ATTENTIONAL PULL: THE OFF-TASK PULL OF EMOTIONS AND ON-TASK PULL OF GOALS

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ATTENTIONAL PULL: THE OFF-TASK PULL OF EMOTIONS AND ON-TASK PULL OF GOALS

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SUMMARY

The allocation of attentional resources to a focal task can influence performance on that task, but within-person changes in allocation policy is typically understudied. This study investigates the off-task pull of emotional experiences and the competing on-task pull of goals. Emotional experience was manipulated using an ostracizing event and goals were experimenter-assigned. The results did not support the off-task pull of emotional experiences or the on-task pull of goals. Implications and directions for future research are discussed.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

It is readily acknowledged that there are many competing demands on attention in the workplace, and emotions are one such source of attentional demand. Strong emotional experiences, such as a being socially ostracized at work, may increase the difficulty of effectively focusing on the task at hand by pulling attention towards the emotional event. Conversely, certain characteristics of tasks, such as specific goals, may provide the extra "boost" needed to maintain attention and efficiently finish a project. Thus, the "attentional pull" of emotions and goals may jointly influence the direction of attentional resources within individuals across time (Beal, Weiss, Barros, & MacDermid, 2005). This on- or off-task allocation of attentional resources may explain changes in performance on attention-demanding tasks.

In organizational research, task performance has traditionally been conceptualized as a between-person construct, such that Person A is a good performer and Person B is a poor performer (McCloy, Campbell, & Cudeck, 1994). However, this "stabilized" measure of performance ignores important within-person variability (i.e., before lunch I was very productive, but now I'm not). Currently, very little is understood about the changes in performance exhibited within a single person over time and how the surrounding environment can influence momentary performance. Employees cannot maximally perform for a long period of time without detrimental effects (i.e., burnout; Maslach, Schaufeli, & Leiter, 2001) and maximum performance may be more desirable in certain situations than others. Considering these human limitations, the lack of a robust

field of research investigating the momentary fluctuations in performance is disappointing.

The amount of attentional resources dedicated to a task can directly influence performance on that task (Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994), suggesting that an individual's performance may vary greatly across time if resources change. Certain aspects of the environment, such as an emotional event, may pull attention away from a focal task. An emotional reaction may continue to pull attention long after the initial event (Beal et al., 2005), and this prolonged off-task attentional pull will impede performance on a focal task. Even as emotions pull attention away, projects with task attentional pull can redirect attention back to the focal task. The characteristics of high attentional pull tasks; such as importance, interest, and relevant goals; may impede the off-task attentional pull of emotions and facilitate prolonged focus on the task. This increased ability to resist off-task attentional pull can serve to maintain or even increase task-related performance.

In this study, I will investigate the joint effects of emotion and task characteristics on attention-mediated performance. In the following sections, I will address (a) the episodic nature of attention and performance, (b) the off-task attentional pull of emotions, (c) the self-regulation of attention, and (d) the characteristics of task attentional pull. I will conclude with a description of the proposed research.

1.1 Attention and Performance

Attention and performance are inherently transient, changing within individuals across time. While it is relatively simple to recognize the changing nature of attention (i.e., I was attentive at the beginning of the meeting, but now I'm not), organizational

researchers have historically not appreciated the important variability in performance within individuals. Instead, in most I/O research, performance has been "stabilized" and aggregated to focus almost exclusively on between-person comparisons, such as Person A is a better performer than Person B (McCloy et al., 1994). This aggregation is problematic because it ignores the potentially informative changes in performance that occur within individuals across time, and instead treats this variability as error.

Organizational researchers recognize that performance can vary meaningfully within a single person over time (Kane & Lawler, 1979), but tend to deemphasize its import. This deemphasis has occurred despite assertions that the within-person variation in performance can be as large as the between-person variation (Deadrick, Bennett, & Russell, 1997; Fisher & Noble, 2004), although this obviously depends on the nature of the task. The lack of research investigating the within-person changes in attention may be due to the lack of a theoretical framework for directing research in this area. Beal and colleagues (2005) fill this need and suggest that the meaningful variation in performance can be explained by shifts in the direction and intensity of attention.

Attentional pull is one mechanism that may explain variation in performance episodes by impacting the direction and intensity of attention. Specifically, attentional pull describes two complementary components of attention: the momentary allocation and the self-regulation of attention (Beal et al., 2005). The momentary allocation of attention refers to the direction of attention, such as the distinction between on-task and off-task focus as outlined by Beal and colleagues (2005). The self-regulation of attention refers to the effort needed to direct and/or maintain attention. These two components are

critical in understanding variations in performance and are core components in Kanfer and Ackerman's (1989) model of attentional effort.

The model suggests that attentional resources can be allocated to three different activities: off-task activities, on-task activities, or self-regulatory activities (see Figure 1; Kanfer & Ackerman, 1989). The researchers propose that attentional resources are limited, so that when a task requires maximal attentional resources, the redirection of resources to off-task or self-regulatory activities will necessarily decrease the proportion of resources devoted to on-task activities. This reduction of on-task resources may result in decreased performance on a maximally demanding task. A critical component of this model is the role of self-regulatory activities in directing the allocation of attention. If self-regulatory processes are activated, the allocation of attention to on-or off-task activities is expected to change in response to individual's goals. Conversely, if self-regulatory processes are inefficient, individuals may be unable to effectively manage the direction of their attention.

In the next sections, I will address the allocation of attention as it is pulled off-task by emotional experiences, the depleting nature of self-regulatory behavior, and the allocation of attention as it is pulled on-task by characteristics of the job.

1.2 Off-Task Attentional Pull of Emotions

Tasks compete with other stimuli and events (i.e., distractions, interruptions, and mind wandering episodes) to capture and maintain attention. Emotional experiences may have the ability to redirect attentional focus by triggering a large amount of cognitive activity in response to an emotional event. It is easy to imagine that emotionally charged episodes, such as hearing about the birth of a child or the death of a friend, will draw

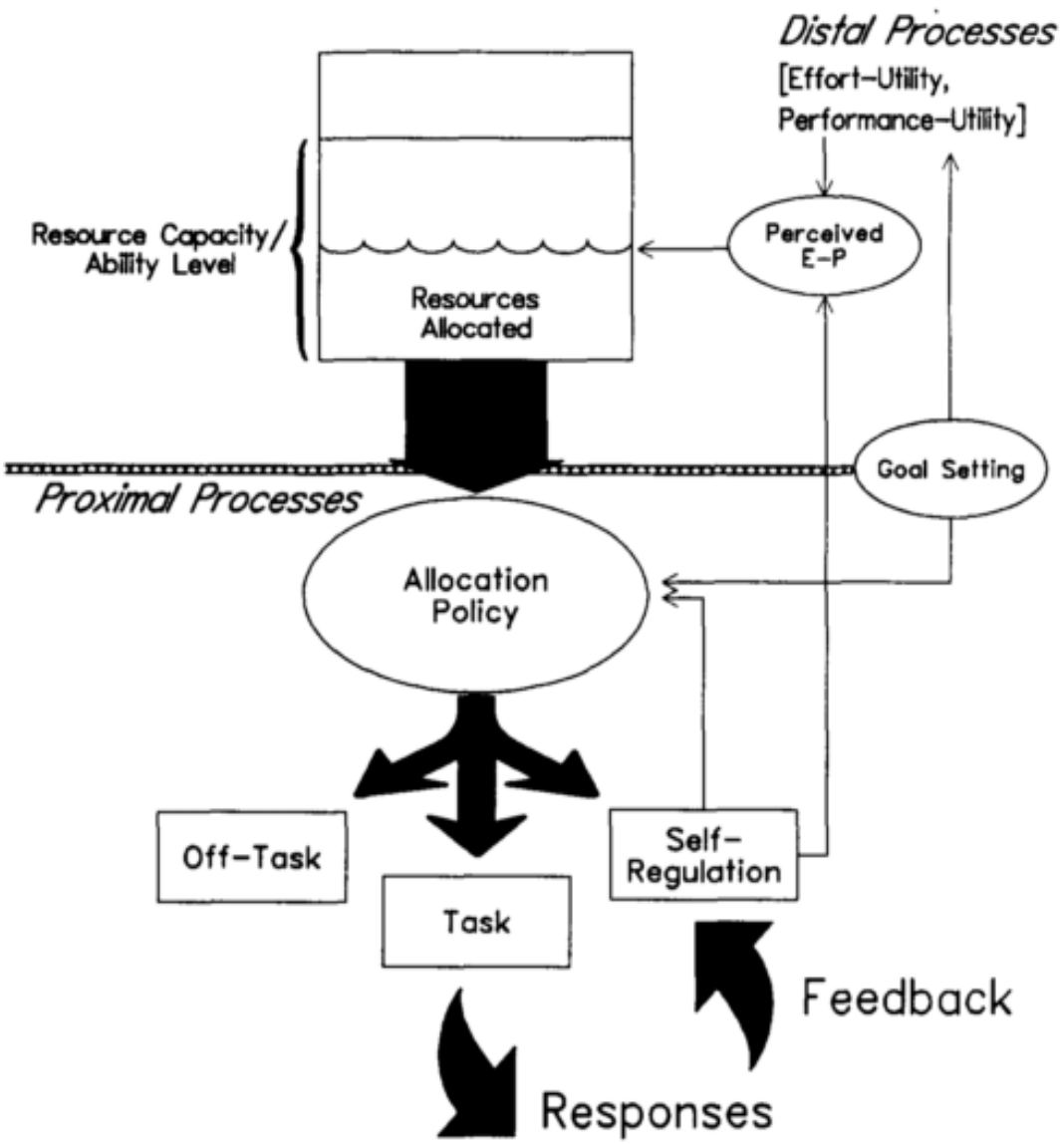

Figure 1. Ability-motivation interactions model for attentional effort (Kanfer & Ackerman, 1989).

attention to the events surrounding the affective experience and away from the task at hand. The cognitive activity created by emotional experiences use attentional resources, thereby limiting the amount of resources available for performance on a task. Beal and colleagues (2005) suggest there are four components of affective experiences that draw on attention: appraisal, arousal, rumination, and affect regulation.

1.2.1 Appraisal

The first attention capturing component of affective experiences, the appraisal process, explains how discrete emotions are generated in response to an event. The emotional appraisal process can be broken down in to two components: primary and secondary appraisal (Lazarus, 1966). The first component, primary appraisal, assesses the event's relevance to personal goals. Events that are highly relevant to goals are more likely to capture attention. Secondary appraisal is a more controlled process whereby individuals assess their ability to cope with the event. As emotional experiences are best considered as an outcome of a process, the same event can be reappraised repeatedly, changing the emotional experience over time.

The appraisal process concerns emotion generation, and should therefore be relevant when an emotional event occurs during a focal task. The primary appraisal process is thought to be largely automatic, suggesting that it will not have a large impact on performance on a focal task beyond the momentary demands on attentional resources. Secondary appraisal, however, is a much more elaborate process and is where most of the cognitive "work" occurs. While the primary appraisal process simply directs attention to an event, the secondary appraisal process evaluates the individual's ability to manage the event (Lazarus, 1966), particularly if the event is goal incongruent. Lazarus (1999)

specifically suggests that the secondary appraisal process is an evaluation of the characteristics of the event and personal resources to determine an appropriate response to the event, such as dedicating more resources to attaining the thwarted goal or giving up that goal altogether. As discussed above, secondary appraisal may occur iteratively over time, and therefore may continue to redirect attention and draw on attentional resources even after the event took place.

1.2.2 Arousal

Arousal is best considered on a continuum ranging from one extreme of sleep and drowsiness to the other extreme of frenetic excitement and can be described as "one's sense of mobilization and energy" (Russell, 2003, p. 148). Models of attentional resources (Kanfer & Ackerman, 1989) suggest that arousal levels influence the amount of attentional resources available for use, such that maximum attention allocation towards a task is only possible during moderate levels of arousal.

Hancock (1986) reviewed the role of thermal stress on behavioral arousal and attentional resources. He proposed three mechanisms that explain changes in performance on a vigilance task based on thermal stress: physiological adequacy, behavioral arousal, and attention resource capacity. Physiological adequacy suggests that measurements of body temperature indicate individual's physiological state. Changes in deep body temperature impact behavioral arousal and can occur in four distinctive patterns. First, an initial introduction in to a warm, mildly uncomfortable environment increases physiological arousal and subsequently increases attentional control. The slow increase in body temperature consistent with remaining in the warm ambient environment is associated with decreased arousal and difficulty sustaining attention. In contrast, an

abrupt change to body temperature corresponds to increased arousal and improved attentional control. Finally, as temperature approaches intolerable levels and physiological arousal increases to abnormally high levels, maintenance of attention becomes improbable. This illustrates the curvilinear relationship between arousal and attentional control. As arousal increases from low to moderate levels, attentional control improves. However, very high levels of arousal result in problematic attentional control.

The relationship between attention and arousal can be best explained if attention is viewed as a limited resource, as proposed by Kanfer and Ackerman (1989). Hancock (1970) and others equate uncontrollable changes in deep body temperature with stress, and suggests that stress draws on the limited pool of attentional resources. However, this approach does not explain why low levels of physiological arousal correspond to reduced attentional control. If arousal moderates the pool of attentional resources available, as proposed by Kanfer and Ackerman (1989), then the effect of low arousal on attentional control can be explained. Low levels of arousal that characterizes states such as sleepiness may decrease the pool of resources available. Similarly, high levels of arousal may create stress, which draws on the pool of resources available. Therefore, low and high levels of arousal decrease the pool of attentional resources available, thereby limiting the amount of resources that can be dedicated to a task and potentially negatively impacting performance on a demanding task. However, performance might not be impacted on a task with low attentional demands, as sufficient resources may still be available for successful completion. The maximum level of attentional resources are available during moderate levels of arousal.

In addition to influencing the amount of attentional resources available, high arousal may also limit the breadth of cues processed. Easterbrook (1959) suggests that arousal will "reduce the range of cues an organism is using" (p. 183) and focus attention on the arousing stimuli. Supporting this hypothesis, Christianson and Loftus (1991) found that participants exhibited improved recall of details related to an instigating stimulus. Participants were presented a slideshow with a "critical" slide depicting an emotional, neutral, or unusual event. The results indicate that participants were better able to recall details central to the critical event in the emotional compared to control condition, but exhibited poorer recall on peripheral details. This differential performance exhibits the narrowing of attentional focus on the instigating stimulus and highlights the potential differential effects of arousal on performance. The focusing of attention may improve task performance if the task demands narrow focus, but overly focused attention may also impair performance.

