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COGNITIVE MALLEABILITY: DOES DISGUST ACT AS A "STOP" SIGNAL ON CURRENTLY ACCESSIBLE COGNITIVE PROCESSING STYLES IN PERCEPTUAL AND CONCEPTUAL TASKS?

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COGNITIVE MALLEABILITY: DOES DISGUST ACT AS A “STOP” SIGNAL ON
CURRENTLY ACCESSIBLE COGNITIVE PROCESSING STYLES IN
PERCEPTUAL AND CONCEPTUAL TASKS?

A Dissertation Presented

by

ELICIA CHELSEY LAIR

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ABSTRACT

COGNITIVE MALLEABILITY: DOES DISGUST ACT AS A “STOP” SIGNAL ON CURRENTLY ACCESSIBLE COGNITIVE PROCESSING STYLES IN PERCEPTUAL AND CONCEPTUAL TASKS?

SEPTEMBER 2014

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Much of the research on feeling and thought supports the notion of a fixed relationship between affect and cognition, specifically that particular affective experiences promote particular ways of thinking (i.e., information processing styles). Surprisingly, little is known about the relationship between disgust and cognition, and this dissertation sought to rectify this omission. The recently proposed Cognitive Malleability approach (Clore, et al., 2001; Huntsinger & Clore, 2007; Isbell, 2010; Isbell, Lair, & Rovenpor, 2013) calls the fixed nature of the affect-cognition relationship into question, and instead argues that affect confers value on whatever information processing style is currently dominant. This new approach suggests that contrary to the current view of a fixed relationship between affect and cognition, this relationship is instead highly malleable. This dissertation had three primary research goals: (1) to determine whether disgust interacts with initial cognitive processing styles, (2) to investigate if a malleable relationship between disgust and cognition exists for both basic cognition (perceptual tasks) and upper-level cognition (conceptual tasks), and (3) to determine if disgust and cognition interact in low-disgust

relevant contexts (neutral stimuli, social judgments) and high-disgust relevant contexts (disgusting stimuli, moral judgments). Results reveal that disgust acts as a stop signal on currently dominant information processing styles to influence visual attention to emotional stimuli (Study 2), impression formation in a social context (Study 3), and impression formation in a moral context (Study 4). Results from Study 1, which investigated how disgust and initial processing styles interact to influence visual attention to neutral stimuli, were inconclusive.

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CHAPTER 1

INTRODUCTION

Affect and cognition are entwined processes that influence a vast array of daily experiences (Isbell & Lair, 2013). With each decade, emotion and cognition researchers have discovered new interactive pathways between what were once thought to be distinct processes. Although researchers now agree on the existence of a relationship between affect and cognition, there is still debate about why this relationship exists, and if there are limits on the extent to which these processes interact. The current research builds on the recent Cognitive Malleability approach (Clore et al., 2001; Clore & Huntsinger, 2007; Isbell, 2013; Isbell, Lair, & Rovenpor, 2013) to examine disgust, an important human experience that is infrequently explored. In doing so, the current work expands the affect and processing literature by systematically investigating the impact of disgust on cognitive processing in both perceptual (Studies 1-2) and conceptual (Studies 3-4) tasks. Further, this work extends research on disgust in the moral judgment domain (Study 4).

First, by drawing heavily on the affect-as-information approach (AAI, Schwarz & Clore, 1983, 2007), the current research examines the relationship between disgust and cognitive processing styles – that is, the impact of disgust on the extent to which people process information in a global (i.e., abstract, broad, top-down, peripheral, heuristic, big-picture) versus local (i.e., concrete, narrow, bottom-up, central, systematic, detailed) manner (Chaiken & Trope, 1999; Kimchi & Palmer, 1982; Köhler, 1929; Navon, 1977; Petty & Cacioppo, 1986). There is a broad consensus among psychological researchers that these are two fundamental ways in which people process information (Chaiken, 1980), and these differences in processing styles exert influence on a great deal of

processes or behaviors that are studied in social psychology (i.e., stereotyping, persuasion, attention, perception, judgments, for a complete review see Isbell & Lair, 2013). I propose that the experience of disgust, like other affective experiences, provides individuals with information about whatever processing style is currently accessible. Based on recent theorizing, I expect that disgust will act as a “stop” signal leading to the inhibition of the currently accessible cognitive processing style. Thus, when one is processing information in a global manner, disgust is likely to inhibit this processing style in favor of more local processing. Likewise, if local processing is dominant, disgust should inhibit this processing style in favor of a more global processing style. The current research empirically tests these predictions to establish whether disgust interacts with cognitive processing styles in the way that other emotions do. If support is obtained, such findings will provide compelling evidence for the cognitive malleability approach in a new domain.

