimage, 29*(4), 1185-1191.
- McVay, J. C., & Kane, M. J. (2009). Conducting the train of thought: working memory capacity, goal neglect, and mind wandering in an executive-control task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*(1), 196.

- McVay, J. C., & Kane, M. J. (2010). Does mind wandering reflect executive function or executive failure? Comment on Smallwood and Schooler (2006) and Watkins (2008).
- Mittner, M., Hawkins, G. E., Boekel, W., & Forstmann, B. U. (2016). A neural model of mind wandering. *Trends in cognitive sciences*, *20*(8), 570-578.
- Mooneyham, B. W., & Schooler, J. W. (2013). The costs and benefits of mind-wandering: a review. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, *67*(1), 11.
- Mrazek, M. D., Franklin, M. S., Phillips, D. T., Baird, B., & Schooler, J. W. (2013). Mindfulness training improves working memory capacity and GRE performance while reducing mind wandering. *Psychological science*, *24*(5), 776-781.
- Mrazek, M. D., Phillips, D. T., Franklin, M. S., Broadway, J. M., & Schooler, J. W. (2013). Young and restless: validation of the Mind-Wandering Questionnaire (MWQ) reveals disruptive impact of mind-wandering for youth. *Frontiers in psychology*, *4*, 560.
- Mrazek, M. D., Smallwood, J., Franklin, M. S., Chin, J. M., Baird, B., & Schooler, J. W. (2012). The role of mind-wandering in measurements of general aptitude. *Journal of Experimental Psychology: General*, *141*(4), 788.
- Mrazek, M. D., Smallwood, J., & Schooler, J. W. (2012). Mindfulness and mind-wandering: finding convergence through opposing constructs. *Emotion*, *12*(3), 442.
- Papageorgiou, C., & Wells, A. (Eds.). (2004). *Depressive rumination: Nature, theory and treatment*. John Wiley & Sons.
- Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of applied psychology*, *92*(1), 128.

- Peters, L. H., Chassie, M. B., Lindholm, H. R., O'Connor, E. J., & Kline, C. R. (1982). The joint influence of situational constraints and goal setting on performance and affective outcomes. *Journal of Management*, 8(2), 7-20.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731. <https://doi.org/10.3758/BF03206553>
- Raichle, M. E., MacLeod, A. M., Snyder, A. Z., Powers, W. J., Gusnard, D. A., & Shulman, G. L. (2001). A default mode of brain function. *Proceedings of the National Academy of Sciences*, 98(2), 676-682.
- Randall, J. G., Oswald, F. L., & Beier, M. E. (2014). Mind-wandering, cognition, and performance: A theory-driven meta-analysis of attention regulation. *Psychological bulletin*, 140(6), 1411.
- Ricciuti, H. N. (1951). A review of procedural variations in level of aspiration studies. *ETS Research Report Series*, 1951(2).
- Riggs, M. L., Warka, J., Babasa, B., Betancourt, R., & Hooker, S. (1994). Development and validation of self-efficacy and outcome expectancy scales for job-related applications. *Educational and psychological measurement*, 54(3), 793-802.
- Rose, S. A., Markman, B., & Sawilowsky, S. (2017). Limitations in the systematic analysis of structural equation model fit indices. *Journal of Modern Applied Statistical Methods*, 16(1), 5.
- Rothbard, N. P. (2001). Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative science quarterly*, 46(4), 655-684.

- Rummel, J., & Boywitt, C. D. (2014). Controlling the stream of thought: Working memory capacity predicts adjustment of mind-wandering to situational demands. *Psychonomic bulletin & review*, 21(5), 1309-1315.
- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness studies*, 3(1), 71-92.
- Schooler, J. W., Mrazek, M. D., Franklin, M. S., Baird, B., Mooneyham, B. W., Zedelius, C., & Broadway, J. M. (2014). The middle way: Finding the balance between mindfulness and mind-wandering. In *Psychology of learning and motivation* (Vol. 60, pp. 1-33). Academic Press.
- Schooler, J. W., Smallwood, J., Christoff, K., Handy, T. C., Reichle, E. D., & Sayette, M. A. (2011). Meta-awareness, perceptual decoupling and the wandering mind. *Trends in cognitive sciences*, 15(7), 319-326.
- Sears, P. S. (1940). Levels of aspiration in academically successful and unsuccessful children. *The Journal of Abnormal and Social Psychology*, 35(4), 498.
- Seli, P., Carriere, J. S., & Smilek, D. (2015). Not all mind wandering is created equal: Dissociating deliberate from spontaneous mind wandering. *Psychological Research*, 79(5), 750-758.
- Seli, P., Ralph, B. C., Risko, E. F., Schooler, J. W., Schacter, D. L., & Smilek, D. (2017). Intentionality and meta-awareness of mind wandering: Are they one and the same, or distinct dimensions?. *Psychonomic Bulletin & Review*, 1-11.
- Seli, P., Risko, E. F., Smilek, D., & Schacter, D. L. (2016). Mind-wandering with and without intention. *Trends in cognitive sciences*, 20(8), 605-617.