Finucane (2011) found that the arousing emotional states, induced by a fear and anger manipulation, impact performance on an unrelated flanker task by reducing the range of cues processed. In the flanker task, participants must respond to a central target while ignoring simultaneously presented distracting information. Aroused individuals were able to better inhibit the irrelevant stimuli and exhibited enhanced selective attention on the central target, suggesting that arousal may enhance selective attention on an unrelated task in addition to the instigating stimulus.

If performance requires focused processing of the central event, arousal may facilitate performance by increasing the amount of attentional resources available (Kanfer

& Ackerman, 1989). However, if performance requires broad processing of the environment, the narrowing of focus resulting from increased arousal may be detrimental.

1.2.3 Rumination

A third component of affective experiences is rumination, or thoughts that revolve around a common theme and recur in the absence of environmental demands on thought (Martin & Tesser, 1996). People tend to ruminate about their emotions, and this rumination requires cognitive activity that may divert attentional resources long after the event occurred. Rumination can therefore be considered as a lingering reaction to an emotional event or part of a continued reappraisal process.

Martin and Tesser (1996) suggest that rumination is goal-directed and negative rumination often occurs in response to a thwarted goal (p. 10). The importance of thwarted goals in rumination is evidenced by Lavallee and Campbell's (1995) study that suggests students report higher levels of rumination and negative affect when negative events are goal-relevant instead of goal-irrelevant. Jones, Papadakis, Orr, and Strauman (2013) extended the literature by investigating the effect of goal failure on subsequent rumination. They found that participants who were primed with promotion (i.e., advancement and growth opportunities) and prevention (i.e., safety and security) goal failures engaged in higher levels of rumination (Jones et al., 2013, p. 499). Furthermore, participants' who self-reported a tendency to experience negative emotion in conjunction with rumination exhibited increased levels of negative affect over a five-minute period, suggesting a reciprocal relationship between rumination and negative affect. Jones and colleagues assert that negative affect predicts increased rumination and increased

rumination predicts negative affect. These studies suggest that rumination often occurs concomitantly with negative affect.

Goal appraisals and subsequent rumination also play an important role in the workplace. Wang and colleagues (2013) investigated the role of rumination with service employees. The researchers found that employees exposed to higher levels of customer mistreatment during a workday reported higher levels of rumination that night and higher negative mood the next morning compared to individuals exposed to low levels of customer mistreatment. This study exhibits the important role rumination may play in the workplace and the potential negative effects that linger long after the original event.

The pervasive, repetitive, and uncontrollable nature of rumination, in conjunction with continued appraisal processes, suggests that attentional resources may be diverted for an extended period of time after the event occurs.

1.2.4 Cognitive Requirements of Affect Regulation

Finally, emotional regulation may exert attentional pull long after the initial emotional event. Emotional regulation is the process by which "individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998, p. 275) and requires substantial amounds of cognitive activity to be effective. The direction of attention, evaluation of an emotional event, and behavioral responses can be impacted by emotion regulation strategies.

The direction of attention in response to an event, termed attentional deployment by Gross (1998), can be impacted by three strategies: distraction, concentration, and rumination. Distraction focuses attention on the non-emotional aspects of the event or redirects attention entirely to a different event and may require the changing or

disengaging from goals. Concentration, on the other hand, involves focusing cognitive resources thoroughly in to a task to the exclusion of distractors. Finally, rumination refers to focusing attention on emotions and their consequences. The strategy engaged by an individual will determine the direction of their attention.

After the attentional focus has been determined, an evaluation occurs that imbues the event with meaning and determines an individual's capacity to manage a situation (Gross, 1998, p. 284), similar to emotional appraisal. One mechanism of evaluating the event is reappraisal, or "cognitively transforming the situation so as to alter its emotional impact" (Gross, 1998, p. 284). Reappraisal is an antecedent-focused strategy of emotional regulation, meaning that it occurs quickly after an emotional event and impacts the experiential and behavioral components of negative emotion (Gross & John, 2003). Finally, emotion regulation strategies can influence the "physiological, experiential, or behavioral responding" (Gross, 1998, p. 285). Suppression is a typical response-focused regulation strategy that attempts to regulate the behavioral expressions in response to an emotion event (Gross & John, 2003).

Gross and John (2003) found that reappraisers experienced less negative emotion while suppressors experienced more negative emotion, suggesting that the different regulation strategies can differentially impact emotional experience. Ortner, Zelazo, and Anderson (2013) explicitly tested the attentional demands of these regulation strategies and found that reaction times on an auditory discrimination task in reappraisal and suppression conditions were slower than the control condition. The researchers suggest that reappraising or suppressing emotions demands attentional resources above and beyond the initial appraisal requirements. These studies explicitly link regulation to

attentional resources and, in demanding situations, attentional impairment, even though the subsequent emotional experiences are distinctly different.

Grandey's (2003) work on emotion regulation in the workplace provides evidence that emotional regulation strategies can alter individual's emotional experience. She found that employees who regulated their emotional expression using surface acting, or only modifying the behavioral display of emotions without regulating inner feelings, was related to increased emotional exhaustion. Interestingly, deep acting, or regulating inner feelings to match outward displays, was not related to emotional exhaustion after removing the effects of surface acting. These disparate emotional experiences illustrate the differential effects of emotion regulation strategies.

The mechanisms of rumination and emotional regulation are the two critical processes for explaining the attentional pull of emotions. These mechanisms involve extensive cognitive "work," particularly emotional regulation which involves evaluating an emotional event and altering behavioral responses accordingly. Furthermore, rumination and emotional regulation can be considered lingering responses to an emotional event that continue to draw upon attentional resources long after the event occurred. This suggests that emotions can exert attentional pull, through the mechanisms of rumination and emotional regulation, for a nontrivial amount of time after the initial event.

1.3 Self-Regulation of Attention and Depletion

Resisting the off-task attentional pull of emotions and redirecting attentional resources on-task requires self-regulation. Effective self-regulation requires sufficient regulatory capacity, often conceptualized as an underlying pool of resources that are

required for acts of self-control or exertion. When sufficient regulatory capacity is not available to meet the existing demands on resources, the individual's ability to manage their behavior or attention efficiently may suffer. As described by Kanfer and Ackerman (1989), self-regulatory activities are responsible for changing the allocation of attentional resources as needed. However, when an individual's ability to self-regulate is depleted, they may be unable to inhibit off-task distractors, such as emotional experiences, and efficiently regulate the direction of attention.

Muraven and Baumeister's (2000) theory of self-control may shed some light on the role regulatory resources play in managing emotions, attention, and subsequent behavior. They suggest that self-regulation is "the attempt to control or alter one's own responses" (Muraven, Tice, & Baumeister, 1998, p. 774). They further propose a strength model that suggests prolonged self-regulation results in depletion of regulatory resources and, consequently, an impaired ability to manage behavior. Their strength model of self-regulation is, at its core, based on five key assumptions. First, Muraven and Baumeister (2000) suggest that "self-control is necessary for the executive component of the self (i.e., the aspect of the self that makes decisions, initiates and interrupts behavior, and otherwise exerts control) to function" (p. 248). Second, self-control is a limited resource that gets depleted with use. Third, all acts of self-control draw on the same underlying resource. Fourth, the ability to successfully complete acts of self-control depends on the individual's "level of self-control strength" (Muraven & Baumeister, 2000, p. 248). Finally, when an individual engages in acts of self-control, self-control strength is subsequently lost.

This model suggests that if individuals are depleted of their regulatory resources they may find it more difficult to inhibit the alluring attentional pull of emotions and the direction of their attentional resources may be pulled off-task. Therefore, the amount of resources available may be critically important for investigating the influence of the off-task attentional pull of emotions. If sufficient resources are available, an individual may be able to maintain sufficient task focus while managing the off-task demands of emotions, thereby maintaining high levels of performance on a focal task. If sufficient resources are unavailable, then emotions should pull attention off-task at the expense of continued high performance.

1.4 Characteristics of Task Attentional Pull

When emotions are drawing attention off-task and regulatory resources are depleted, maintaining task-focused attention may be particularly difficult. However, certain characteristics of the task itself may exhibit attentional pull and be able to overcome the off-task pull of emotions. These characteristics may draw attention to and maintain attention on a particular task without requiring active self-regulation (Beal et al., 2005). In this section, I will specifically investigate the role of task importance, task interest, and task-relevant goals in directing attention.

1.4.1 Task importance

Important tasks may be less susceptible to the off-task attentional pull of distractions of emotions. Unfortunately, the literature of task importance and attention is not as pronounced as the literature on performance. Therefore, I will report studies that attempted to approximate the importance-attention relationship, often by assessing performance.

Some have attempted to bridge the gap between attention and performance by embedding their research within Kanfer and Ackerman's (1989) model of attentional effort. According to this, distal motivation processes impact intended task effort, or the proportion of attentional resources allocated to the task. When a task is perceived as important, these distal processes should increase intended task effort and improve subsequent performance by dedicating more attentional resources to the task. Conversely, individuals should dedicated fewer attentional resources to unimportant tasks and, if the task is resource-dependent, subsequently exhibit decreased performance. Seijts, Meertens, and Kok (1997) found that, in accordance with the framework, task importance moderates the relationship between goals and performance. Specifically, when participants were exposed to very high goals for a perceived unimportant task, performance decreased. This decrease likely occurred because the distal processes deemed that the continuous effort and persistence needed for high performance was unnecessary for an unimportant task, therefore resulting in fewer attentional resources being allocated to the task. Conversely, very high goals for an important task resulted in increased performance, suggesting that increased attentional resources were allocated to the task and illustrating the attentional pull of importance.

Other researchers investigated the impact of importance on resource dependent and resource independent stimuli. Participants were asked to respond to event-based (i.e., when an external reminder is presented) or time-based (i.e., every 10 minutes with no external reminder) probes while simultaneously completing a demanding background task (Kliegel, Martin, McDaniel, & Einstein, 2001). The event-based probes are resource independent; successful completion of the probe does not require attentional resources.

The time-based probes are resource dependent; participants must devote attentional resources to monitoring the probe in order to respond appropriately, thereby redirecting resources away from the background task. The results suggest that important tasks pull attention when they are resource dependent. Performance on the background task showed no change when the probes were event-based, presumably because the probes did not demand attentional resources. Conversely, performance on the background task decreased immediately before and after target times for the important time-based probes compared to the unimportant time-based probes. The researchers suggest this decrease in performance is due to increased allocation of attentional resources to the important probe, which resulted in a necessary decrease in the proportion of resources dedicated to the demanding background task. This differential treatment of important and unimportant probes exhibits the attentional pull of important, resource dependent tasks.

1.4.2 Task interest

Interesting tasks may pull attention independent of the task's importance. Once again, the literature on task interest and attention is not as extensive as the literature on performance. Therefore, studies that approximate the interest-attention relationship, but do not directly measure attention, are included.

Silvia (2001) suggests that "texts can contain interesting elements and important elements; interesting elements need not be important, however" (p. 277). In a study comparing the recall of interesting and important information, researchers found that interesting information was much more likely to be remembered than important information (Wade & Adams, 1990). These results suggest that task interest may exert stronger attentional pull than task importance.

The influence of task interestingness on performance is broad. Meta-analytic results suggest that interest is correlated with academic achievement (r = .27; Schiefele, Krapp, & Winteler, 1992). Others suggest that task interest is related to performance on lab tasks (r = .39) and accounts for unique variance beyond the demands of the task (Eveleth & Pillutla, 2003). Fisher and Noble's (2004) experience sampling study using employees found that task interest had an effect on performance beyond that due to its contribution to effort. While these studies did not explicitly explore the role of attention, these results could be interpreted as evidence that task interest not only directs attention to a task, but does so without using regulatory resources. The indication that task interest accounts for more variance in performance than task demands or effort expended suggests that participants automatically and effortlessly allocate more attentional resources to the on-task demands.

Similar to the findings addressed above, numerous researchers propose that task interest lessens the regulatory burden for directing attention. Hidi (2000) suggests that when interest is high, "focusing attention and continuing cognitive engagement… feel relatively effortless" (p. 311). Interesting tasks may even lessen regulatory burden by making it easier to block intrusive thoughts or distractions (Sarason, Pierce, & Sarason, 1996; Silvia, 2001). Despite the breadth of theory linking task interest and attention, there does not appear to any research directly assessing this relationship.

1.4.3 Task-Relevant Goals

The core explanatory mechanisms in interest (i.e., increased engagement and attention) are also central to goal setting theory. Goals, as defined by Locke and Latham (1990), are a "generic concept that encompasses the essential meaning of terms such as

intention, task, deadline, purpose, aim, end, and objective" (p. 2). Three mechanisms are proposed that explain the effect of goals on action or performance: effort, persistence, and direction of attention (Locke & Latham, 1990).

Intensity of effort is thought to increase when individuals are assigned difficult goals. For example, tasks with high demands require a larger proportion of attentional resources, and therefore more intense effort, than tasks with low demands. Kahneman (1973) suggests effort can be conceptualized as the amount of attentional resources assigned to a task, such that increased effort corresponds to increased allocation of attentional resources. Research has investigated the effect of difficult goals on physical effort, rate of work, subjective effort ratings of the participants, effort inferences made by third parties, and physiological indicators of effort (see Locke & Latham, 1990, for a review). The breadth of methods and number of studies that indicate goals impact effort led Locke and Latham (1990) to suggest that the "inescapable conclusion that goals affect performance" is due in part to "their effects on intensity of effort" (p. 89).

The second mechanism, persistence, is effort maintained over time and is typically measured as time spent on an activity. The duration of effort is independent of the intensity of effort; it is possible to persist at a low effort activity for hours or engage in high-effort behavior for only a few minutes. Research indicates that individuals with hard goals spend more time on a task, whether it is a prose learning task (LaPorte & Nath, 1976), an anagram task (Sales, 1970), time spent exercising (Kirsch, 1978), or a physical endurance task (Hall, Weinberg, & Jackson, 1987; Stevenson, Kanfer, & Higgins, 1984).

Finally, goals serve to direct attention to goal-relevant activities and to activate stored knowledge and skills that are relevant to the goal (Locke & Latham, 1990). The majority of studies investigating the directive effects of goals are prose learning studies, and they indicate that students learn more about goal-relevant material than goal-irrelevant material (Rothkopf & Billington, 1975; Rothkopf & Kaplan, 1972). Other studies suggest that when multiple measures of performance exist, only goal-relevant criteria exhibited improvements while goal-irrelevant criteria were unchanged (Locke & Bryan, 1969; Terborg, 1976).

Overall, goals have been shown to decrease the variability in and increase the general levels of performance by influencing the intensity, duration, and direction of attention. Research indicates that specific and difficult goals are particularly adept at redirecting attention to goal-relevant stimuli.