Second, to provide a thorough and systematic examination of how disgust impacts cognitive processing, I tested the Cognitive Malleability framework in both perceptual (i.e., visual) and conceptual (i.e., impression formation) tasks, as well as in tasks for which the experience of disgust is either low or high in relevance. This latter factor is important to consider because emotional influences on judgments and processing are sometimes limited by their relevance to the task at hand, as I will describe in more detail in a later section. Given that disgust has not yet been widely researched, this dissertation sheds light on the interaction between disgust and cognition in a variety of contexts.

Third, while researchers studying moral judgments have recently begun to examine disgust, they have not yet examined this alongside cognitive information

processing styles. Yet moral judgments reflect complex processes that typically include an emotional component. Thus, testing and extending the cognitive malleability approach to the role of disgust in moral judgments represents a natural and important research direction. Moral judgments, like other judgments, can be influenced by either big-picture, gestalt-based information, or by specific, detailed information. Recent research has begun to examine these thinking styles in relation to moral judgments (Agerström, Björklund, & Carlsson, 2009; Eyal, Liberman, & Trope, 2008; Libby, Shaeffer, & Eibach, 2009), specifically by focusing on how construal level (first vs. third person point of view, Trope & Liberman, 2010) influences moral judgment, but this research has not yet examined how affect influences these construals. This dissertation therefore bridges the theoretical gaps between the affect, cognitive information processing styles, and morality literatures.

The first two studies examined how disgust interacts with cognition to influence visual perception tasks and specifically tested whether feeling disgusted produces an attentional bias for local stimuli (Studies 1 and 2) and disgusting stimuli (Study 2). Although fear and anxiety have often been studied in relation to visual attention, disgust has only been sparingly examined and therefore a more systematic test of disgust's influence on visual attention is necessary. The next set of studies (Studies 3 and 4) examined how disgust and cognitive processing interact to influence processing in more conceptual tasks, such as impression formation and moral judgment tasks. This set of studies provides a comprehensive examination of how disgust and cognition interact, and also significantly contributes to the social cognition literature. Finally, exploring this interaction in different domains was expected to reveal that the cognitive malleability effect, particularly when examined through disgust, is robust and generalizable.

In what follows, I first provide some useful definitions when discussing affect and cognitive processing, followed by evidence demonstrating the relationship between affect and cognition. Next, I describe and provide evidence for the Cognitive Malleability approach, and then describe the current findings on disgust and moral judgments. Finally, I describe four studies that test if disgust interacts with cognition in a manner consistent with the cognitive malleability approach.

Background Information

Affect, Moods, Emotions

Since psychology's infancy, researchers have often asked, "What is an emotion?" (James, 1890). Despite many attempts to provide clarity on this issue, this seemingly simple question has yet to be definitively answered. Over many years, researchers have proposed a number of definitional themes that have yielded a general, descriptive consensus. Most readily, researchers agree that valence (i.e., positivity or negativity; Ortony, Clore, & Collins, 1988; Russell, 2003), and the duration or intensity of the experience are central elements to any affective experience (Isbell & Burns, 2007; Morris, 1989; see Keltner & Lerner, 2010 for a review).

This dissertation will use terms that are consistent with the current emotion literature, and will refer to affect, moods, and emotions. *Affect* or an *affective experience* are generalized, umbrella terms that encapsulate moods and emotions. *Moods* are feelings that are low-intensity, long-lasting and do not have an accessible eliciting cause. *Emotions*, on the other hand, are feelings that are more discrete than moods, and are of shorter duration and greater intensity than moods. Unlike moods, emotions are tied to a specific and accessible eliciting cause (Morris, 1989). In general, moods and emotions

are those affective experiences that are brought to mind when people think of “feelings.” My dissertation examines specifically how particular emotions interact with cognition.