- Seo, M. G., Barrett, L. F., & Bartunek, J. M. (2004). The role of affective experience in work motivation. *Academy of Management Review*, 29(3), 423-439.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological methods*, 7(4), 422.
- Smallwood, J. (2013). Distinguishing how from why the mind wanders: a process–occurrence framework for self-generated mental activity. *Psychological bulletin*, 139(3), 519.
- Smallwood, J., Davies, J. B., Heim, D., Finnigan, F., Sudberry, M., O'Connor, R., & Obonsawin, M. (2004). Subjective experience and the attentional lapse: Task engagement and disengagement during sustained attention. *Consciousness and cognition*, 13(4), 657-690.
- Smallwood, J., & Schooler, J. W. (2006). The restless mind. *Psychological bulletin*, 132(6), 946.
- Smallwood, J., & Schooler, J. W. (2015). The science of mind wandering: empirically navigating the stream of consciousness. *Annual review of psychology*, 66, 487-518.
- Snyder, M. (1987). *Public appearances, Private realities: The psychology of self-monitoring*. WH Freeman/Times Books/Henry Holt & Co.
- Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory STAI (Form Y)*. Palo Alto, CA: Consulting Psychologists Press.
- Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. *Psychological bulletin*, 124(2), 240.
- Teasdale, J. D., Dritschel, B. H., Taylor, M. J., Proctor, L., Lloyd, C. A., Nimmo-Smith, I., & Baddeley, A. D. (1995). Stimulus-independent thought depends on central executive resources. *Memory & cognition*, 23(5), 551-559.

- Thomson, D. R., Besner, D., & Smilek, D. (2015). A resource-control account of sustained attention: Evidence from mind-wandering and vigilance paradigms. *Perspectives on psychological science, 10*(1), 82-96.
- Unsworth, N., & Robison, M. K. (2018). Tracking arousal state and mind wandering with pupillometry. *Cognitive, Affective, & Behavioral Neuroscience, 18*(4), 638-664.
- VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and psychological measurement, 57*(6), 995-1015.
- van Hooff, M. L., & van Hooft, E. A. (2014). Boredom at work: Proximal and distal consequences of affective work-related boredom. *Journal of occupational health psychology, 19*(3), 348.
- Walach, H., Buchheld, N., Bütünmüller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness—the Freiburg mindfulness inventory (FMI). *Personality and individual differences, 40*(8), 1543-1555.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology, 54*(6), 1063.
- Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of management, 17*(3), 601-617.
- Wegner, D. M., Schneider, D. J., Knutson, B., & McMahon, S. R. (1991). Polluting the stream of consciousness: The effect of thought suppression on the mind's environment. *Cognitive Therapy and Research, 15*(2), 141-152.

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: properties of the MCQ-30. *Behaviour research and therapy*, 42(4), 385-396.

Zedelius, C. M., Broadway, J. M., & Schooler, J. W. (2015). Motivating meta-awareness of mind wandering: A way to catch the mind in flight?. *Consciousness and Cognition*, 36, 44-53.

Zhiyan, T., & Singer, J. L. (1997). Daydreaming styles, emotionality and the big five personality dimensions. *Imagination, Cognition and Personality*, 16(4), 399-414.

Appendix A

Demographics

(Both Student and Work Samples)

INSTRUCTIONS: Please select the response that best reflects your answer.

Age (in years):

Gender (select one): Male Female Non-binary

Ethnicity (select one): African American Asian Hispanic Native American
Pacific Islander White/Caucasian Other: _____

Completed education level (select one): High School Some College
College Graduate School

College GPA (if applicable):

Current employment status (select one): Full-time Part-time Unemployed

Total Number of Years Working (if applicable):

Number of Years Working in Current Employment (if applicable):

Job Title (if applicable):

Appendix B

Personality

(Both Student and Work Samples)

INSTRUCTIONS: Below are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future.