1.4.3.1 Influence of Specific and Difficult Goals

A productive area of research within goal setting theory investigates the difference between qualitatively different goals, such as the difference between specific goals with an associated standard of performance and vague goals such as "do your best." A difficult and specific goal and a "do your best" goal both imply a high standard of performance, but that standard is communicated in qualitatively different ways. The pairing of specific and difficult goals is almost ubiquitous in the research for theoretical reasons. Locke and Latham (1990) suggest that it would be "relatively trivial" to compare the effects of specific moderate or easy goals with "work at a moderate pace" or "work at a slow pace" qualitative goals (p. 29). Therefore, the majority of the literature comparing the influence of specific goals on vague, qualitative goals automatically equates specific

goals with high difficulty and qualitative goals with "do your best" instructions. In line with previous research, I will investigate the joint influence of specific and difficult goals.

Similar to task interest and importance, few studies directly assess the role of goals in directing attention, but instead assume changes in attention based on performance. As directing attention is a core proposed mechanism for explaining the influence of goals, the studies reported approximate changes in attention by reporting changes in performance.

Research suggests that individuals with specific and difficult goals exhibit higher levels of performance on a variety of tasks than individuals with vague, qualitative goals such as "do your best." An original primary study by Locke and Bryan (1966) investigated the role of specific and difficult goals on performance of a complex coordination task. The results indicate that even though participants successfully achieved their goals on only 29% of trials, participants with specific goals almost immediately exhibited higher performance levels than those in the "do your best" condition.

Hundreds of studies followed this initial investigation, which have been summarized in a variety of meta-analyses. Five meta-analyses conducted in the 1980s (Chidester & Grigsby, 1984; Hunter & Schmidt, 1983; Mento et al., 1987; Tubbs, 1986; Wood et al., 1987) found effect size estimates ranging from .42 to .80, suggesting that difficult and specific goals produce tangible improvements in performance compared to "do your best" or no goals. In a more recent review, Day and Unsworth (2013) claim that research has shown that "setting specific and difficult goals increases performance on

over 100 different tasks across more than 40,000 participants with time spans ranging from 1 minute to 25 years" (p. 160). These results and assertions suggest that specific and difficult goals may reliably and robustly pull attention to the focal task, thereby enhancing performance.

The robust improvement in performance related to specific and difficult goals compared to "do your best" goals may be due to the ambiguity of qualitative goals. When participants are told to "do their best," any range of performance outcomes may be compatible with the goal. However, a specific and difficult goal is very clear cut. Only attaining a specific level of performance is considered successfully achieving the goal. Kernan and Lord (1989) suggested that participants without specific goals typically evaluated their performance more positively than participants with specific and difficult goals. This finding could be due to the range of responses that satisfy qualitative goals.

This evidence suggests that specific and difficult goals typically have a robust impact on performance of a focal task, as suggested by Locke and Latham (1990), by pulling attention to the task by influencing the effort, persistence, and direction of attention. Despite the breadth of research indicating the utility of specific and difficult goals, they are not always advantageous. Boundary conditions exist that limit the effectiveness of specific and difficult goals on certain tasks.

1.4.3.2 Deleterious Effects of Specific and Difficult Goals

Research suggests that specific goals may not uniformly improve performance. Specific and difficult goals may actually impede performance on complex and novel tasks. Kanfer and Ackerman (1989) found evidence that performance was impeded on a complex Air Traffic Control task when participants were assigned specific and difficult

goals compared to "do your best" goals. They suggest the additional self-regulatory demands that accompany specific and challenging goals may hinder performance by taking away needed resources from the focal task. Interestingly, as participants learned the rules for the task and the resource demands declined, specific and challenging goals once again began to improve task performance.

A similar effect was found in a study on goal conditions and practice conditions (Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994). A massed practice condition was thought to require higher levels of regulatory resources as performance must be sustained over time, while spaced practice poses less of a burden because of rest intervals that do not require regulatory resources. In line with previous research, participants in the massed practice condition were hurt by specific and difficult goals, but participants in the spaced practice conditions benefited. Specific and difficult goals hurt performance when participants' regulatory resources were already severely taxed.

The above results illustrate the utility of specific and difficult goals as well as outline the boundary conditions for effective use. These results suggest that, when using a relatively simple task, specific and difficult goals will pull attention to the focal task and enhance performance.

Despite the lack of direct evidence of the effects of goals on attention, specific and difficult goals will be used to investigate the role of task attentional pull in this study. This specific mechanism was chosen above task interest and importance for several reasons. First, goal setting literature proposes that goals redirect attention, and this study will allow us to more precisely assess that mechanism. Second, goal setting literature also suggests that goals increase expended effort, and Kahneman (1973) equates effort with

the proportion of attentional resources assigned to a specific task. The goal setting mechanism, persistence, is defined as effort over time. This suggests that the effects of goals on effort and persistence may be manifested in changes in the allocation and regulation of attentional resources.

1.5 Summary

As discussed above, high levels of task performance requires focused attention on that task. Tasks compete with other stimuli and events for attention. Emotions demand attention through multiple processes, notably rumination and emotional regulation, and therefore can impede performance. Rumination and emotional regulation generate extensive amounts of cognitive activity, and this activity can continue long after the initial emotional event has occurred. This suggests that emotions can continue to pull attention even after the initial event.

People can respond to the off-task pull of emotions by regulating their attention and therefore maintaining their performance. However, this regulation requires sufficient regulatory resources, which can become depleted after extended use. When individuals are depleted, they will be less able to effectively regulate their attention. However, certain characteristics of tasks can exert attentional pull, thereby overcoming the need for regulation. Even when individuals are depleted of their regulatory resources, tasks with high attentional pull (i.e., tasks with specific and difficult goals) may be able to pull attention to the task and therefore allow individuals to maintain high levels of performance.

CHAPTER 2

THE CURRENT INVESTIGATION

Attention can be pulled in multiple directions at a given time. As described above, emotions can exert off-task attentional pull and certain characteristics of an assignment can elicit on-task attentional pull. In this study, I investigated the effects of the off-task attentional pull of emotions, as elicited by an ostracizing experience, and the on-task attentional pull of specific and difficult goals. Prior to completion of the full study, two pilot studies were conducted to determine (a) that ostracism does elicit an emotional response and (b) that the task used for this study, the Sustained Attention to Response Task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997), is susceptible to attentional pull.

2.1 Ostracism and Emotions

As I have argued above, emotional episodes can pull attention away from a focal task. At work, many kinds of events can elicit distracting emotional reactions. In this study, I focused on one: ostracism. Ostracism is best characterized by ignoring, excluding, or rejecting others (Williams, 2001), and is a common occurrence in society and organizations. In a study with over 2,000 participants, 67% reported using the "silent treatment" to chastise a loved one and 75% reported being the recipient of the "silent treatment" (Faulkner, Williams, Sherman, & Williams, 1997). Ostracism is also commonly used in organizations after "whistleblowers" report organizational misconduct (Williams, 2001).

In addition to being common, ostracism is also a powerful emotion-eliciting experience. In Williams' (2001) basic model of ostracism, he suggests that immediate reactions to ostracism may be "hurt feelings, anger, damaged mood, and physiological arousal" (p. 64).

Intuition suggests that exclusion will elicit an emotional reaction from individuals. For many individuals, it is easy to recall a time when they were excluded and the subsequent frustration, confusion, sadness, or anger. However, the empirical studies show mixed results. In this section, I will describe studies that found strong evidence for the impact of ostracism on emotion and studies that did not find this relationship. Furthermore, I will attempt to explain why the studies finding no relationship may be a poor assessment of emotional reactions.

2.1.1 Ostracism does Elicit Emotion

A breadth of research suggests that ostracism does cause self-reported distress, as measured by "mood…, hurt feelings, levels of belonging, self-esteem, control, meaningful existence, and more direct measures of distress or pain" (Williams, 2007, p. 434). Meta-analytics results corroborate Williams' (2007) assertion that there is "ample evidence" of the relationship between ostracism and emotions (p. 434). Specifically, meta-analytic results suggest that a moderate effect exists between ostracism and emotion (d = -0.50; Gerber & Wheeler, 2009). The authors also coded for mood scale and found that items developed by the researcher evidenced the largest effect between ostracism and mood (d = -0.66), followed by the PANAS/PANAS-X (d = -0.34; Watson, Clark, & Tellegen, 1988), Heatherton Sensation Questionnaire (d = -0.28, n.s.; Heatherton, Striepe, & Wittenberg, 1998), and finally the BMIS (d = -.09, n.s.; Mayer & Gaschke, 1988).

Gerber and Wheeler (2009) also found a relationship between ostracism and positive/negative mood scales. Specifically, they found that ostracism was related to negative emotion (d = 0.33), such that ostracized individuals reported increased negative mood. Ostracism was also related to positive emotion (d = -0.48), such that ostracized individuals reported decreased positive mood. Despite the small number of studies included in these estimates ($k \leq 15$), they provide preliminary evidence that exclusion does indeed evoke an emotional reaction.

A variety of studies support the meta-analytic results described above. Notably, Eisenberger, Lieberman, and Williams (2003) found that the same neural pathways activated in physical pain were also involved in the experience of social separation or rejection. Other researchers found that, even when exclusion was financially beneficial, individuals still reportedly felt worse when ostracized (van Beest & Williams, 2006). These studies suggest that ostracism is a basic and powerful experience that produces negative reactions even when exclusion is desirable, suggesting that reactions to ostracism may be automatic.

2.1.2 Ostracism Does Not Elicit Emotion

In contrast, some researchers suggest that individuals do not experience emotional responses after ostracizing experiences (Bastian & Haslam, 2010). Specifically, individuals respond to exclusion with "emotional numbing, reduced empathy, cognitive inflexibility, lethargy, and an absence of meaningful thought" (Bastian & Haslam, 2010, p. 108). This "cold" response to ostracism was found in multiple studies conducted by Twenge, Baumeiseter, and their colleagues

Baumeister, DeWall, Ciarocco, and Twenge (2005) conducted six studies that measured the impact of ostracism on self-regulatory failure, and the mediating role of emotions. Across these six studies, the researchers concluded that ostracism does not elicit an emotional reaction and emotions do not mediate the relationship between ostracism and self-regulatory failure. However, a number of methodological errors may have obscured the potential true relationship between ostracism and emotion. Across the studies, the number of participants in each condition ranged from 10 to a maximum of 19 participants per condition. Based on the number of conditions and participants per cell, the reported studies' power ranged from .20 to .32 for a medium effect size (f = .25), exhibiting substantially low power. Even if a large effect size was estimated in the power analysis (f = .40), the power ranged from .44 to .70, which is still below the widely recommended cutoff of .80 for power in psychological studies. Despite these power issues, one study did find a significant effect of ostracism on emotion valence using planned comparisons with a sample of 17 participants per condition (Baumeister et al., 2005, p. 598). However, the researchers suggest that as mood did not mediate the relationship between ostracism and self-regulatory failure, the effect is uninteresting.

Furthermore, the measures of emotional response may not have been appropriate. Two of the six studies had participants respond to a single item rating their mood from "very negative" (1) to "very positive" (7). The remaining four studies measured emotional response using the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988). Use of the BMIS may be particularly problematic for several reasons. The items used to measure mood do not make practical sense as a reaction to ostracism. Specifically the BMIS contains items such as "loving," "lively," "calm," and "jittery" (Mayer &

Gaschke, 1988, p. 103). It is unclear, practically and theoretically, how ostracism is supposed to impact a number of the items contained in this scale. Furthermore, the authors point out that the arousal subscale is insufficiently reliable (Mayer & Gaschke, 1988, p. 105).

After considering these potential limitations in Baumeister et al. (2005)'s studies, we may conclude that they were unable to provide an adequate test of the relationship between ostracism and emotion. Problems with the quality of the ostracism manipulation, sample size, and measurement of emotion may have obscured the relationship.

Despite these limitations, it is important to consider the possibility that ostracism experiences do not elicit emotional responses. If emotions do not mediate the relationship between ostracism and self-regulatory failure, as suggested, then Baumeister et al. (2005) propose three potential mediating mechanisms: increased arousal, rumination, and using cognitive resources to regulate emotional distress. These three "non-emotional" mechanisms match exactly the emotion attentional pull mechanisms proposed by Beal et al. (2005), suggesting that even if individuals inhibit emotional responses to ostracism, the ostracizing experience will still exert attentional pull. The resemblance between these mechanisms coupled with the questionable assessment of emotion suggests that the lack of significant findings may be due to study design, not because the phenomenon does not actually exist.

2.1.3 Ostracism and Attentional Pull

A variety of researchers using a variety of measures, manipulations, and methods found evidence supporting the claim that exclusion elicits an emotional reaction. Even Baumeister and colleagues (2005) suggest that the experience draws attention. Research

indicates that ostracism affects the same processes that are hypothesized to be at work in emotion attention pull. Specifically, there are parallels in the ostracism literature that match the processes of emotion appraisal, arousal, rumination, and impaired self-regulation.

Reactions to exclusion mirror the primary and secondary appraisal processes described in the emotions literature. The reflexive pain response to ostracism mirrors primary appraisal and is thought to be automatic or precognitive response (van Beest & Williams, 2006), while the process of "cognitively and affectively cop(ing)… unabated by distracting tasks" (Williams, 2009, p. 294) to recover from the exclusion experience mirrors secondary appraisal. Ostracism also increases arousal as indicated by observed behavior (Boyes & French, 2009) and skin conductance levels (Kelly, McDonald, & Rushby, 2012). Ruminating on an ostracizing experience has also been shown to prolong negative affect (Lau, Moulds, & Richardson, 2009). Finally, Baumeister et al. (2005) suggest that participants may engage in emotional regulation in an attempt to decrease experienced distress and showed that ostracism impaired self-regulation on a number of tasks (i.e., amount of bad tasting drink consumed, number of cookies consumed, persistence on an unsolvable puzzle, and performance on a dichotic listening task).

The strong evidence provided here, combined with the questionable evidence contradicting the ostracism-emotion link, suggests that exclusion will cause an emotional response in participants as predicted in Williams' (2009) Temporal Need-Threat theory. Due to the conflicting positions on ostracism and emotions, a pilot study was conducted to assess emotional reactions to exclusion in an online ball-tossing game.

2.2 Pilot Study of Ostracism and Emotions

Twenty-seven undergraduate students participated in the study for compensation. Participants played a computer-based ball-tossing game (Cyberball; Williams & Jarvis, 2006) which required participants to virtually interact with two other "students." This ostracism manipulation is the most commonly used experimental manipulation, and the procedures used in this study exactly mimic previous ostracism studies. For the pilot study, twelve individuals were randomly assigned to a condition in which they were ostracized (ostracism condition), while the remaining fifteen individuals were assigned to a condition in which they were included (inclusion condition).