Cognitive Processing

Cognition is broadly defined as mental processes that relate to comprehension and learning, and consists of many psychological subdomains (e.g., memory, learning, attention, categorization, language, judgment, decision-making, perception, Neisser, 1976). Cognitive processing refers to the ways in which people incorporate information about their environment, and is an important factor to consider in social psychology, as different processing styles tend to produce different decisions, judgments, or actions (Chaiken, 1980; Köhler, 1929; Navon, 1977). There are two different processing styles that dominate the literature. Broadly speaking, these processing styles have been described with many different labels, but these labels generally overlap conceptually. For instance, the term *global* processing refers to heuristic, top-down, holistic, distal, and broadened processing, whereas the term local processing typically refers to systematic, bottom-up, central, detailed, proximal, and narrowed processing (Chaiken, 1980; Chaiken & Trope, 1999; Förster & Dannenberg, 2010; Kimchi & Palmer, 1982; Köhler, 1929; Navon, 1977; Petty & Cacioppo, 1986). Notably, these processing styles are always active, with global processing generally considered to be the default (Bruner, 1957; Kimchi & Palmer, 1982; Navon, 1977), but these styles can vary in their dominance depending on individual and contextual factors.

Generally, people processing globally, as compared to those processing locally, have a greater likelihood of using stereotypes, peripheral cues, or other mental “short-cuts” when making judgments or decisions, as their attention is drawn to these types of

information (Isbell & Lair, 2013). The outcomes produced by global and local processing are usually meaningfully different, which make these distinct processing styles one of high interest to social psychologists (Fiske & Taylor, 2008). For example, global processing may increase the reliance on stereotypes whereas local processing may reduce this reliance (Bodenhausen, 1993). This dissertation focuses exclusively on how discrete emotions interact with global and local cognitive processing styles to influence perceptions and judgments.

The Affect as Information (AAI) Approach

The AAI approach maintains that people use affect as a source of information when making judgments and when processing information (Schwarz & Clore, 1983; Wyer & Carlston, 1979). According to this and many other views, affect can impact both *what* we think, as well as *how* we think. For example, in a classic study, Schwarz and Clore (1983) demonstrated that people judged their life satisfaction more favorably when responding on sunny days as compared to rainy days. Although the sunshine was only episodic, the authors argued that the positive mood associated with a sunny day became absorbed into people's judgments of their general life-satisfaction. Importantly, the difference between rainy and sunny days was eliminated when people were reminded about the weather before answering. Thus, when people were given a reason for their heightened or depressed mood (the weather), they discounted this information when judging their life satisfaction. This research demonstrates that people use affect as a source of information when making judgments, except when individuals are led to discount their affect prior to making their judgment. Such effects, which are plentiful in the literature (Schwarz, 2002; Keltner, Locke, & Audrain, 1993, Wegener & Petty, 1997;

Wilson & Brekke, 1994; Strack & Hannover, 1996, Isbell & Wyer, 1999; Ottati & Isbell, 1996, Siemer & Reisenzein, 1998, Raghunathan & Pham, 1999), demonstrate that affect can influence *what* we think and can have a direct effect on judgments.

A separate line of work, which is the main focus of this dissertation, demonstrates that affect may instead influence *how* we think, that is the extent to which we process information in global, abstract ways versus local, concrete ones, as defined earlier. In this way, affect directs cognitive processing (Clore, 1992; Frijda, 1988; Schwarz, 1990; Wyer, Clore, & Isbell, 1999). According to this view, positive moods and emotions generally increase the likelihood of reliance on global processing (Bless, 2000, 2001; Bless & Schwarz, 1999; Bodenhausen, 1993; Bodenhausen, Kramer, & Süsner, 1994; Bodenhausen, Sheppard, & Kramer, 1994; Isbell, 2004; Isbell, Burns, & Haar, 2005; Isbell, Ottati, & Burns, 2006; Isen, 2002; Frederickson, 2001; Fredrickson & Branigan, 2005; Gasper & Clore, 2002) because such moods signal to the perceiver that the current environment is safe and benign (Schwarz & Clore, 2007). In contrast, negative moods and emotions tend to encourage local processing because, according to the AAI model, such affect signals to perceivers the presence of a problem in the environment (Bodenhausen, Sheppard, et al., 1994; Isbell et al., 2005; Isbell, et al., 2013; Lambert, Khan, Lickel, & Fricke, 1997; Park & Banaji, 2000; Tiedens & Linton, 2001). When presented with problems, a more detailed processing is typically useful in resolving them. Thus, our affective experiences are both functional and adaptive (Darwin, 1872/1965; Tooby & Cosmides, 2000; Damasio, 1994; Ekman, 1992; LeDoux, 1994; Mesquita & Frijda, 1992; Ortony & Turner, 1990).