1	2	3	4	5
Very Inaccurate	Moderately Inaccurate	Neither Accurate nor Inaccurate	Moderately Accurate	Very Accurate

1. Often feel blue. (N)
2. Feel comfortable around people. (E)
3. Believe in the importance of art. (O)
4. Have a good word for everyone. (A)
5. Am always prepared. (C)
6. Rarely get irritated. (N)*
7. Have little to say. (E)*
8. Am not interested in abstract ideas. (O)*
9. Have a sharp tongue. (A)*
10. Waste my time. (C)*
11. Dislike myself. (N)
12. Make friends easily. (E)
13. Have a vivid imagination (O)
14. Believe that others have good intentions. (A)
15. Pay attention to details. (C)
16. Seldom feel blue. (N)*
17. Keep in the background. (E)*
18. Do not like art. (O)*
19. Cut others to pieces. (A)*
20. Find it difficult to get down to work. (C)*
21. Am often down in the dumps. (N)

22. Am skilled in handling social situations. (E)
23. Tend to vote for liberal political candidates. (O)
24. Respect others. (A)
25. Get chores done right away. (C)
26. Feel comfortable with myself. (N)*
27. Would describe my experiences as somewhat dull. (E)*
28. Avoid philosophical discussions. (O)*
29. Suspect hidden motives in others. (A)*
30. Do just enough work to get by. (C)*
31. Have frequent mood swings. (N)
32. Am the life of the party. (E)
33. Carry the conversation to a higher level. (O)
34. Accept people as they are. (A)
35. Carry out my plans. (C)
36. Am not easily bothered by things. (N)*
37. Don't like to draw attention to myself. (E)*
38. Do not enjoy going to art museums. (O)*
39. Get back at others. (A)*
40. Don't see things through. (C)*
41. Panic easily. (N)
42. Know how to captivate people. (E)
43. Enjoy hearing new ideas. (O)
44. Make people feel at ease. (A)
45. Make plans and stick to them. (C)
46. Am very pleased with myself. (N)*
47. Don't talk a lot. (E)*
48. Tend to vote for conservative political candidates. (O)*
49. Insult people. (A)*
50. Shirk my duties. (C)*

Key:

Neuroticism = (N)

Extraversion = (E)

Openness = (O)

Agreeableness = (A)

Conscientiousness = (C)

*Reverse scored items.

Source: International Personality Item Pool: A Scientific Collaboratory for the Development of Advanced Measures of Personality Traits and Other Individual Differences (<http://ipip.ori.org/>).

Appendix C

Affectivity (Positive, Negative)

(Both Student and Work Samples)

INSTRUCTIONS: This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word.

Indicate to what extent you have felt this way during the past few weeks.

	1	2	3	4	5
Very Slightly					
or Not at All		A Little	Moderately	Quite a Bit	Extremely
1.	Interested				
2.	Distressed				
3.	Excited				
4.	Upset				
5.	Strong				
6.	Guilty				
7.	Scared				
8.	Hostile				
9.	Enthusiastic				
10.	Proud				
11.	Irritable				
12.	Alert				
13.	Ashamed				
14.	Inspired				
15.	Nervous				
16.	Determined				
17.	Attentive				
18.	Jittery				
19.	Active				
20.	Afraid				

Positive Affect: Sum the responses to items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19.

Negative Affect: Sum the responses to items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20

Source: Watson et al., 1988

Appendix D

Generalized Self-efficacy

(Both Student and Work Samples)

INSTRUCTIONS: Below are statements about people's beliefs that in general they can achieve tasks and goals. Use the following scale to indicate how accurate each item reflects **your own** beliefs about your ability to achieve various tasks and goals.

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neutral	Moderately Agree	Strongly Agree

1. I will be able to achieve most of the goals that I have set for myself.
2. When facing difficult tasks, I am certain that I will accomplish them.
3. In general, I think that I can obtain outcomes that are important to me.
4. I believe I can succeed at most any endeavor to which I set my mind.
5. I will be able to successfully overcome many challenges.
6. I am confident that I can perform effectively on many different tasks.
7. Compared to other people, I can do most tasks very well.
8. Even when things are tough, I can perform quite well.