2.2.1 Pilot Cover Story

As this study was attempting to elicit emotions from participants, a convincing cover story was needed to prevent participants from becoming disengaged from the study and render our manipulations ineffective. Therefore, participants were told that they were participating in a study investigating the effects of mental visualization on work tasks. In actuality, the study investigated the impact of inclusion/exclusion in the Cyberball task and subsequent affect. This cover story is identical to the cover story used by the original developers of the Cyberball task (Williams & Jarvis, 2006) and subsequent researchers.

2.2.2 Pilot Procedure

Instead of revealing the true nature of the study, participants were told they were participating in a study on mental visualization. Participants were initially asked to complete the Vividness of Visual Imagery Questionnaire (Marks, 1973) to strengthen this cover story. Participants were then asked to play a ball-tossing game (Cyberball) with

"students" connecting remotely from two other local universities, in congruence with standard Cyberball procedure.

After completing the ball-tossing task, participants were asked to fill out the Reflexive and Reflective Questionnaire to assess participant's emotional responses (Williams, 2009). The reflexive questionnaire asks participants to report on feelings experienced *during* the game, and the reflective questionnaire asks participants to report on feelings experienced *right now*. The stems used on these scales to differentiate between reflexive and reflective emotional responses are taken verbatim from the original scale. Despite the different time frames, both questionnaires were administered immediately following the Cyberball task. As the study concluded after that survey, it was not possible to separate the two measures in time for the pilot. However, the reflective and reflexive scales were temporally separated for the full study.

In order to maintain our cover story, participants were asked (a) how vividly they imagined the task, (b) how much they enjoyed the other players, (c) how much they would like to meet the other players in person, and (d) how often they engage in different types of virtual interactions. The above four questions were not be used in the analyses.

2.2.3 Manipulation of Ostracism

Cyberball was used to manipulate ostracism and inclusion conditions (Williams & Jarvis, 2006). In this task, a participant throws and catches a virtual "ball" with two online "players." The participant was also told that two other participants will participate in the activity remotely from other universities. In actuality, no remote participants were used. Instead, the participant interacted with two cartoons displayed on the computer screen that have pre-programmed responses. In the no ostracism condition, the participant

received the ball on approximately 33% of turns (Williams, 2001). In the complete ostracism condition, the participant was allowed to throw and catch the ball only once. For the remainder of the task, the two cartoons passed the ball between themselves only.

2.2.4 Pilot Measures

The following are the measures used in the pilot study investigating responses to ostracism.

2.2.4.1 Vividness of Visual Imagery Questionnaire.

The Vividness of Visual Imagery Questionnaire (Marks, 1973) assessed the clarity of an individual's mental picture using a 5-point Likert scale. No responses to this questionnaire were used in data analysis. It was included solely to strengthen the cover story in this study.

2.2.4.2 Reflexive and Reflective Questionnaire.

The Reflexive and Reflective Questionnaire assessed participants' emotional responses (see Appendix A). Participants were asked to complete 4 items assessing positive mood (i.e., friendly, pleasant) and 4 items assessing negative mood (i.e., angry, sad) for each questionnaire (reflexive and reflective). Each item was rated on a 5-point Likert scale (Not at all to Extremely). The reflexive and reflective scales for positive and negative affect exhibited acceptable levels of reliability ($\alpha \geq .80$).

2.2.4.3 Ball-Tossing Game Questions

A series of questions asked participants to report on their experiences in the ball-tossing game (i.e., "How vividly did you imagine the ball tossing game?", "Where did you "see" yourself playing catch?", etc.). These questions were a mix of 5-point Likert

scale ratings and open-responses. No responses to these questions were used in data analysis. It was included solely to strengthen the cover story in this study.

2.2.4.4 Frequency of virtual interactions.

Participants were asked to rate on a 5-point Likert scale how frequently they engaged in different types of virtual reactions. No responses to these questions were used in data analysis. It was included solely to strengthen the cover story in this study.

2.2.5 Pilot Results and Discussion

The main question for this pilot study was whether ostracism impacts emotional experience. Specifically, individuals excluded in the Cyberball task were hypothesized to self-report more negative affect and less positive affect than included individuals**.** A split-plot ANOVA was conducted to investigate the impact of ostracism condition and survey time frame on negative affect. A main effect of ostracism condition was found, $F(1, 25) = 21.57$, $p < .01$, $d = 1.28$. Across the reflective and reflexive surveys, participants reported higher negative affect if they were ostracized ($M = 2.10$, $SE = .13$) than if they were included ($M = 1.28$, $SE = .12$). A main effect was also found for survey time frame, $F(1,25) = 7.14$, $p < .05$, $d = .47$. Participants reported higher reflexive negative affect ($M = 1.88$, $SE = .11$) than reflective ($M = 1.50$, $SE = .115$). Finally, a significant interaction was found between condition and survey time frame, $F(1,25) = 4.32$, $p < .05$. The marginal means suggest that ostracized participants consistently reported higher negative affect across reflexive and reflective surveys, but their ratings of negative affect decreased from reflexive to reflective reactions more than participants in the included condition (See Figure 2).

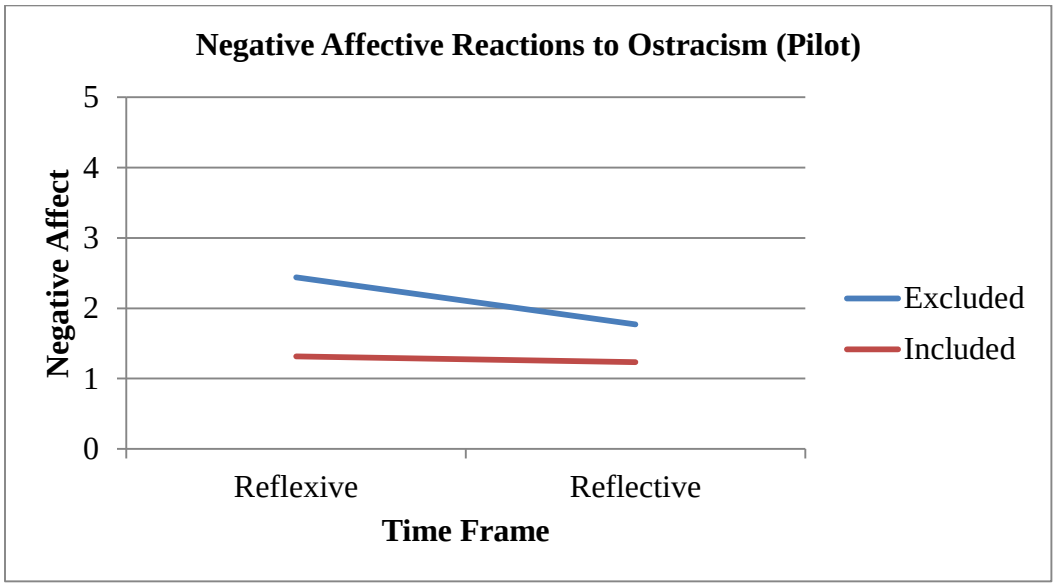

Figure 2. Negative affective reactions to ostracism. This figure illustrates that excluded individuals have more negative affect compared to included individuals and ratings of negative affect change from reflexive to reflective evaluations.

Similarly, a split-plot ANOVA was conducted to investigate the impact of ostracism condition on positive emotion. A main effect of ostracism condition on positive affect was found, $F(1,25) = 19.60$, $p < .05$, $d = 1.45$. Participants in the exclusion condition reported lower positive affect ($M = 3.23$, $SE = .11$) than individuals in the included condition ($M = 3.43$, $SE = .12$). A main effect was not found for survey time frame, $F(1, 25) = 3.55$, $p = .07$. However, a significant interaction was found between condition and time frame, $F(1, 25) = 9.69$, $p < .05$. The marginal means suggest that ostracized participants self-reported improved positive affect from reflexive to reflective, and included participants reported degrading positive affect from reflexive to reflective (See Figure 3).

These results suggest that ostracism does elicit a strong emotional response, as exhibited by changes in negative ($\omega^2_{partial} = 0.46$) and positive affect ($\omega^2_{partial} = 0.44$). The interactions also suggest that experienced emotions change rather quickly, and the short time frame between the reflexive and reflective questionnaires may be enough for participants to begin repairing their mood.

2.3 Goals and Attentional Pull

A second pilot was conducted to assess the effect of goals on attention. As described previously, specific and difficult goals are thought to improve task performance compared to "do your best" goals by influencing the effort, persistence, and direction of attention towards (Locke, Shaw, Saari, & Latham, 1981). In order to assess attentional pull of specific and difficult goals, an attention task susceptible to momentary fluctuations in attention was needed.

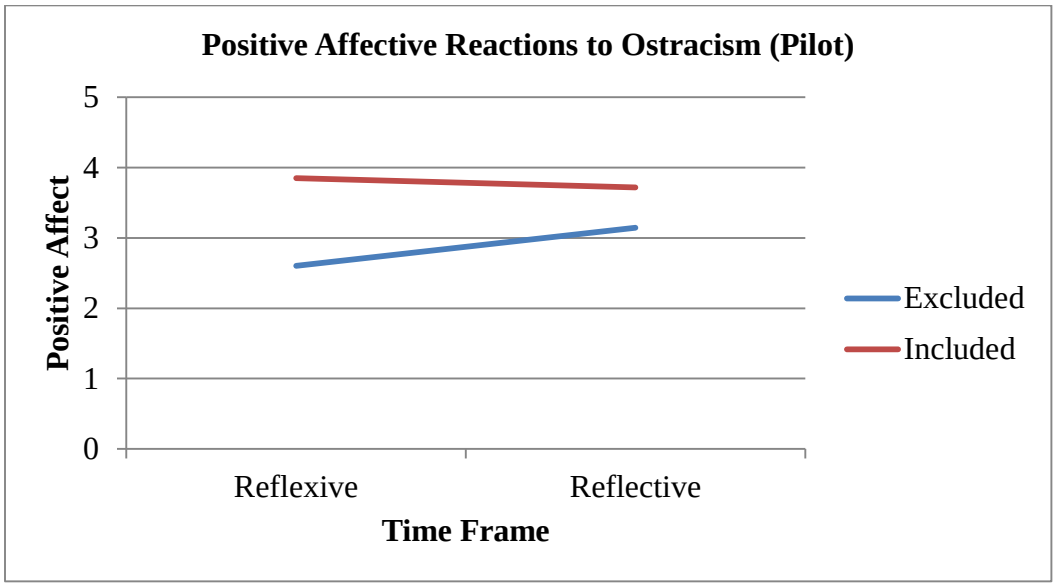

Figure 3. Positive affective reactions to ostracism. This figure illustrates that excluded individuals have less positive affect compared to included individuals and ratings of positive affect change from reflexive to reflective evaluations.

The SART (Robertson et al., 1997) is a simple go/no-go task that involves withholding a response on rarely occurring trials (i.e., 1 out of 9 trials). This task has been widely used in the mind wandering literature and has been shown to be susceptible to changes in momentary attention (Christoff, Gordon, Smallwood, Smith, & Schooler, 2009; Hu, He, & Xu, 2012; McVay & Kane, 2009, 2012; Smallwood, Beach, Schooler, & Handy, 2008; Smallwood et al., 2004). This task's ability to capture slight fluctuations in attention indicates it should be a good assessment of the off-task attentional pull of emotions and the on-task attentional pull of goals.

This task is also relatively simple as it solely involves pressing a key in response to a frequent stimuli and refraining from pressing a key when a "target" is presented. Therefore, specific and challenging goals should not have detrimental effects on performance of this task as it does not require high cognitive load. Similarly, the simplistic nature of the task should attenuate the relationship between task effort and automatic mood regulation. Research indicates that engaging in cognitively demanding tasks or high demand expectations may temper negative moods (Erber & Tesser, 1992; Gohm, 2003; Kim & Kanfer, 2009). The simplistic nature of the SART should decrease the likelihood that task engagement will facilitate automatic mood repair.

The SART also has the added benefit of being a widely used measure of attention. Instead of assessing the influence of goals on performance of a focal task and inferring attention, the SART will allow a more direct inference on the influence of goals on attention.

In order to determine if goals pull attention towards a focal task, a second pilot study was conducted to assess the relationship between (a) specific and difficult goals

and “do your best” goals and (b) SART performance. Specific and difficult goals were used to test attentional pull, as the effect of these goals compared to “do your best” goals has been demonstrated on a variety of performance tasks.

2.4 Pilot Study of SART and Attentional Pull

Twenty undergraduate students participated in the study for compensation. Participants completed a 20-minute version of the SART and a battery of survey questions. Ten individuals were assigned a specific and difficult goal, while the remaining ten individuals received a “do your best” goal. However, a data recording error occurred with one participant on the SART, so his data was discarded leaving a sample size of 19 (nine in the “specific and difficult goal condition, ten in the “do your best” goal condition).

2.4.1 Pilot Procedure

Subjects were asked to complete a 20-minute version of a semantic sustained attention task. The task is a go/no-go task in which participants were asked to respond with a key-press to all presented stimuli except infrequent (11% all presented stimuli) targets. The stimuli were presented in 18-point Courier New font for 300 ms followed by a 900-ms mask. The nontarget go trails belonged to one category and the infrequent no-go trials belonged to another. There were 540 trials with 60 targets. Target accuracy for each participant’s performance was reported in real-time in the upper right hand corner of the computer screen. Similarly, non-target accuracy for each participant was reported in the upper left hand corner of the computer screen.

First, a practice block consisting of 20 trials introduced participants to the task using female and male names as target and non-target trials, respectively. After

completing the practice block, participants were introduced to the instructions for the test block. The test blocked used vegetable and animal names for target and non-target trials, respectively. After learning about the task, participants were randomly assigned to the specific and difficult goal condition or the "do your best" goal condition. Participants in the specific and difficult goal condition were instructed to aim for 80% accuracy or higher on target trials. This goal was chosen based on the previous performance of Georgia Tech students and was approximately 1.5 standard deviations above the previous mean.articipants in the "do your best" goal condition were instructed to do their best on target trials as well.

After completing the SART task, participants were given a battery of survey questions, debriefed, and compensated.

2.4.2 Pilot Measures

The following are the measures used in the pilot study assessing the influence of attentional pull on SART performance.

2.4.2.1 Measure of goal commitment.

This scale assessed the degree to which participants were committed to the experimenter assigned goal (see Appendix B; (Hollenbeck, Klein, O'Leary, & Wright, 1989). It consisted of nine items, and participants were asked to indicate the degree to which they agreed or disagreed with each item (from "strongly disagree" to "strongly agree").

2.4.2.2 Personal Goal for SART

To assess the effectiveness of the goal-setting manipulation, participants were asked the following: "Did you have a personal goal for the task you just completed? If

yes, what was your personal goal?" Reponses were compared to their goal setting condition.