Notably, negative affect tends to be more varied than positive affect in the ways that it can influence cognition. For example, anger encourages global processing, whereas disgust and fear tend to encourage local processing (Bodenhausen, Sheppard, et al., 1994; Lambert, Khan, Lickel, & Fricke, 1997; Park & Banaji, 2000; Parker & Isbell, 2010; Tiedens & Linton, 2001; Wyer et al., 1999). For example, anger is associated with an increased reliance on stereotypic information (Bodenhausen, Sheppard, et al., 1994), heuristic processing (Ask & Granhag, 2007; Small & Lerner, 2008), reliance on accessible scripts (Tiedens, 2001), and peripheral cues in persuasive argument contexts (Bodenhausen, Sheppard, et al., 1994; Tiedens & Linton, 2001). Therefore, anger seems to be a unique case of how emotion interacts with cognition and demonstrates that the informational influences of affective experiences on cognition depend on more than just affective valence.

Although affective valence is important, emotion and cognition researchers agree that affect is associated with a variety of cognitive constructs, such as cognitive appraisals (e.g., pleasantness, certainty, and situational control, (Smith & Ellsworth, 1985; Keltner, Ellsworth, & Edwards, 1993), action tendencies (e.g., Frijda, Kuipers, & ter Schure, 1989; Scherer, 1984), and motivations (e.g., approach or avoidance, Carver & Harmon-Jones, 2009; Gable & Harmon-Jones, 2010b) that are also useful in explaining the relationship between affect and cognitive processing styles. Using cognitive appraisals as an example, when people feel fear it is usually the combination of a physiological response and the cognitive appraisals about the environment (e.g., uncertainty, threat, or unpleasantness) that serve to inform individuals that what they are feeling is fear (e.g., Lerner & Keltner, 2000; Ortony et al., 1988). These cognitive

appraisals and the affective experiences that they produce become intertwined to such a degree that when a person feels fear, the cognitive constructs associated with fear are also activated, even in a situation where these appraisals, action tendencies, or motivations might not apply. Importantly, in these types of situations, affect activates these appraisal constructs, which can then serve to direct cognitive processing and influence downstream judgments (Frijda, 1986; Gable & Harmon-Jones, 2011; Harmon-Jones, Price, & Gable, 2012; Keltner, Ellsworth, et al., 1993; Lerner, Goldberg, & Tetlock, 1998; Lerner & Keltner, 2000, 2001; Lerner, Small, & Loewenstein, 2004; Tiedens & Linton, 2001).

Although the interaction between emotion and cognition has been well-established (for a complete review see Isbell & Lair, 2013), a recent theoretical approach suggests that the dedicated link between specific emotions and processing styles may not in fact exist at all. The cognitive malleability approach contends that affect can actually serve as a source of information about *cognitive processing styles* (Clore, et al., 2001; Clore & Huntsinger, 2007; Huntsinger, Isbell, & Clore, 2012; Huntsinger, 2012; Huntsinger, Isbell, & Clore, in press; Isbell, et al., 2013). In particular, this approach argues that some emotions and moods convey certainty (e.g., happiness, anger, Clore & Huntsinger, 2009; Lerner & Tiedens, 2006; Tiedens & Linton, 2006; Roseman, 1984) and therefore make people *more* likely to use whatever cognitive processing style is currently accessible at the moment, whereas other emotions and moods convey uncertainty (e.g., fear, sadness, Ortony et al., 1988; Roseman, 1984), which therefore make people *less* likely to use whatever cognitive processing style is currently accessible. In the section below, I present evidence for this new perspective of how emotion interacts with

cognition. This dissertation further exposes the cognitive malleability approach to rigorous empirical tests by extending the research to examine feelings of disgust.