Source: Chen, Gully, and Eden, 2001

Appendix E
Goal Orientation
(Student Sample)

INSTRUCTIONS: Below are statements describing people’s classroom behaviors. Please use the following scale to indicate how accurate each statement reflects **your own** behavioral tendencies.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. I am willing to select a challenging class assignment that I can learn a lot from.
2. I often look for opportunities to develop new skills and knowledge.
3. I enjoy challenging and difficult tasks at class where I’ll learn new skills.
4. For me, development of my academic ability is important enough to take risks.
5. I prefer to work in situations that require a high level of ability and talent.
6. I’m concerned with showing that I can perform better than my classmates.
7. I try to figure out what it takes to prove my ability to others in class.
8. I enjoy it when others in class are aware of how well I am doing.
9. I prefer to work on projects where I can prove my ability to others.
10. I would avoid taking on a new task if there was a chance I would appear rather incompetent to others.

11. Avoiding a show of low ability is more important to me than learning a new skill.
12. I'm concerned about taking on a task in class if my performance would reveal that I had low ability.
13. I prefer to avoid situations in class where I might perform poorly.

Note: *Learning goal orientation items are 1-5, prove-performance goal orientation items are 6-9, and avoid-performance goal orientation items are 10-13.*

Source: Vandewalle (1997)

(Work Sample)

INSTRUCTIONS: Below are statements describing people's workplace behaviors. Please use the following scale to indicate how accurate each statement reflects **your own** behavioral tendencies.

1	2	3	4	5	6
Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree

1. I am willing to select a challenging work assignment that I can learn a lot from.
2. I often look for opportunities to develop new skills and knowledge.
3. I enjoy challenging and difficult tasks at work where I'll learn new skills.
4. For me, development of my work ability is important enough to take risks.
5. I prefer to work in situations that require a high level of ability and talent.

6. I'm concerned with showing that I can perform better than my coworkers.
7. I try to figure out what it takes to prove my ability to others at work.
8. I enjoy it when others at work are aware of how well I am doing.
9. I prefer to work on projects where I can prove my ability to others.
10. I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.
11. Avoiding a show of low ability is more important to me than learning a new skill.
12. I'm concerned about taking on a task at work if my performance would reveal that I had low ability.
13. I prefer to avoid situations at work where I might perform poorly.

Note: *Learning goal orientation items are 1-5, prove-performance goal orientation items are 6-9, and avoid-performance goal orientation items are 10-13.*

Source: Vandewalle (1997)

Appendix F

Trait Anxiety

(Both Student and Work Samples)

INSTRUCTIONS: A number of statements people use to describe themselves are given below.

Read each statement and indicate the extent to which each statement describes *how you generally feel*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer that best describes your overall feelings best.

1	2	3	4
Not at all			Very Much

1. I feel calm.*
2. I am tense.
3. I feel upset.
4. I am relaxed.*
5. I feel content.*
6. I am worried.

* = *Reverse scored*

Source: Marteau and Bekker (1992)

Appendix G

Goal Level

(Student Sample)

INSTRUCTIONS: Below you are to choose a grade **goal** for your final exam in PSYC 1010 and for your final grade in the course. Indicate your grade goal on a 0-100 percentage scale.

Goal for final exam score (% of points on exam): _____

Goal for total points in class (% of total points): _____

(Work Sample)

INSTRUCTIONS: Below you are to choose a **goal** for your job performance, as if being graded on a 0-100 scale like in school. Indicate your “grade” goal on a 0-100 percentage scale.

Job performance “grade” goal (0-100%): _____

Appendix H

Goal Commitment

(Both Student and Work Samples)

INSTRUCTIONS: Below are statements describing people's feelings about goals. Please use the rating scale below to describe how accurately each statement describes **your feelings** about the grade goals you have just chosen.

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neutral	Moderately Agree	Strongly Agree

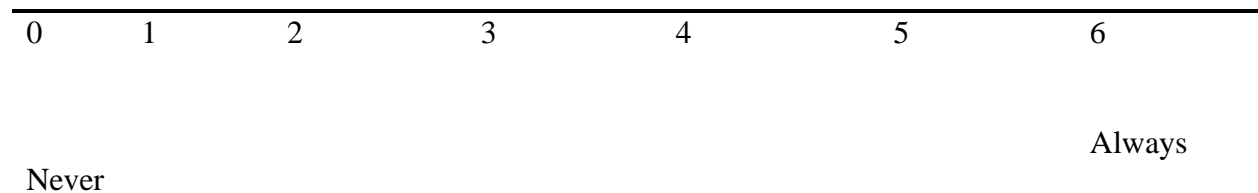
1. It's hard to take this goal seriously.
2. It's unrealistic for me to expect to reach this goal.
3. It is quite likely that this goal may need to be revised, depending on how things go.
4. Quite frankly, I don't care if I achieve this goal or not.