2.4.2.3 Ruminative Response Scale (RRS)

The RRS (Nolen-Hoeksema & Morrow, 1991) measures trait-level rumination. Tendency to ruminate may enhance the effects of a negative mood (Nolen-Hoeksema & Morrow, 1991) and has also been shown to account for significant variance in SART performance (Roberts et al., 2013). Therefore, the RRS was included as a potential covariate. The Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991) includes 22 items that describe trait-level responses to depressed mood that are focused on the self, symptoms, or possible consequences and causes of the mood (see Appendix C). Participants were asked to evaluate the frequency of each statement, ranging from "never" to "always" and exhibits acceptable reliability (α = .89; Nolen-Hoeksema & Morrow, 1991). This scale was used as a covariate in the exploratory analyses for the SART.

2.4.2.4 Cognitive Failures Questionnaire – Memory and Attention Lapse (CFQ-MAL)

The SART has been shown to be susceptible to trait-level cognitive errors. Individuals who report more cognitive failures tend to exhibit more errors on the SART. The CFQ-MAL has demonstrated that it accounts for significant variance in SART performance (McVay & Kane, 2009). Therefore, the CFQ-MAL was included in analyses of SART performance as a potential covariate. This scale assesses the frequency of trait-level minor cognitive failures (see Appendix D; McVay & Kane, 2009). It consists of 40 items that are evaluated based on their frequency (from "never" to "very often) and

demonstrates acceptable reliability (α = .93; McVay & Kane, 2009). This scale was used as a covariate in the exploratory analyses for the SART.

2.4.2.5 SART Performance

Accuracy on target trials was assessed as a measure of attentional pull on SART performance.

2.4.3 Pilot Results and Discussion

The main purpose of this pilot was to determine that goals do impact attention. As such, an independent samples t-test was conducted to determine if specific and difficult goals drew attention to the focal task and improved SART performance compared to "do your best" goals. One participant's data was discarded as an outlier on target accuracy, defined as more than three standard deviations from the mean. Discarding this participant's data seemed especially justified, as the participant commented after the task that he spoke English as a second language and did not recognize a number of the animals and vegetables presented during the task. The data for the remaining 18 participants was used to assess capability of the SART to capture changes in attentional pull.

A significant effect of goal condition was found on SART target accuracy, $t(16) = 2.63$, $p < .05$), $d = 1.28$. Individuals in the specific and difficult goal condition exhibited higher SART accuracy ($M = .69$, $SD = .20$) than those in the "do your best" goal condition ($M = .44$, $SD = .19$). This suggests that the SART task is able to capture changes in attentional pull. Separate linear regression analyses were used to investigate the RRS and CFQ-MAL as potential covariates. An effect was not found for the RRS on SART target accuracy, $\beta = .12$, $t(15) = 1.30$, $p > .05$, but the effect of condition on SART

target accuracy remained significant, β = -.27, t(15) = -2.90, p < .05. Similarly, an effect was not found for the CFQ-MAL on SART target accuracy, β = .10, t(15) = 1.10, p > .05, but the effect on condition on SART performance remained significant, β = -.27, t(15) = -2.82, p < .05.

In addition to assessing attentional pull, this pilot study investigated participant's goal commitment to the experimenter assigned goals. The goal commitment measure exhibited acceptable reliability (α = .82). An independent samples t-test was used to determine if goal condition impacted goal commitment. An effect of condition was not found, t(18) = -.28, p > .05, suggesting that goal commitment exhibited similar moderate levels for the specific and difficult goal condition (M = 3.18, SD = .79) and the "do your best" goal condition (M = 3.26, SD = .39).

In summary, it appears that the goals are effective for pulling attention towards a focal task, as measured by SART performance. Therefore, the two pilot studies described here were combined for the full study.

2.5 Hypotheses

Despite the conflicting accounts of ostracism and emotional experience, the preponderance of evidence suggests that an ostracizing experience will elicit a strong emotional reaction. This leads to the first hypothesis:

H1: Ostracized individuals will report higher levels of negative affect compared to included individuals.

The results of the ostracism and emotions pilot provide initial support for H1. Ostracized individuals do report higher levels of negative affect than included individuals. Of more interest to this study, however, is the attentional pull of this negative affect. If ostracism

exerts attentional pull through any of the mechanisms explored above, then individuals who are depleted of their regulatory resources will be unable to manage the off-task pull and subsequent performance on a task requiring sustained attention will be diminished. Depletion is a necessary condition to investigate the relationship between emotion and attentional pull. If participants have sufficient regulatory capacity, they may be able to resist the off-task pull of emotions and not demonstrate a decrease in performance on a sustained attention task, thereby obscuring the effect of emotion attentional pull. Conversely, depleted individuals may be unable to efficiently ignore the off-task pull of emotions, and will therefore exhibit decreased performance on a sustained attention task. This leads to the second hypothesis:

H2: Ostracized individuals will perform worse on a sustained attention task than included individuals.

Characteristics of tasks may also pull attention, and the presence of specific and difficult goals may be one such characteristic. Although the effect of goals on attention have not been explicitly studied, the core explanatory mechanisms posit that goals redirect attention towards the relevant task, resulting in increased performance on that task.

H3: Individuals with specific and difficult goals will perform better on a sustained attention task than individuals with a “do your best” goal

The results of the SART and goals pilot provide initial support for H3. Individuals with a specific and difficult goal exhibit improved performance on the SART compared to individuals with a “do your best” goal, suggesting that specific and difficult goals pull attention to the focal task.

When emotions and goals are simultaneously activated, the two processes of on- and off-task attentional pull may occur concurrently. Specific and difficult goals may allow individuals to overcome the off-task attentional pull of emotions by providing a safe outlet for individuals to focus their attention. Therefore, an interaction is proposed between goal type (specific and difficult vs. "do your best" goal) and emotion condition (excluded vs. included).

H4: The effects of ostracism on attention performance will be moderated by goal type, such that specific and difficult goals will exert attentional pull above and beyond the effects of ostracism.

This interaction is the key hypothesis for the study, as it demonstrates the competing pull of emotions and goals on attention.

CHAPTER 3

METHOD

3.1 Participants

University students were recruited through flyers and word of mouth around the Georgia Institute of Technology campus. Participants were randomly assigned to be ostracized vs. included and to receive a specific and difficult goal or vague goal (2x2). A total of 150 individuals participated in the full study and were compensated $15 each for their participation. The data for four participants were discarded (a data recording error occurred during the SART for two participants, one participant declined to give her informed consent after learning about the true purpose of the study, and one participant had completed a previous pilot study), leaving a final sample size of 146 participants.

3.2 Study Tasks

3.2.1 Resource Depleting Task

Prior to the emotion and goals manipulation, all participants were depleted of their regulatory resources by completing a difficult and detailed letter task where they will be asked to cross out all instances of the letter "e" (Baumeister, Bratslavsky, Muraven, & Tice, 1998). . Participants were handed one page of text from an advanced statistical book with the ink lightened so it was difficult to read. Furthermore, they were told to cross out all instances of the letter "e" except when it was adjacent to or one letter away from a vowel. Completion of this task has been found to require more concentration and result in higher levels of fatigue than a similar, yet non-depleting, task (Baumeister et al., 1998). This task has been used previously to manipulate regulatory depletion and has

been found to be effective. The directions and stimuli presented in this study is identical to the directions and stimuli described in previous research.

3.2.2 Cyberball Game

To manipulate ostracism, individuals played the Cyberball game (Williams & Jarvis, 2006), which is identical to the task used in the ostracism and emotions pilot.

3.2.3 Sustained Attention to Response Task (SART; Robertson et al., 1997)

To then manipulate goals, participants were instructed to strive for a specific, challenging goal or to simply do their best on the SART (Robertson et al., 1997). The SART was identical to the task described in the attentional pull and goals pilot study. Performance on the SART was used to assess the attentional pull of specific and difficult vs. vague goals and emotions.

3.3 Manipulation Checks

To ascertain that the manipulations of emotions and goals worked effectively, checks were included.

3.3.1 Emotional Reaction to Ostracism

Emotional reactions were assessed using the mood measures contained in the Reflective and Reflexive Questionnaire, which was used in the ostracism and emotions pilot (see Appendix A; Williams, 2009). The reflexive questions asked participants to report on feelings experienced *during* the game and is administered immediately following the conclusion of the Cyberball task. The reflective questions asked participants to report on feelings experienced *right now* and is administered following the conclusion of the SART. The stems used in the Reflexive and Reflective questionnaires are identical to the stems used by (Williams, 2009). Each item is assessed on a Likert-

type scale (Not at all to Extremely). For the reflexive scale, acceptable levels of reliability were found for the negative (α = .92) and positive (α = .93) affect. Similarly, acceptable levels of reliability were found for the reflective scale on negative (α = .87) and positive (α = .90) affect. The high reliability justifies the use of this scale as an indicator of participants' emotional states.

3.3.2 Measure of Goal Commitment

This scale, used in the SART and goals pilot, assessed the degree to which participants are committed to the experimenter assigned goal (see Appendix B; (Hollenbeck et al., 1989). It consisted of nine items, and participants were asked to indicate the degree to which they agree or disagree with each item (from "strongly disagree" to "strongly agree").

3.3.3 Personal Goal for SART

To assess the effectiveness of the goal-setting manipulation, participants were asked the following: "Did you have a personal goal for the arithmetic task you just completed? If yes, what was your personal goal?" Reponses were compared to their goal setting condition.

3.3.4 Believability of Cover Story

To determine if the cover story was effective, participants were asked the following: **"**Please describe what you believe is the purpose of this study" and "Please describe what you believe are our hypotheses."

3.4 Measures

The (a) Vividness of Visual Imagery Questionnaire (Marks, 1973), (b) ball tossing game questions, and (c) frequency of virtual interaction scales will be identical to

those used in the ostracism and emotions pilot. Similarly, one of these scales will be used in the final analyses, but were included solely to bolster the cover story. The RRS (Nolen-Hoeksema & Morrow, 1991) and CFQ-MAL (McVay & Kane, 2009) were also included, as described in the SART and goals pilot.

3.4.1 Demographics

The demographic questions asked participants to report their (a) age, (b) gender, (c) ethnicity, and (d) study major. These variables were included as they could potentially influence the effectiveness of the ball-tossing task for eliciting emotion.

3.4.2 SART Performance

Useful dependent variables from this task are accuracy, reaction times, and signal detection sensitivity (d_L) and bias (c_L; McVay & Kane, 2009).

3.5 Procedure

Upon entering the lab, participants were told the cover story identical to the pilot study (described above). After participants give their consent, the experimenter asked the participant if she could take a photo of him/her to upload to the server so the other "participants" could see him/her. If the participant said "yes," then the experimenter took a photo of the participant and downloaded it to a folder on the desktop. If the participant said "no," then the experimenter told the participant they will use a Georgia Tech logo in place of his/her picture. A total of four participants opted to use the logo instead of their own picture. The experimenter also ostensibly downloaded the pictures from the two "participants" at Emory University and Georgia State University.

In reality, the participant's photo was not uploaded to a server. It was downloaded onto the desktop for the duration of the study session, and then promptly deleted at the

conclusion of the session. The photos were not linked to a lab at Emory or Georgia State, and no photos were kept past the conclusion of the study. Additionally, no photos of other students were downloaded from Emory or Georgia State. Two pictures, found online, were used to represent the two "participants" at Emory University and Georgia State University.

While the experimenter was "uploading" and "downloading" pictures, the participant was asked to complete the Vividness of Visual Imagery Questionnaire (Marks, 1973) and the depleting letter task (Muraven et al., 1998).

After the depletion manipulation, participants began the Cyberball game. As the participant read the instructions presented on the computer screen, the experimenter made a fake phone call to our partner lab to tell the remote experimenter that we were ready to begin. After the participant clicked "Start" to begin the task, a "waiting" page appeared to further strengthen the cover story. After that time, the Cyberball task actually began. It is important to note that the procedure used regarding the Cyberball task is identical to past procedures, including the use of mental visualization as a cover story (Williams & Jarvis, 2006), a mental visualization scale prior to completing to the task (Wirth & Williams, 2009), and the fake phone call (Lau, Moulds, & Richardson, 2009). The only change to the protocol compared to past studies is the addition of the "waiting" page prior to the beginning of the Cyberball task. While previous did not explicitly state that a "waiting" period was used prior to the beginning of the task, it seems reasonable to assume that a similar delay was used to uphold the cover story. It is difficult to believe that participants would believe a cover story involving multiple remote 'participants' if they were conveniently available immediately when the participant pressed "start."

Once the Cyberball game was complete, participants were handed a second survey packet. As a manipulation check for emotional response, participants were asked to complete the reflexive questions of the Reflexive and Reflective Questionnaire (Williams, 2009). In order to maintain the cover story, participants were also asked the ball tossing game and frequency of virtual interaction questions.

Next, the participants were asked to begin the sustained attention task. Participants were randomly assigned to goal condition and were told to "Please do your best to respond as accurately as possible on the vegetable trials (when you do not hit the spacebar)" or "Please try and achieve an accuracy rate of 80% or higher on the vegetable trials (when you do not hit the space bar)." An accuracy rate of 80% was chosen based on a previous pilot using the SART. Accuracy for target trials (when participants refrain from pressing the space bar) was displayed in the upper right corner of the screen, and accuracy for non-target trials (when participants press the space bar) was displayed in the upper left corner of the screen. After completing the SART, participants were given a third and final survey packet. This survey packet collected (a) a measure of goal commitment, (b) the Reflective Questionnaire (Williams, 2009), (c) demographic information, such as age, gender, and nationality, (d) the Cognitive Failures Questionnaire – Memory and Attention Lapses (McVay & Kane, 2009), (e) the Ruminative Responses Scale (Nolen-Hoeksema & Morrow, 1991), and (f) asked the participants to identify the purpose of our study as a measure of the effectiveness of the deception.

In order to continually remind participants of their ostracizing/including experiences, the Cyberball avatar was printed on the cover of all survey packets.

Therefore, a reminder of the ball-tossing game was visually present during the entire SART task.

CHAPTER 4

RESULTS

The results are presented in two sections. The first section will address the main hypotheses. The second section will address exploratory hypotheses associated with potential covariates and emotional responses. Descriptive statistics for the variables of interest are presented in Table 1.