The Cognitive Malleability Approach

The cognitive malleability approach extends the AAI model by positing that affective cues act as a “stop” or “go” signal that can either maintain or redirect an individual’s currently dominant cognitive processing style (Clore et al., 2001; Clore & Huntsinger, 2007, 2009; Huntsinger et al., 2012; Huntsinger, et al., in press; Isbell, 2010; Isbell, et al., 2013). This new theoretical approach suggests that affect provides information about whatever cognitive processing style is currently active. Unlike existing theoretical conceptualizations of affect and cognition, this approach explicitly states that there is no *dedicated* link between certain emotions and specific processing styles. Instead, whether happiness, fear, disgust, or any other emotion leads to either global or local processing depends on what processing style is currently dominant. Thus, for example, fear does not *always* produce a local processing style, nor does happiness *always* produce a global one, but rather the relationship between affect and cognition is highly malleable and easily changed in response to situational factors (Clore et al., 2001; Isbell, 2010; Isbell, et al., 2013).

Direct evidence for this perspective is very recent and limited, but has already been found in a variety of contexts and domains. For instance, research examining group categorization processes demonstrated that happy moods led individuals to perceive outgroup members to be more homogeneous than did sad moods; however, this was only true when global processing was primed. When local processing was primed, the opposite pattern emerged (Isbell, Lair, & Rovenpor, under review). Likewise, in research

examining the self-concept, individuals primed with global processing who then felt anger (vs. fear) were more likely to generate global, abstract (vs. local, concrete) self-descriptive statements. As predicted by the cognitive malleability account, these effects reversed under local processing conditions (Isbell, Rovenpor, & Lair, under review). Cognitive malleability also emerges for more basic cognitive processes, such as visual attention. For example, happy individuals primed with global processing displayed a wider attentional scope in a subsequent flanker task (see Eriksen & Eriksen, 1974) than did individuals in sad moods. Importantly, these effects reversed when local processing was primed (Huntsinger, 2012).

Cognitive malleability has also been demonstrated in impression formation tasks using novel situations to prime processing, such as prompting participants to think about their current, local psychological state (or not), or when their environment heightened their local awareness (or not) by using a neutral but unfamiliar odor. In one study (Huntsinger, et al., 2012), participants were asked to form an impression of “Carol”, and were provided with categorical information about Carol (that she is either an introverted librarian or extroverted sales representative) as well as detailed, behavioral information about Carol’s recent experiences – information that was mixed in its implication for introversion and extroversion. Participants who wrote about a happy (vs. sad) life experience were more likely to rely on the categorical, global trait information when forming impressions of Carol, but this effect reversed when they were exposed to primes that activated local processing.

Taken together, this new evidence sheds serious doubt on the notion that there is a dedicated link between particular emotions and particular cognitive processing styles, and

instead suggests that this relationship is highly malleable. Furthermore, this new approach does not contradict previous findings, but rather incorporates them into a new understanding of how affect influences cognition. Thus previous research is simply incomplete because it fails to manipulate processing styles. Therefore, this dissertation extends current research by systematically manipulating both processing styles and affect, and by examining disgust, an emotion which is thought by many researchers to have strong, dedicated path to local processing (Rozin & Fallon, 1987; Gable & Harmon-Jones, 2010a).

Disgust

Disgust has been defined as an intensely evocative emotion that produces a visceral, revulsion response (Olatunji & Sawchuk, 2005; Rozin & Fallon, 1987). This reaction can be felt in response to a variety of stimuli, such as human excrement, as well as morally wrong actions – both of which can elicit similarly disgusted reactions (Chapman, Kim, Susskind, & Anderson, 2009).

Much of the social cognition literature has focused on how happiness, sadness, anger, anxiety, or fear influence cognition, but disgust has rarely been examined. What little research exists has found that disgust leads to detailed processing and narrowed attention (Gable & Harmon-Jones, 2010a; Wyer, et al., 1999). For example, Gable and Harmon-Jones (2010a) found that participants completing a task that assesses global or local focus (Navon, 1977) were faster to respond to local (vs. global) trials when preceded by disgusting (vs. neutral) photos. These findings are explained by the cognitive malleability approach, as such findings may simply reflect the powerful stop signal provided by disgust on the naturally dominant global processing style (Navon, 1977).