Source: Hollenbeck, Klein, O'Leary, and Wright (1989)

Appendix I
Work Engagement

(Student Sample)

INSTRUCTIONS: Below are statements about experiences people have at college. Use the following scale to indicate how frequently you experience each **with respect to your psychology course**.



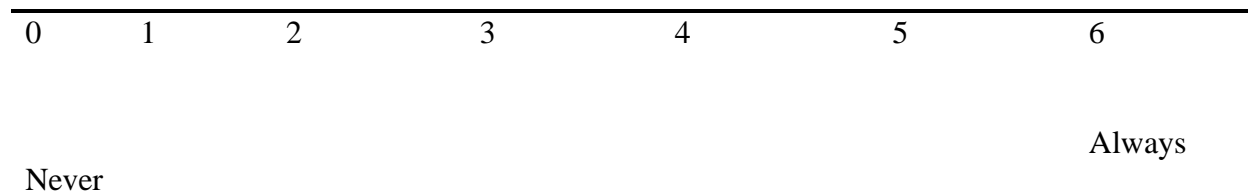
1. When I get up in the morning, I feel like going to class. (VI)
2. When I'm doing my work as a student, I feel bursting with energy. (VI)
3. As far as my studies are concerned I always persevere, even when things do not go well. (VI)
4. I can continue studying for very long periods at a time. (VI)
5. I am very resilient, mentally, as far as my studies are concerned. (VI)
6. I feel strong and vigorous when I'm studying or going to class. (VI)
7. To me, my studies are challenging. (DE)
8. My study inspires me. (DE)
9. I am enthusiastic about my studies. (DE)
10. I am proud of my studies. (DE)
11. I find my studies full of meaning and purpose. (DE)
12. When I am studying, I forget everything else around me. (AB)
13. Time flies when I am studying. (AB)
14. I get carried away when I am studying. (AB)
15. It is difficult to detach myself from my studies. (AB)
16. I am immersed in my studies. (AB)
17. I feel happy when I am studying intensely. (AB)

Source: Schaufeli et al., 2002

Note: VI = Vigor facet, DE = Dedication facet, AB = Absorption facet

(Work Sample)

INSTRUCTIONS: Below are statements about experiences people have at work. Use the following scale to indicate how frequently you experience each **at work**.



1. When I get up in the morning, I feel like going to work. (VI)
2. At my work, I feel bursting with energy. (VI)
3. At my work I always persevere, even when things do not go well. (VI)
4. I can continue working for very long periods of time. (VI)
5. At my job, I am very resilient, mentally. (VI)
6. At my job I feel strong and vigorous. (VI)
7. To me, my job is challenging. (DE)
8. My job inspires me. (DE)
9. I am enthusiastic about my job. (DE)
10. I am proud of the work that I do. (DE)
11. I find the work that I do full of meaning and purpose. (DE)
12. When I am working, I forget everything else around me. (AB)
13. Time flies when I am working. (AB)
14. I get carried away when I am working. (AB)
15. It is difficult to detach myself from my job. (AB)
16. I am immersed in my work. (AB)
17. I feel happy when I am working intensely. (AB)

Source: Schaufeli et al., 2002

Note: VI = Vigor facet, DE = Dedication facet, AB = Absorption facet

Appendix J

Mind Wandering

(Student Sample)

INSTRUCTIONS: Below are statements about experiences people have in class. Use the following scale to indicate how frequently you experience each **while in your psychology class**.

(Work Sample)

INSTRUCTIONS: Below are statements about experiences people have at work. Use the following scale to indicate how frequently you experience each **while at work**.

1	2	3	4	5	6
Almost never	Very infrequently	Somewhat infrequently	Somewhat frequently	Very frequently	Almost always

1. I have difficulty maintaining focus on simple or repetitive work.
2. While reading, I find I haven't been thinking about the text and must therefore read it again.
3. I do things without paying full attention.
4. I find myself listening with one ear, thinking about something else at the same time.
5. I mind-wander during lectures or presentations.

Source: Mrazek et al., 2013

Appendix K

Task-specific Self-efficacy

(Student Sample)

INSTRUCTIONS: Below are statements reflecting people' ability to do tasks required by their classes. Use the following scale to indicate how accurately each statement describes **your ability** to perform the class-related tasks mentioned below.