4.1 Main Hypotheses

4.1.1 Hypothesis 1

The first hypothesis investigates the relationship between emotions and inclusion/exclusion. Two ANOVAs were conducted to examine the effect of goal and ostracism conditions on reflexive (i.e., how did you feel during the game, administered after the Cyberball task) negative and positive affect. A large effect of ostracism condition was found on reflexive negative affect, $F(1, 142) = 212.10$, $p < .01$, $d = 2.40$, $\omega^2_{partial} = 0.60$, and positive affect, $F(1, 142) = 234.96$, $p < .01$, $d = 2.54$, $\omega^2_{partial} = .62$. Individuals in the ostracized condition experienced higher reflexive negative affect ($M = 3.05$, $SD = .85$) than those in the included condition ($M = 1.33$, $SD = .55$; see Figure 4). Excluded individuals also experienced lower reflexive positive affect ($M = 2.24$, $SD = .68$) than individuals in the included condition ($M = 3.94$, $SD = .66$; see Figure 5). A main effect of goal condition was not found for reflexive negative affect, $F(1, 142) = 1.25$, $p > .05$, or reflexive positive affect, $F(1, 142) = 1.04$, $p > .05$. As the goal condition

Table 1

Descriptive statistics for scales and SART performance variables

Variable	N	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
Emotion Scales							
Reflexive Negative Affect	146	1.00	4.75	2.19	1.12	0.45	-1.16
Reflexive Positive Affect	146	1.00	5.00	3.09	1.09	-0.03	-0.92
Reflective Negative Affect	146	1.00	4.25	2.23	0.93	0.38	-0.92
Reflective Positive Affect	146	1.00	5.00	2.99	0.85	-0.09	-0.23
Goal Commitment	146	1.56	4.33	3.08	0.60	-0.43	-0.32
CFQ-MAL	146	1.55	4.53	2.84	0.50	0.03	0.37
RRS	146	1.23	3.59	2.22	0.46	0.18	-0.25
SART Variables							
Target Accuracy	141	0.04	0.96	0.46	0.22	0.07	-0.74
Non-Target Accuracy	141	0.73	1.00	0.96	0.06	-2.30	4.74
Target RT	141	203.47	611.16	382.79	85.98	0.50	0.13
Non-Target RT	141	207.83	661.39	455.64	99.84	-0.29	-0.51
Signal Detection Sensitivity	141	-0.65	9.57	3.86	2.07	-0.11	-0.51
Signal Detection Bias	141	0.27	3.99	2.13	0.74	-0.07	-0.24

Note. Five outliers, defined as observations greater than 3 standard deviations away from the mean, are removed from the SART descriptive statistics.

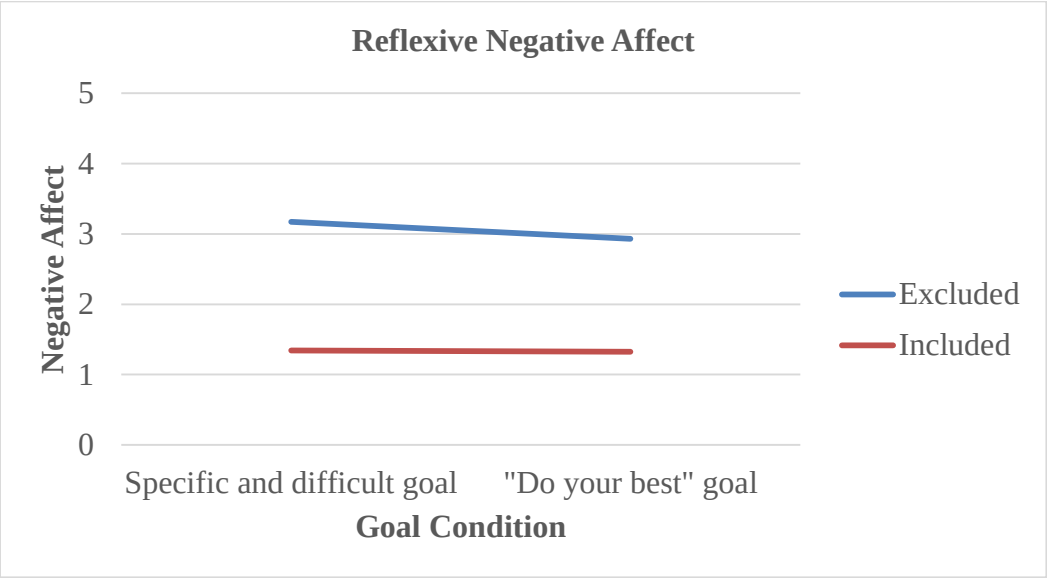

Figure 4. Reflexive negative affective reactions to ostracism and goal conditions. This figure illustrates the main effect of ostracism condition on negative affect. Individuals who are excluded exhibit higher negative affect than included individuals.

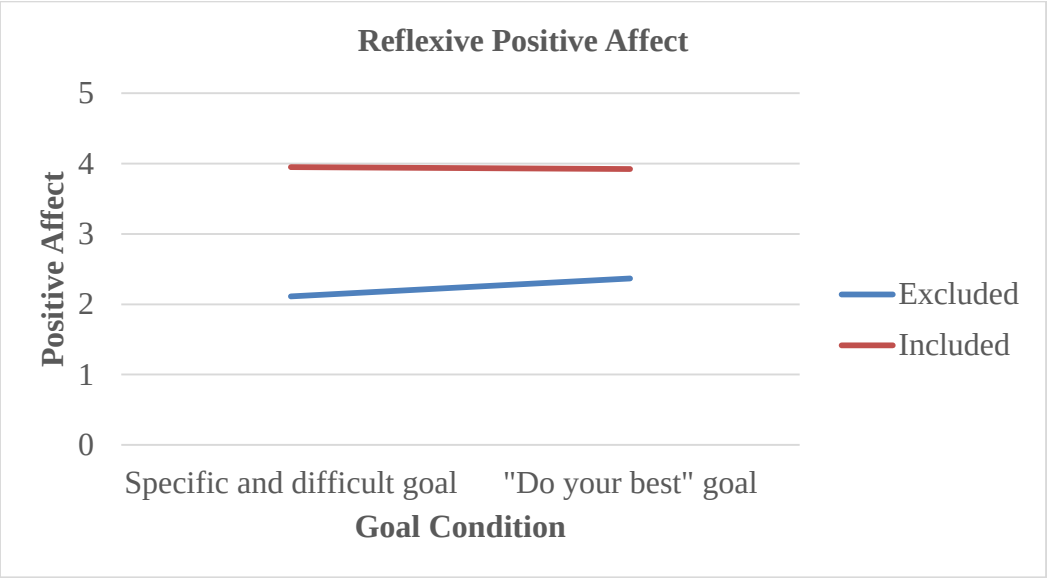

Figure 5. Reflexive positive affective reactions to ostracism and goal conditions. This figure demonstrates the main effect of ostracism on positive affect. Excluded individuals exhibit lower positive affect than included individuals.

manipulation was not given until after the reflexive survey was completed, this analysis served as a manipulation check. The goal condition groups were affectively equivalent prior to the goal manipulation. Similarly, an interaction between ostracism and goal conditions was not found for negative affect, $F(1, 142) = .89$, $p > .05$, or positive affect, $F(1, 142) = 1.70$, $p > .05$.

Two additional ANOVAs were conducted to examine the effect of ostracism and goal condition on reflective (i.e., how do you feel right now, administered after the SART) negative and positive affect. A main effect of ostracism condition was not found for reflective negative affect, $F(1, 140) = .01$, $p > .05$, or reflective positive affect, $F(1, 140) = .03$, $p > .05$, suggesting that the effect of ostracism on emotions dissipated. Similar to the reflexive scales, a main effect was not found for reflective negative affect, $F(1, 140) = .93$, $p > .05$, or reflective positive affect, $F(1, 140) = .01$, $p > .05$. As the reflective questionnaire occurs after the goal manipulation was administered, these results suggest that goal condition did not impact participants' emotional states. Finally, an interaction between ostracism and goal conditions was not found for reflective negative affect, $F(1, 140) = .69$, $p > .05$, or reflective positive affect, $F(1, 140) = .13$, $p > .05$. Figures 6 and 7 depict the marginal means described in these analyses for negative and positive affect, respectively.

Even though the reflexive and reflective questionnaires have different stems, repeated measures ANOVAs were conducted to more explicitly investigate the effects of time on emotional states. As there were no main effects of goals, I collapsed across goal conditions. A split-plot ANOVA was conducted to assess negative emotional reactions to ostracism across time. The results indicate a significant main effect of

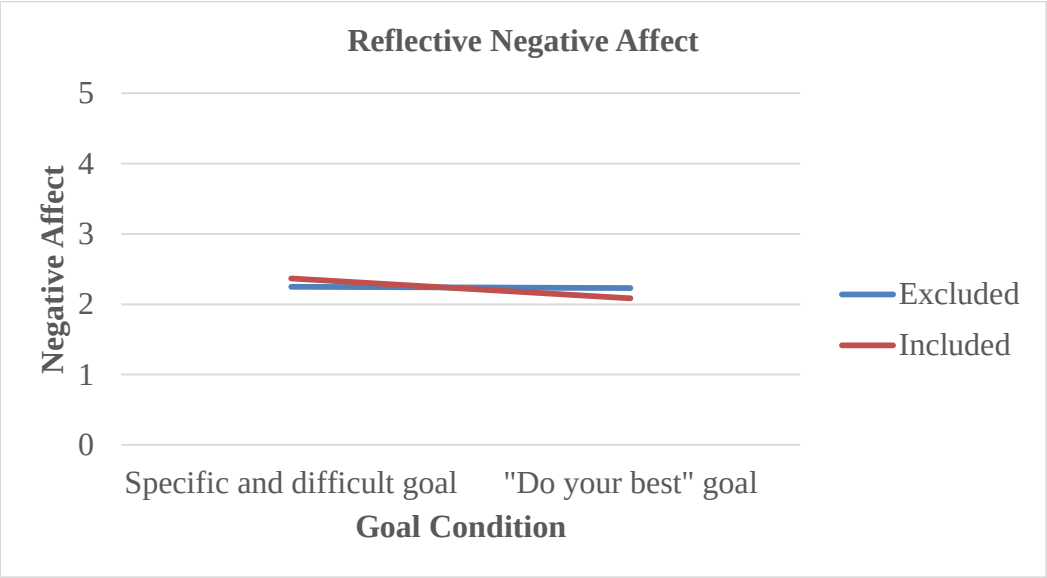

Figure 6. Reflective negative affective reactions to ostracism and goal conditions. A main effect of ostracism on reflective negative affect does not exist.

Figure 7. Reflective positive affective reactions to ostracism and goal conditions. A main effect of ostracism on positive negative affect does not exist.

inclusion/exclusion, $F(1, 142) = 57.17$, $p < .01$. Across reflexive and reflective questionnaires, participants reported higher negative affect when excluded ($M = 2.63$, $SE = .08$) from the ball tossing game than when included ($M = 1.78$, $SE = .08$). There was no main effect of time frame found, suggesting that across exclusion and inclusion conditions, participants did not exhibit systematic differences in negative affect across time, $F(1, 142) = .43$, $p > .05$. Finally, a significant interaction was found between inclusion/exclusion conditions and time frame, $F(1, 142) = 111.03$, $p < .01$. An inspection of the marginal means indicates that on the reflexive questionnaire, indicating participants' emotional responses during the Cyberball task, excluded individuals reported higher levels of negative affect ($M = 3.03$, $SE = .08$) than those who were included ($M = 1.33$, $SE = .08$). However, on the reflective questionnaire, assessing participants' emotional responses "right now" after completing the SART, participants exhibited similar, moderate levels of negative effect in the excluded ($M = 2.24$, $SE = .11$) and included ($M = 2.23$, $SE = .11$) conditions (See Figure 8). This provides partial support for Hypothesis 1; ostracism did elicit a negative emotional reaction, but only when assessed reflexively. When assessed reflectively, participants exhibit similar levels of negative affect, suggesting that the effect of exclusion/inclusion faded.

A second split-plot ANOVA was conducted to assess the role of positive affect in response to exclusion. Similar to the effects of negative affect, a significant main effect of inclusion/exclusion was found, $F(1, 142) = 67.13$, $p < .01$, indicating that individuals who were excluded experienced less positive affect ($M = 2.62$, $SE = .07$) than those who were included ($M = 3.47$, $SE = .07$). A main effect of time frame was not found, $F(1, 142) = 1.78$, $p > .05$, indicating that affect did not change systematically across time

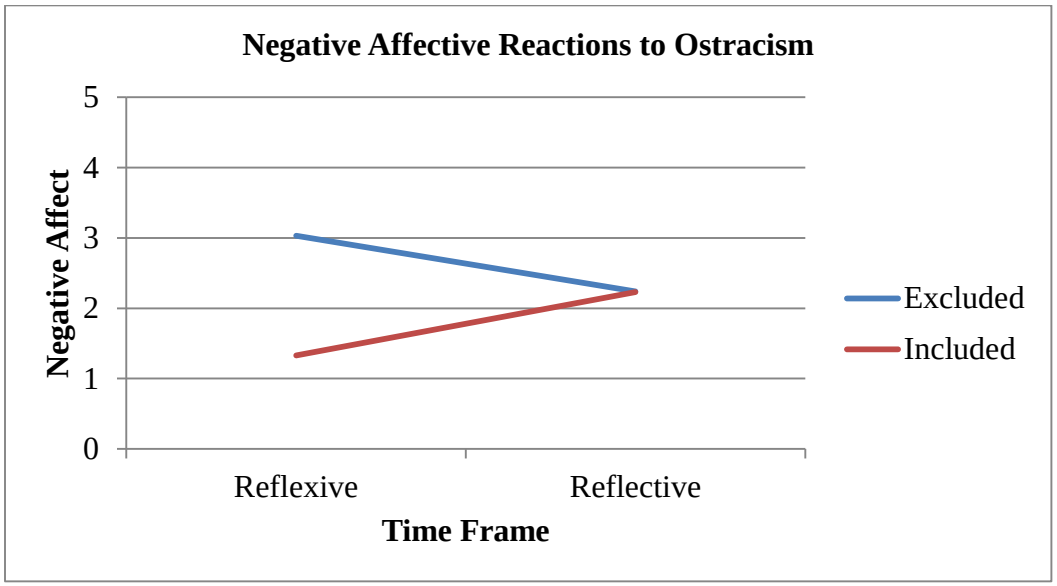

Figure 8. Negative affective reactions to ostracism. The figure illustrates that excluded individuals have more negative affect than included individuals when asked for reflexive reactions. Excluded and included individuals exhibit similar levels of negative affect when asked for reflective reactions.

across inclusion/exclusion conditions. A significant interaction was found, $F(1, 142) = 124.18$, $p < .01$. Similar to the interaction with negative emotion, an inspection of the marginal means revealed that on the reflexive questionnaire, excluded individuals exhibited lower positive affect ($M = 2.26$, $SE = .08$) than included individuals ($M = 3.93$, $SE = .08$). However, on the reflective questionnaire, individuals exhibited similar, moderate levels of positive affect in the excluded ($M = 2.98$, $SE = .10$) and included ($M = 3.01$, $SE = .10$) conditions (See Figure 9). This suggests that the influence of exclusion/inclusion condition on positive affect attenuated as time increased.