That is, according to the cognitive malleability view, disgust should act as a “stop” signal, which would result in the inhibition of whatever cognitive processing style is currently dominant. Thus, it should be possible to reverse such effects by altering the dominant processing style from a global to a local one.

Disgust may, however, be a unique emotion that only conveys highly specific information to an individual concerning contamination or threat. If so, it is possible that disgust may not interact with cognitive processing styles in the manner predicted by the cognitive malleability perspective, but may instead have a highly specific and dedicated link to local processing. Consistent with this possibility, visual attention research has demonstrated that disgust induces a highly specific narrowed focus of attention: one that biases attention toward disgusting stimuli and makes it difficult to disengage attention and focus on a neutral task (Burke, Heuer, & Reisberg, 1992; Christianson, 1992; Carretié, Ruiz-Padial, López-Martín, & Albert, 2011; Krusemark & Li, 2011; Nobata, Hakoda, & Ninose, 2010). Some of this research (Krusemark & Li, 2011) suggests that disgust produces an even stronger attentional bias than anxiety (Broadbent & Broadbent, 1988; Easterbrook, 1959; Mathews & MacLeod, 1985). Although I expected disgust to act in a manner consistent with the cognitive malleability approach, this previous research makes it plausible that disgust may not. For this reason, I carefully designed the current studies to investigate this possibility.

Moral Judgments

Given my interest in examining disgust’s influence on cognitive processing, this dissertation also explores a domain in which disgust has most often been studied: moral judgments (Haidt, Rozin, McCauley, & Imada, 1997; Scherer, 1997; Wheatley & Haidt,

2005). Thus, the moral judgment domain is already established as highly disgust relevant, which provides an adequate test for the cognitive malleability approach. First, I briefly suggest ways in which processing styles might influence moral judgments, and then I review the limited literature found at the intersections of moral judgments, cognition, and disgust. In so doing, I argue why morality, in comparison to other domains, was chosen as the highly relevant context within which to study the cognitive malleability perspective for Study 4.

Moral Cognition

When people decide whether or not an action is moral, they consider information such as whether the behavior was intentional, caused harm, could have been avoided, and so on (Bartels, 2008). Sometimes people focus on the *outcomes* of actions (Consequentialism/Utilitarianism, Pettit, 1993;), whereas other times, people focus on the *actions* themselves and whether or not they meet a set of rules (Deontology, Darwall, 2003; Davis, 1993). These considerations require people to process information regarding actions, outcomes, rule compliance, and degree of harm; all of which would necessitate the activation of a detail-oriented cognitive processing style. For instance, the cognitive processes associated with category inclusion (e.g., whether a desk is a piece of furniture, Isen, 1987; Isen & Daubman, 1984) would be central when judging if actions meet a set of rules, which shows the potential importance of cognitive processing in moral cognition.

In support of this notion, researchers have recently begun examining the role of construal level (distance, point-of-view, abstraction) on moral judgments, and they have generally found that abstract thinking leads to more harsh judgments (e.g., Agerström &

Björklund, 2009; Eyal, et al., 2008; Libby, et al., 2009). Likewise, another recent approach situates moral judgments within a social cognitive framework (Cushman & Young, 2011). This approach takes a social cognitive perspective on the common philosophical and legal constructs that are often referred to in moral judgment research (e.g., action/omission, means/side-effect, and personal/impersonal distinctions, Hauser, Cushman, Young, Jin, & Mikhail, 2007; Ritov & Baron, 1990; Spranca, Minsk, & Baron, 1991), and provides evidence that these legal constructs are simply different labels for social cognitive mechanisms (e.g., causal or attribution cognitions, Heider, 1958). Thus, taken together, these new perspectives in the moral domain demonstrate that cognitive processing is an important aspect of moral judgments, but has typically been understudied, especially in conjunction with affect. For these reasons, the moral domain a good candidate for investigating the cognitive malleability approach and disgust.