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neutral	Moderately Agree	Strongly Agree

1. I have confidence in my ability to do well in my introductory psychology (Psyc 1010) class.
2. There are some tasks required by my Psyc 1010 class that I cannot do well.*
3. When my grades are poor, it is due to my lack of ability.
4. I doubt my ability to do well in my Psyc 1010 class.*
5. I have all the skills needed to perform well in my Psyc 1010 class.
6. Most people in my class get better grades than I do.*
7. I am a great student.
8. My future in school is limited because of my lack of skills.*
9. I am very proud of my skills and abilities in school.
10. I feel threatened when others watch me take a test or do homework.*

**Reverse coded*

Adapted from Riggs, Warka, Babasa, Betancourt, and Hooker (1994)

(Work Sample)

INSTRUCTIONS: Below are statements reflecting people' ability to do tasks required by their job. Use the following scale to indicate how accurately each statement describes **your ability** to perform the work-related tasks mentioned below.

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neutral	Moderately Agree	Strongly Agree

1. I have confidence in my ability to do well at my job.
2. There are some tasks required by my job that I cannot do well.*
3. When my job evaluations are poor, it is due to my lack of ability.
4. I doubt my ability to do well in my job.*
5. I have all the skills needed to perform well at my job.
6. Most people at my organization receive better evaluations than I do.*
7. I am a great worker.
8. My future in my current career is limited because of my lack of skills.*
9. I am very proud of my skills and abilities at work.
10. I feel threatened when others watch me work.*

**Reverse coded*

Adapted from Riggs, Warka, Babasa, Betancourt, and Hooker (1994)

Appendix L

Mindfulness

(Both Student and Work Samples)

INSTRUCTIONS: The purpose of this inventory is to characterize your experience of mindfulness. Provide an answer for every statement as best you can. Please answer as honestly and spontaneously as possible. There are neither ‘right’ nor ‘wrong’ answers, nor ‘good’ or ‘bad’ responses. What is important to us is your own personal experience.

1	2	3	4
Rarely	Occasionally	Fairly often	Almost always

1. I am open to the experience of the present moment.
2. I sense my body, whether eating, cooking, cleaning or talking.
3. When I notice an absence of mind, I gently return to the experience of the here and now.
4. I am able to appreciate myself.
5. I pay attention to what’s behind my actions.
6. I see my mistakes and difficulties without judging them.
7. I feel connected to my experience in the here-and-now.
8. I accept unpleasant experiences.
9. I am friendly to myself when things go wrong.
10. I watch my feelings without getting lost in them.
11. In difficult situations, I can pause without immediately reacting.
12. I experience moments of inner peace and ease, even when things get hectic and stressful.
13. I am impatient with myself and with others.
14. I am able to smile when I notice how I sometimes make life difficult.

Source: Walach, Buchheld, Grossman and Schmidt (2006)

Appendix M

Boredom

(Student Sample)

INSTRUCTIONS: When answering the following, please consider your work in your psychology course.

1	2	3	4	5
Almost				Almost
never				always

1. I think my work is boring.
2. There are long periods of boredom in my psychology course lab and/or lecture.
3. My psychology course goes by slowly.
4. I often get bored with my work.
5. The time seems to go by slowly when I'm in my psychology course lab and/or lecture.

Source: Adapted from Van Hooft and Van Hooft (2014)

(Work Sample)

INSTRUCTIONS: When answering the following, please consider your current job and work.

1	2	3	4	5
Almost				Almost
never				always

1. I think my work is boring.
2. There are long periods of boredom on my job
3. My job goes by slowly
4. I often get bored with my work
5. The time seems to go by slowly when I'm at work.

Source: Van Hooft and Van Hooft (2014)

Appendix N

Metacognition

(Both Student and Work Samples)

INSTRUCTIONS: Below are statements describing people's behaviors. Please use the following scale to indicate how accurate each statement reflects **your own** behavioral tendencies.

1	2	3	4
Do not agree	Agree slightly	Agree moderately	Agree very much

1. I am constantly aware of my thinking.
2. I pay close attention to the way my mind works.
3. I think a lot about my thoughts.
4. I constantly examine my thoughts.
5. I monitor my thoughts.
6. I am aware of the way my mind works when I am thinking through a problem.