4.1.2 Hypotheses 2-4

Prior to assessing the relationship between ostracism and goals on SART performance, five participants with outliers on the SART, defined as being more than 3 standard deviations away from the mean, had their data discarded. A 2x2 ANOVA was conducted on the remaining 141 participants to assess (a) the main effect of emotions on SART performance (H2), (b) the main effect of goals on SART performance (H3), and the interaction between emotions and goals (H4). A main effect was not found for ostracism on on target accuracy, $F(1, 137) = .83$, $p > .05$, target reaction time, $F(1, 137) = .20$, $p > .05$, signal detection sensitivity, $F(1, 137) = .001$, $p > .05$), and signal detection bias, $F(1, 137) = 3.09$, $p > .01$. This does not provide support for H2, indicating that there is no evidence that ostracism pulled attention away from the SART and negatively impact SART performance. A main effect was not found for goals on target accuracy, $F(1, 137) = .78$, $p > .05$, target reaction time, $F(1, 137) = 1.82$, $p > .05$, signal detection sensitivity, $F(1, 137) = .01$, $p > .05$, and signal detection bias, $F(1, 137) = 3.25$, $p > .05$. This does not provide support for H3, indicating that there is no evidence that specific

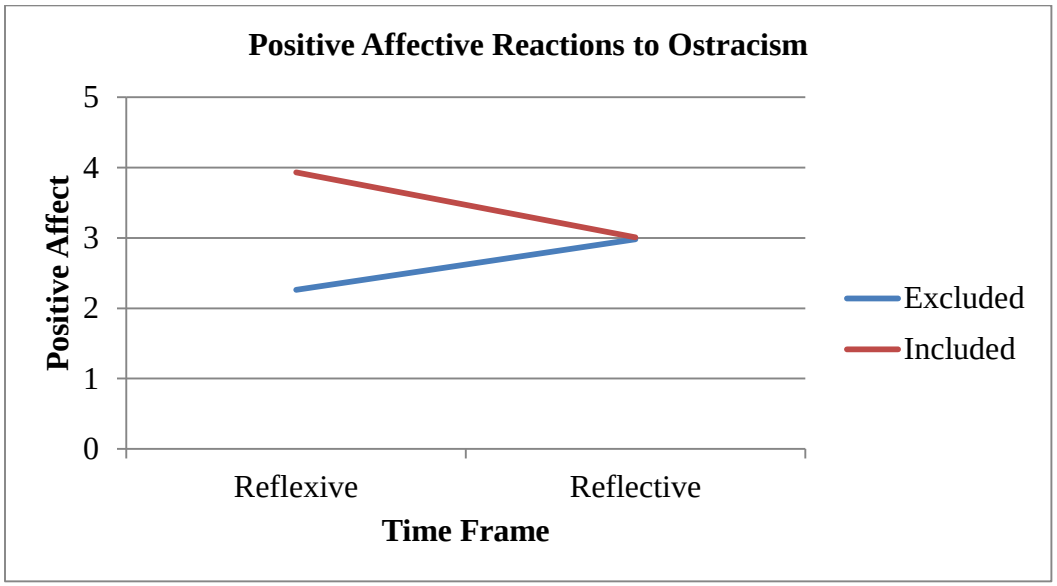

Figure 9. Positive affective reactions to ostracism. The figure illustrates that excluded individuals have less positive affect than included individuals when asked for reflexive reactions. Excluded and included individuals exhibit similar levels of positive affect when asked for reflective reactions.

and difficult goals pull attention to the SART task and increase performance. This lack of support is troubling, especially given the evidence from the pilot study. Finally, aninteraction between ostracism and goals was not found for target accuracy, $F(1, 137) = .54$, $p > .05$, target reaction time, $F(1, 137) = 1.10$, $p > .05$, signal detection sensitivity, $F(1, 137) = F = .0002$, $p > .05$), or signal detection bias, $F(1, 137) = 1.13$, $p > .05$. This does not provide support for H4, indicating that there is not evidence for an interaction between inclusion/exclusion and goals on SART performance.

4.1.3 Secondary Analyses

After testing the main hypotheses, the following exploratory analyses were conducted: (a) examining goal commitment as a manipulation check, (b) examining goal commitment as a covariate in SART performance, (c) examining the RRS and CFQ as covariates in SART performance, (d) a multivariate test of SART performance to explore attentional pull effects at different time frames during the task, and (e) correlations between emotions and SART performance.

Goal commitment was assessed as a manipulation check for the participants' acceptance of the experimenter assigned goal. A measure of internal consistency exhibited reliability levels that are slightly below conventional standards ($\alpha = .79$), suggesting that the following analyses involving goal commitment should be interpreted with caution. An independent samples t-test suggests that goal commitment did not change based on goal condition (specific and difficult goal vs. a "do your best" goal), $t(144) = .48$, $p > .05$. Individuals in the specific and difficult goal condition appear to have similar levels of goal commitment ($M = 3.12$, $SD = .62$) as individuals in the "do your best" goal condition ($M = 3.05$, $SD = .60$). This, combined with the moderate levels

of goal commitment as evidenced by the means, suggests that participants were reasonably committed to their experimenter assigned goals.

After ascertaining that participants were reasonably committed to the experimenter assigned goals, the relationship between goal commitment and SART performance was explored. Specifically, goal commitment was included as a covariate in analyses of SART performance. A main effect of goal commitment was not found for signal detection bias, $F(1, 136) = .06$, $p > .05$. A significant effect of goal commitment was found on target accuracy, $F(1, 136) = 8.79$, $p < .01$, target reaction, $F(1, 136) = 5.07$, $p < .05$, and signal detection sensitivity, $F(1, 136) = 12.21$, $p < .01$. However, the associated main effects and interactions with ostracism and goal conditions remained insignificant for all four dependent variables. While goal commitment was related to SART performance, it did not help explain the effects of the experimental manipulations on SART performance.

The RRS and CFQ were also examined as potential covariates. The RRS measures trait-level rumination. Individuals high in trait-level rumination may exhibit stronger negative emotion effects (Nolen-Hoeksema & Morrow, 1991). Furthermore, previous research has found that the RRS accounts for significance variance in SART performance (Roberts et al., 2013). A non-significant effect of the RRS was found on target accuracy, $F(1, 136) = .37$, $p > .05$, signal detection sensitivity, $F(1, 136) = 1.36$, $p > .05$, and signal detection bias, $F(1, 136) = .40$, $p > .05$. A significant relationship was found between RRS and target reaction time, $F(1, 136) = 4.02$, $p < .05$, but the associated main effects and interactions with exclusion/inclusion and goal condition remained insignificant.

The CFQ-MAL captures trait-level cognitive errors and has been shown to account for significant variance in SART performance (McVay & Kane, 2009). Individuals higher in trait-level cognitive errors tend to exhibit more errors on the SART, potentially increasing the noise in our analyses. Similar to the RRS, a non-significant effect of CFQ was found on target accuracy, $F(1, 136) = .33$, $p > .05$, target reaction time, $F(1, 136) = 1.60$, $p > .05$, signal detection sensitivity, $F(1, 136) = .37$, $p > .05$, and signal detection bias, $F(1, 136) = .004$, $p > .05$. This indicates that the RRS and CFQ did not account for significant variance in SART performance.

After examining the role of potential covariates, SART performance was broken down into blocks to determine if an effect of inclusion/exclusion and goals on SART performance existed during different time frames of the task. SART performance was broken into five blocks comprised of 135 trials (120 non-target trials, 15 target trials). A MANOVA was conducted across all five blocks. Similar to the univariate results, the multivariate results were non-significant for the main effect of inclusion/exclusion, the main effect of goal condition, and the interaction (See Table 2 for relevant F values and significance tests). Attentional pull effects were not found at any of the five time points in the SART.

Finally, the logic of this study indicates that exclusion will generate a negative emotion, and this negative emotion will pull attention away from the focal task. To better assess the relationship between emotions and SART performance, the correlation between the two was assessed (see Table 3). Of note here are the significant correlations between reflective negative affect and target accuracy and signal detection sensitivity, such that individuals exhibiting higher levels of negative affect made more mistakes on

Table 2

Multivariate tests of ostracism and goals on SART blocks.

	Ostracism Condition			Goal Condition			Interaction		
Variable	F Value	df	Sig.	F Value	df	Sig.	F Value	df	Sig.
Target Accuracy	.812	(5, 133)	n.s.	1.288	(5, 133)	n.s.	.589	(5, 133)	n.s.
Target RT	2.417	(5, 122)	$p < .05$*	.714	(5, 122)	n.s.	1.682	(5, 122)	n.s.
Signal Detection Sensitivity	.462	(5, 133)	n.s.	1.057	(5, 133)	n.s.	.670	(5, 133)	n.s.
Signal Detection Bias	1.029	(5, 133)	n.s.	.603	(5, 133)	n.s.	.361	(5, 133)	n.s.

Note. A main effect for ostracism condition was found for target reaction; however, the subsequent F-tests for each of the 5 blocks were all non-significant ($p > .05$).

Table 3

Correlations between emotion and SART performance

Variable	1	2	3	4	5	6	7	8
1. Reflexive Negative Affect	—							
2. Reflexive Positive Affect	-0.86**	—						
3. Reflective Negative Affect	0.23**	-0.17*	—					
4. Reflective Positive Affect	-0.10	0.22**	-0.60**	—				
5. SART Target Accuracy	-0.03	-0.02	-0.22**	0.22**	—			
6. SART Target Reaction Time	-0.16	0.06	-0.09	0.03	0.71**	—		
7. SART Signal Detection Sensitivity	-0.04	-0.00	-0.19*	0.23**	0.74**	0.39**	—	
8. SART Signal Detection Bias	-0.01	0.04	0.02	0.02	-0.41**	-0.48**	0.29**	—

Note. *$p < .05$. *$p < .01$.

target trials and exhibited lower sensitivity for distinguishing between target trials and noise trials. Similarly, reflective positive affect was significantly related to target accuracy and signal detection sensitivity, such that individuals expressing higher levels of positive affect made fewer mistakes on target trials and exhibited increased sensitivity for distinguishing between target trials and noise trials. Interestingly, SART performance was not related to reflexive emotions. This suggests that the interactive effect of emotion and goals on attention mediated performance. Participants who performed well reported higher positive affect, and participants who performed poorly reported higher negative affect.

CHAPTER 5

DISCUSSION

This study investigated the role of attentional pull (Beal et al., 2005). Specifically, it investigated the off-task attentional pull of emotions as induced by an ostracizing experience and the on-task attentional pull of specific and challenging goals as assessed by performance on the SART. The results indicated that the emotions as induced by an ostracizing experience and experimenter-assigned specific and difficult goals were not sufficient to exert attentional pull.

When a study reports insignificant results, there are two possible options: (1) the proposed theoretical model is incorrect or (2) the study failed to create the necessary conditions to provide an adequate test of the hypotheses. In the following section, I will outline each link in my theoretical model and evaluate the conditions under which was tested.

The primary interest in this study was investigating the off-task attentional pull of emotions. Therefore, the first step in the theoretical model is to ascertain that the ostracism manipulation used in this study did elicit an emotional response. The results indicate that ostracism as induced by the Cyberball game did create an emotional response. However, I did not directly assess the intensity or the duration of the emotional response. While a large effect on emotions was found between the ostracized and included conditions, it is not clear if ostracized individuals were experiencing intense emotions in this study. However, a previous qualitative study addressed the intense emotional reactions to ostracizing experiences. Williams, Bernieri, Faulkner, Gada-Jain,

and Grahe (2000) discussed emotions in their description of the 'Scarlet Letter' project, where colleagues purposely ostracized each other for five days. Their report suggests that ostracism led to intense emotional experiences that did reliably pull their attention. However, the current study was unable to recreate the immersive experience that characterized the 'Scarlet Letter' project where individuals were ostracized by known colleagues who they saw regularly. It is possible that the elicited emotion was insufficiently intense to pull attention. However, the large effect size found in this study, coupled with the large effects typically found in studies using the Cyberball task (Williams & Jarvis, 2006), suggests that ostracized individuals do have very different emotional experiences compared to included individuals. Therefore, it seems unlikely that the emotion manipulation was ineffective in eliciting a strong emotional response.

A second potential problem is the duration of the emotional response. While the Cyberball task has been reliably shown to produce emotion effects, few studies examine the temporal duration of these effects. Of the studies that do investigate the temporal effects of ostracism, they are limited to the "reflexive" and "reflective" distinctions addressed earlier and are concerned with finding individual difference moderators (Oaten, Williams, Jones, & Zadro, 2008; Zadro, Boland, & Richardson, 2006). No study has explicitly examined the duration of emotional effects induced by ostracism in minutes, but Lau et al. (2009) explored the duration of threatened needs in response to ostracism. Specifically, they investigated the role of rumination perspective on the persistence of the negative effects of ostracism. They found that recalling the experience from an observer perspective (i.e., as a detached outsider) versus a field perspective (i.e., through their own eyes) moderated the persistence of depleted primary needs.

Individuals who recalled their experience from an observer perspective reported higher threatened needs 10 minutes after the ostracizing experience, while individuals who recalled the event from a field perspective had recovered by that time. While this study did not explicitly investigate the duration of emotions after an ostracizing experience, the researchers to provide preliminary evidence suggesting the effects of ostracism via the Cyberball task may be relatively short-lived. This is reflected in the dissipating emotional effects observed from the reflexive to reflective time frames. However, SART performance was also analyzed in blocks for precisely this reason. Even if the elicited emotion dissipated, the off-task pull should have been seen in the first or second blocks. As the elapsed time between the Cyberball task and beginning the SART was purposefully kept to a minimum, it seems unlikely that elicited emotion was too fleeting for this study.

In summary, ostracism in this study did create an emotional reaction to ostracism. While the intensity and duration of that emotion was not directly assessed, previous literature and the results of the present study indicate that elicited emotion should have been sufficiently intense and persistent for the purposes of this study.

The second step in the theoretical model to explore is the off-task attentional pull of emotions. Assuming the Cyberball task did elicit an emotional response, participants' attentional resources should be pulled off-task, resulting in impaired task performance. However, the emotions induced by the ostracizing ball tossing game were not sufficient to exert attentional pull during the SART. If we assume that the emotion manipulation was successful in eliciting a sufficiently intense and persistent emotion, as arguged above, then there are two potential explanations for the insignificant results: (a) emotions

do not exert attentional pull, or (b) the SART was unable to capture the off-task attentional pull. Prior to passing judgment on the emotion and attentional pull link in the theoretical model, I will discuss the goals and attentional pull link to provide a more complete picture.