Source: Wells and Cartwright-Hatton (2004)

Appendix O

In-Role Behavior Performance

(Work Sample)

INSTRUCTIONS: Please read the following statements carefully. Use the scale below to indicate your agreement or disagreement with each of the following statements.

1 (Strongly Disagree).....7 (Strongly Agree)

1. I adequately complete assigned duties.
2. I fulfill the responsibilities specified in my job description.
3. I perform tasks that are expected of myself.
4. I meet formal performance requirements of the job.
5. I engage in activities that will directly affect my performance evaluation.
6. I neglect aspects of the job I am obligated to perform. *
7. I fail to perform essential duties. *

Note. * reversed scored.

Source: Williams and Anderson, 1991

Appendix P
Consent Form
(Student Sample)

Investigators: Kent Etherton (Etherton.4@wright.edu)

WSU Psychology Department, Fawcett Hall Room 335,
Dayton, OH 45435

Dr. Debra Steele-Johnson (debra.steele-johnson@wright.edu)

WSU Psychology Department, Fawcett Hall Room 335,
Dayton, OH 45435

Study site: Online at a time and location of your choosing

If you have general questions about giving consent or your rights as a research participant in this research study, you can call the Wright State University Institutional Review Board at 937-775-4462.

Background Information:

You are invited to participate in a research study. The study is being conducted by Kent Etherton (student in the WSU IO/HF PhD Program) and Dr. Debra Steele-Johnson.

Approximately 400 subjects will be invited to participate.

Purpose

The purpose of this research study is to examine the effects of various personality variables on performance-related behaviors.

Procedure

In this study, you will be asked to complete several online questionnaires. You will receive SONA research credits for completing all of the questionnaires. These surveys will be used to measure aspects of your personality, motivation, and academic ability. You may decline to answer any questions that may make you uncomfortable. This study will take approximately 1 hour to complete.

Potential Risks

There is minimal risk and discomfort anticipated as part of or as a result of this research study. The primary risk is fatigue resulting from responding to the questionnaires. Any information about you obtained from this study will be kept strictly confidential and you will not be identified in any report or publication.

Benefits

The possible benefits of this study include the gaining of knowledge about human psychology that can improve individual performance. The information collected may not benefit you directly. The information learned in this study may be helpful to others. You will receive the benefit of SONA credits for completing this study. The information learned in this study may be helpful to others.

Compensation

You will receive 2 SONA credits for your time while you are in this study.

Confidentiality

Total privacy cannot be guaranteed. We will protect your privacy to the extent permitted by law. If the results from this study are published, your name will not be made public. Once your information leaves our institution, we cannot promise that others will keep it private. Results of the study will show only aggregated (combined) data. No individual results will be available.

Your information may be shared with the following:

- The Wright State IRB and Office of Research and Sponsored Programs
- Office for Human Research Protections (OHRP)

Security

To ensure data collected is secured, your data will be kept in either a password protected computer or the password protected SONA system.

Voluntary Participation

Taking part in this study is voluntary. You may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

Research Subject's Rights, Questions, Concerns, and Complaints

You may contact the principal investigator, Kent Etherton, at etherton.4@wright.edu and his faculty advisor, Dr. Debra Steele-Johnson, at debra.steele-johnson@wright.edu.

If you have any questions about your rights as a study subject, questions, concerns or complaints, you may call the Wright State IRB Office (937) 775-4462. You may discuss any questions about your rights as a subject with a member of the IRB or staff. The IRB is an independent committee composed of members of the University community, staff of the institutions, as well as lay members of the community not connected with these institutions. The IRB has reviewed this study.

This form tells you what will happen during the study if you choose to take part. We also ask for your permission to get information about your academic performance (course grade and GPA).

Clicking the “I Agree” button below and continuing with the questionnaires implies that this study has been discussed with you, that your questions have been answered, that you give us permission to get information about your academic performance, and that you will take part in the study. This informed consent document is not a contract. You are not giving up any legal rights by signing this informed consent document. Your decision to participate or to not participate will not adversely affect your standing at this institution or cause a loss of benefits to which you might otherwise be entitled. There is no penalty of any kind for either non-participation or withdrawal at any time. You may request a copy of this consent to keep for your records by contacting the primary investigator, Kent Etherton.

Please indicate your agreement to participate in this study. If you choose not to participate you may close your browser now.

I agree to participate in this study.

(Work Sample)

Investigators: Kent Etherton (etherton.4@wright.edu)

WSU Psychology Department, Fawcett Hall Room 335,

Dayton, OH 45435

Dr. Debra Steele-Johnson (debra.steele-johnson@wright.edu)

WSU Psychology Department, Fawcett Hall Room 335,

Dayton, OH 45435

Study site: Online at a time and location of your choosing

If you have general questions about giving consent or your rights as a research participant in this research study, you can call the Wright State University Institutional Review Board at 937-775-4462.

Background Information:

You are invited to participate in a research study. The study is being conducted by Kent Etherton (student in the WSU IO/HF PhD Program) and Dr. Debra Steele-Johnson.

Approximately 400 subjects will be invited to participate.

Purpose

The purpose of this research study is to examine the effects of various personality variables on performance-related behaviors.

Procedure

In this study, you will be asked to complete several online questionnaires. Completion of the online surveys is self-paced. You may leave the survey and return to complete it at any time, so

long as the study is still open. If you leave the survey, you must use the same device (i.e., the same phone or laptop) to complete the survey. You will receive \$0.50 for completing all of the questionnaires. These surveys will be used to measure aspects of your personality, motivation, and job performance. You may decline to answer any questions that may make you uncomfortable. This study will take approximately 1 hour to complete.

Potential Risks

There is minimal risk and discomfort anticipated as part of or as a result of this research study. The primary risk is fatigue resulting from responding to the questionnaires. Additionally, some items may cause discomfort or result in positive or negative feelings. Any information about you obtained from this study will be kept strictly confidential and you will not be identified in any report or publication.

Benefits

The possible benefits of this study include the gaining of knowledge about human psychology that can improve individual performance. The knowledge gained may not benefit you directly. The information learned in this study may be helpful to others. You will receive the benefit of \$0.50 for completing this study.

Compensation

You will receive \$0.50 for your time while you are in this study.

Confidentiality

Total privacy cannot be guaranteed. We will protect your privacy to the extent permitted by law.

If the results from this study are published, your name will not be made public. Once your information leaves our institution, we cannot promise that others will keep it private. Results of the study will show only aggregated (combined) data. No individual results will be available.

Your information may be shared with the following:

- The Wright State IRB and Office of Research and Sponsored Programs
- Office for Human Research Protections (OHRP)

Security

To ensure data collected is secured, your data will be kept in either a password protected computer or the password protected Amazon MTURK system.

Voluntary Participation

Taking part in this study is voluntary. You may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

Research Subject's Rights, Questions, Concerns, and Complaints

You may contact the principal investigator, Kent Etherton, at etherton.4@wright.edu and his faculty advisor, Dr. Debra Steele-Johnson, at debra.steele-johnson@wright.edu.

If you have any questions about your rights as a subject, questions, concerns or complaints, you may call the Wright State IRB Office (937) 775-4462. You may discuss any questions about your rights as a subject with a member of the IRB or staff. The IRB is an independent committee composed of members of the University community, staff of the institutions, as well as lay members of the community not connected with these institutions. The IRB has reviewed this study.

This form tells you what will happen during the study if you choose to take part. Clicking the “I Agree” button below and continuing with the questionnaires implies that this study has been discussed with you, that your questions have been answered, and that you will take part in the study. This informed consent document is not a contract. You are not giving up any legal rights by signing this informed consent document. Your decision to participate or to not participate will not cause a loss of benefits to which you might otherwise be entitled. There is no penalty of any kind for either non-participation or withdrawal at any time. You may request a copy of this consent to keep for your records by contacting the primary investigator, Kent Etherton at Etherton.4@wright.edu

Please indicate your agreement to participate in this study. If you choose not to participate you may close your browser now.

I agree to participate in this study.

Appendix Q

Debriefing Form

(Both Student and Work Samples)

THANK YOU FOR YOUR PARTICIPATION

The experiment you just completed examines the relationships between various personality variables and performance-related behaviors.

Prior research has examined relationships between personality variables and motivational variables and behavior in organizations. We are interested in whether some of these personality variables are better predictors of motivation and performance.

With data from you and other individuals, we are discovering more about how personality might relate to motivation and performance in organizations.

Please do not discuss these surveys with anyone else because it is important that future participants know nothing about the experiment before they participate in the same experiment. The data you provide today is important to us, and we appreciate your help. If you have any questions or comments about today's experiments, please talk to the researcher, Kent Etherton at etherton.4@wright.edu or contact Dr. Debra Steele-Johnson at debra.steele-johnson@wright.edu.

Thank you for your time and cooperation.