The third theoretical link explored in this study was the on-task attentional pull of specific and difficult goals. However, individuals with specific and difficult goals did not exhibit higher performance on the SART than individuals with "do your best" goals. This finding is especially surprising, as goal setting theory has received robust empirical support over the years. There are three potential explanations for the insignificant results: (a) goals do not exert attentional pull, (b) the goal manipulation was ineffective, or (c) the SART was unable to capture the on-task attentional pull. An inspection of the participants' personal goals reveals that many individuals in the specific and difficult goal condition revised their experimenter assigned goal of 80% accuracy on target trials down to 50 or 60% accuracy, providing preliminary evidence that the goal manipulation may have been ineffective. This downward revision may be due to the difficult nature of the task and the cumulative nature of the accuracy goal. If participants responded incorrectly to a number of target trials at the beginning of the task, it becomes very difficult to increase accuracy back to the 80% target level. Individuals in the "do your best" goal condition also tended to self-assign specific goals of 50% or 60% accuracy. In exploratory analyses, we ran several models with the contaminated self-assigned goals discarded in an attempt to get a purer picture of the role of experimenter-assigned goals on SART performance. Unfortunately, the results were similarly insignificant, suggesting that the lack of a main effect may be unrelated to the goal contamination.

A great deal of previous research has investigated the impact of specific and difficult goals on performance. While no study has explicitly tested attentional processes and goals, it is a hypothesized mechanism for impacting performance. Previous research has provided compelling support for the efficacy of difficult and specific goals across a variety of tasks and samples. Due to the sheer breadth of this research, it seems highly unlikely that goals do not exert attentional pull. Similarly, the goal manipulation used in this study has been successfully used in the past, suggesting that it is unlikely that the goal manipulation was unsuccessful. Therefore, by process of elimination, it appears that the SART provided a poor assessment of attentional pull.

The individual difference measures provide further evidence that the SART was a poor measure of attentional fluctuations. The CFQ-MAL and RRS were included as potential covariates in SART performance, as used in previous studies (McVay & Kane, 2009; Nolen-Hoeksema & Morrow, 1991). However, these individual difference measures did not account for any additional variance in this study. This suggests that something about the SART did not work as anticipated. It is possible that the task itself has exerted attentional pull, therefore obscuring the effect of emotions and goals on task performance. However, the task is very dull; target trials are infrequent, the stimuli is repetitive, and the task is long. It does not seem likely that the task itself exerts attentional pull, especially as it does not explain the lack of relationship with the individual difference measures.

A second option is that the SART does not work with a Georgia Tech student population. The task is a relatively simple task; don't press the space bar when a target stimulus is shown. It is possible that Georgia Tech students, who are typically higher

than average cognitive ability, are able to perform adequately on this task regardless of their off-task or on-task attentional pull. Regardless of the hypothesized reasons for the insignificant effects, it appears that the SART was an inappropriate measure of attentional pull.

Overall, the conditions for testing my hypotheses were imperfect, suggesting that the study did not provide an adequate test of the hypotheses. The potential problems with the SART combined with the dissipating emotions suggest that, even if attentional pull does exit, this study would be unable to capture attentional fluctuations. It is possible that the hypothesized model is correct, and a more precise study would be able to uncover the predicted relationships. A future study should use a different mesaure of attentional pull that can better capture these momentary fluctuations in attention.

5.1 Conclusion

This study was a new endeavor to understand the within-person changes in performance as a function of fluctuations in attention. It was hypothesized that emotions exert off-task attentional pull and goals exert on-task attentional pull, resulting in subsequent changes in task performance. However, support was not found for the attentional pull of emotions or goals. Future research should further explore on- and off-task attentional pull using (a) a more persistent emotion manipulation than the Cyberball task and (b) a more sensitive measure of changes in attentional control than the SART.

APPENDIX A: REFLEXIVE AND REFLECTIVE QUESTIONNAIRE (WILLIAMS, 2009)

*For each question, please circle the number to the right that best represents the **feelings** you **were** experiencing **DURING** the game.*		**Not at all**				**Extremely**
Belonging						
I felt "disconnected"		1	2	3	4	5
I felt rejected		1	2	3	4	5
I felt like an outsider		1	2	3	4	5
I felt I belonged to the group		1	2	3	4	5
I feel the other players would interact with me a lot		1	2	3	4	5
Self esteem						
I felt good about myself		1	2	3	4	5
My self-esteem was high		1	2	3	4	5
I felt liked		1	2	3	4	5
I felt insecure		1	2	3	4	5
I felt satisfied		1	2	3	4	5
Meaningful existence						
I felt invisible		1	2	3	4	5
I felt meaningless		1	2	3	4	5
I felt non-existent		1	2	3	4	5
I felt important		1	2	3	4	5
I felt useful		1	2	3	4	5
Control						
I felt powerful		1	2	3	4	5
I felt I had control over the course of the game		1	2	3	4	5
I felt I had the ability to significantly alter events		1	2	3	4	5
I felt I was unable to influence the action of others		1	2	3	4	5
I felt the other players decided everything		1	2	3	4	5
MOOD						
Good		1	2	3	4	5
Bad		1	2	3	4	5
Friendly		1	2	3	4	5
Unfriendly		1	2	3	4	5
Angry		1	2	3	4	5
Pleasant		1	2	3	4	5
Happy		1	2	3	4	5
Sad		1	2	3	4	5

*For each question, please circle the number to the right that best represents the **feelings** you are experiencing **RIGHT NOW**.*	**Not at all**				**Extremely**

Belonging					
I feel “disconnected”	1	2	3	4	5
I feel rejected	1	2	3	4	5
I feel like an outsider	1	2	3	4	5
I feel I belong to the group	1	2	3	4	5
I feel the other players interact with me a lot	1	2	3	4	5
Self esteem					
I feel good about myself	1	2	3	4	5
My self-esteem is high	1	2	3	4	5
I feel liked	1	2	3	4	5
I feel insecure	1	2	3	4	5
I feel satisfied	1	2	3	4	5
Meaningful existence					
I feel invisible	1	2	3	4	5
I feel meaningless	1	2	3	4	5
I feel non-existent	1	2	3	4	5
I feel important	1	2	3	4	5
I feel useful	1	2	3	4	5
Control					
I feel powerful	1	2	3	4	5
I feel I have control over the course of events	1	2	3	4	5
I feel I had the ability to significantly alter events	1	2	3	4	5
I feel I am unable to influence the action of others	1	2	3	4	5
I feel others decide everything	1	2	3	4	5
MOOD					
Good	1	2	3	4	5
Bad	1	2	3	4	5
Friendly	1	2	3	4	5
Unfriendly	1	2	3	4	5
Angry	1	2	3	4	5
Pleasant	1	2	3	4	5
Happy	1	2	3	4	5
Sad	1	2	3	4	5

APPENDIX B: GOAL COMMITMENT SCALE (HOLLENBECK ET AL., 1989)

In regard to your experimenter assigned goal, please indicate how much you agree or disagree with each statement below.

Questions	Responses				
1. It's hard to take this goal seriously. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
2. It's unrealistic for me to expect to reach this goal. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
3. It is quite likely that this goal may need to be revised, depending on how things go. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
4. Quite frankly, I don't care if I achieve this goal or not. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
5. I am strongly committed to pursuing this goal.	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
6. It wouldn't take much to make me abandon this goal. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
7. I think this goal is a good goal to shoot for.	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
8. I am willing to put forth a great deal of effort beyond what I'd normally do to achieve this goal.	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree
9. There is not much to be gained by trying to achieve this goal. (R)	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly Agree

APPENDIX C: RUMINATIVE RESPONSES SCALE (NOLEN-HOEKSEMA & MORROW, 1991)

People think and do many different things when they feel sad, blue, or depressed. Below is a list of possibilities. Please indicate if you never, sometimes, often, or always think or do each one when you feel down, sad, or depressed by circling the appropriate response. Please indicate what you generally do, not what you think you should do.

Question	Responses			
1. Think about how alone you feel	Never	Sometimes	Often	Alw
2. Think "I won't be able to do my job if I don't snap out of this"	Never	Sometimes	Often	Alw
3. Think about your feelings of fatigue and achiness	Never	Sometimes	Often	Alw
4. Think about how hard it is to concentrate	Never	Sometimes	Often	Alw
5. Think "What am I doing to deserve this?"	Never	Sometimes	Often	Alw
6. Think about how passive and unmotivated you feel	Never	Sometimes	Often	Alw
7. Analyze recent events to try to understand why you are depressed	Never	Sometimes	Often	Alw
8. Think about how you don't seem to feel anything anymore	Never	Sometimes	Often	Alw
9. Think "Why can't I get going?"	Never	Sometimes	Often	Alw
10. Think "Why do I always react this way?"	Never	Sometimes	Often	Alw
11. Go away by yourself and think about why you feel this way	Never	Sometimes	Often	Alw
12. Write down what you are thinking and analyze it	Never	Sometimes	Often	Alw
13. Think about a recent situation, wishing it had gone better	Never	Sometimes	Often	Alw
14. Think "I won't be able to concentrate if I keep feeling this way"	Never	Sometimes	Often	Alw
15. Think "Why do I have problems other people don't have"	Never	Sometimes	Often	Alw
16. Think "Why can't I handle things better?"	Never	Sometimes	Often	Alw
17. Think about how sad you feel	Never	Sometimes	Often	Alw
18. Think about all your shortcomings, failings, faults, mistakes	Never	Sometimes	Often	Alw

19. Think about how you don't feel up to doing anything	Never	Sometimes	Often	Alw
20. Analyze your personality to try to understand why you are depressed	Never	Sometimes	Often	Alw
21. Go someplace alone to think about your feelings	Never	Sometimes	Often	Alw
22. Think about how angry you are with yourself	Never	Sometimes	Often	Alw

APPENDIX D: COGNITIVE FAILURES QUESTIONNAIRE – MEMORY AND ATTENTION LAPSES (MCVAY & KANE, 2009)

This is a questionnaire about minor cognitive failures. You will answer 40 questions that try to record how often the different kinds of minor failures happen to you.

The following questions refer to minor failures, which happen to all of us from time to time. Some of these failures occur more frequently than others. Please indicate how frequently you notice such incidents in your own behavior by specifying how often such incidents have happened to you during the last twelve months.

Please mark only one answer per row.

		never	rarely	once in a while	often	ve oft
1.	Do you read something and find you haven't been thinking about it, so you have to read it again?	❍	❍	❍	❍	❍
2.	Do you find you forget why you went from one part of the house to the other?	❍	❍	❍	❍	❍
3.	Do you find that you forget whether you've turned off a light or the stove or locked the door?	❍	❍	❍	❍	❍
4.	Do you find it difficult to stay focused on what's happening in the present?	❍	❍	❍	❍	❍
5.	Do you forget where you put something like a newspaper, set of keys, or book?	❍	❍	❍	❍	❍
6.	Do you find you accidentally throw away the thing you want, and keep what you meant to throw away – as in the example of throwing away the matchbook and putting the used match in your pocket?	❍	❍	❍	❍	❍
7.	Do you daydream when you ought to be listening to something?	❍	❍	❍	❍	❍
8.	Do you start doing one thing at home and get distracted into doing something else (unintentionally)?	❍	❍	❍	❍	❍
9.	At the end of a conversation, do you realize that you forget to mention something you wanted to say?	❍	❍	❍	❍	❍
10.	Do you have to return to your home or apartment to pick up something you forgot?	❍	❍	❍	❍	❍
11.	Do you forget to give a message to somebody as you were requested to do?	❍	❍	❍	❍	❍
12.	Do you *not* notice feelings of physical tension or discomfort until they really grab your attention?	❍	❍	❍	❍	❍
13.	Are you unable to find something that you put away only a couple of days ago?	❍	❍	❍	❍	❍
14.	Do you drive places on "automatic pilot" and then wonder how or why you went there?	❍	❍	❍	❍	❍

15.	Do you forget a person's name almost as soon as you've been told it for the first time?	❍	❍	❍	❍	❍
16.	Do you forget a change in your daily routine, such as a change in the place where something is kept, or a change in the time something happens?	❍	❍	❍	❍	❍
17.	Do you have to go back to check whether you have done something that you meant to do?	❍	❍	❍	❍	❍
18.	Do you find your mind wandering when you're doing something that needs your concentration?	❍	❍	❍	❍	❍
19.	Do you completely forget to take things with you, or leave things behind and have to go back and get them?	❍	❍	❍	❍	❍
20.	Do you decide to do something and then find yourself side-tracked into doing something different?	❍	❍	❍	❍	❍
21.	Do you start to read something (a book or an article in a magazine) without realizing you have read it before?	❍	❍	❍	❍	❍
22.	Do you completely forget to do things you said you would do, and things you planned to do?	❍	❍	❍	❍	❍
23.	Do you find you are not sure whether you have told someone a particular story or joke already?	❍	❍	❍	❍	❍
24.	Does it seem you are "running on automatic" without much awareness of what you're doing?	❍	❍	❍	❍	❍
25.	Do you find it hard to keep your mind on a task or job?	❍	❍	❍	❍	❍
26.	Do you do some routine thing more than once by mistake? For example, going to brush your teeth when you have just done so?	❍	❍	❍	❍	❍
27.	Do you begin to do something and then forget what you were supposed to be doing?	❍	❍	❍	❍	❍
28.	Do you lose your train of thought in conversation?	❍	❍	❍	❍	❍
29.	Do you have the feeling that you should be doing something, either now or later, but you can't remember what?	❍	❍	❍	❍	❍
30.	Do you leave some necessary step out of a task? For example, forgetting to put tea in the teapot.	❍	❍	❍	❍	❍
31.	Do you do jobs or tasks automatically without being aware of what you're doing?	❍	❍	❍	❍	❍
32.	Do you think you're paying attention to something when you're actually not (such as when reading a book or having a conversation)?	❍	❍	❍	❍	❍
33.	Do you forget to keep appointments that you don't write down?	❍	❍	❍	❍	❍

34.	Do you find you forget which way to turn on a road that you're quite familiar with but rarely use?	❍	❍	❍	❍	❍
35.	Are you unable to remember something that you had been told some time ago?	❍	❍	❍	❍	❍
36.	Do you have the 'what-am-I-here-for" feeling when you find you've forgotten what you went somewhere to do?	❍	❍	❍	❍	❍
37.	Do you do something automatically, or by habit, that you really wouldn't have done if you had thought more about it?	❍	❍	❍	❍	❍
38.	Do you find yourself *not* having done something you intended after having been interrupted unexpectedly?	❍	❍	❍	❍	❍
39.	Do you find yourself searching for something that you are actually carrying around with you?	❍	❍	❍	❍	❍
40.	Do you "lose your place" in the course of carrying out some fairly routine activity?	❍	❍	❍	❍	❍

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