Moral Emotions

Many researchers contend that emotional reactions are an important aspect of moral judgments (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Nichols & Mallon, 2006), but there is disagreement about how these emotional reactions, particularly disgust, contribute to moral judgment. Disgust has often been referred to as a moral emotion (Haidt, 2003; Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 1999), as it reflects cognitive appraisals of purity and justice (Lerner & Keltner, 2000, 2001). Yet others have questioned if this causal, direct link between disgust and moral judgments actually exists (David & Olatunji, 2011; Pizarro, Inbar, & Helion, 2011). For many decades, those interested in moral judgments thought that rational deliberation indicated an *inhibition* of affective responses (see Haidt, 2001 for a review), but more recently,

research has included emotion as an important aspect in moral deliberation (Cushman & Greene, 2011; Haidt, 2003; Moll, de Oliveira-Souza, & Zahn, 2008; see Haidt & Kesebir, 2010 for a review). Affect researchers have known for some time that affect and cognition interact in complex ways, and it therefore seems unlikely that these processes would not interact for moral judgments as well. Study 4 in this dissertation bridges the current gap in the morality literature, and brings a social cognitive and cognitive malleability approach to moral judgments.

Although affective reactions have long been discussed and theorized by philosophers and psychologists interested in moral judgments, this area of research only began systematic manipulations of disgust in 2005 (Wheatley & Haidt). In this initial study, participants were post-hypnotically primed whereby a particular word was subliminally paired with a disgusting word, and participants then read a story that either included or excluded the disgust-conditioned word. Participants who read the stories including this word were harsher in their moral judgments of the character in the story, as compared to those who read the story without the word. This finding has been corroborated by research that shows a more nuanced influence of disgust on moral judgments. For example, disgusted participants were more likely to make harsh moral judgments, but this effect was not moderated by individual disgust sensitivity, meaning greater feelings of disgust did not correspond to harsher judgments (David & Olatunji, 2011). Additionally, disgust only led to harsher judgments of purity violations (not harm or justice violations, Horberg, Oveis, Keltner, & Cohen, 2009), as well as personal (vs. impersonal) moral action scenarios (Ugazio, Lamm, & Singer, 2012). Other inductions of disgust, which included participants watching a disgusting video, sitting in a disgusting

room, remembering a disgusting experience, or smelling a disgusting odor, all led participants to judge morally ambiguous behaviors as more immoral than a control group (Schnall, Haidt, Clore, & Jordan, 2008). Therefore, it is clear that emotion has an influence on moral judgments, but it is not yet clear if this is a direct or indirect influence (Huebner, Dwyer, & Hauser, 2009), as few studies to date have systematically manipulated emotion, or considered the influence of processing style, which means that more research is needed in this area.

The body of work described above demonstrates the intersections between moral judgments, cognition, and emotion, and suggests that the moral domain is ripe for further scrutiny regarding moral judgments, cognitive processing, and affect. Additionally, it seems as if the moral judgment domain is confronting a familiar problem in the affect and cognition literature, namely, that exceptions to the rules about how affect and cognition operate with regard to moral processes keep cropping up in new research. Although moral researchers have not yet begun to systematically investigate both cognitive processes and emotion, I argue that the current evidence suggests that both affect and cognition influence moral deliberation. Finally, disgust has been rarely investigated in the social cognitive literature, but many more researchers in the moral domain have investigated the effects of disgust. For all of these reasons, morality is the logical choice to investigate disgust for the cognitive malleability approach in Study 4. Although not the primary focus or contribution of this dissertation, expanding the social cognitive literature into the moral judgment domain will be a secondary benefit of the proposed research.

Study Overview

In the following four studies I provide a comprehensive examination of how disgust interacts with cognitive processing styles. These studies reflect three primary research goals. The first goal was to extend the cognitive malleability approach by examining whether disgust and initial processing styles interact, and also whether cognitive malleability exists in the domains of visual attention, impression formation, and moral judgments. The second goal of this research was to examine whether disgust influences cognition in basic cognitive tasks (i.e., visual attentional, Studies 1 & 2) and higher-level cognitive tasks (i.e., impression formation, Studies 3 & 4). The third goal of this work was to determine if, within these cognitive domains, disgust influences cognition in both low relevance contexts (Studies 1 & 3) and high relevance contexts (Studies 2 & 4).

The first study establishes if incidental disgust (vs. happiness and sadness) interacts with cognition to influence the breadth of one's attentional scope on an emotionally neutral visual perceptual task. The second study examines if similar effects emerge when employing emotionally evocative stimuli to elicit affect as part of the perceptual task. This combination of studies allows me to establish if disgust interacts with cognitive processing, and also provides an opportunity to investigate the alternative hypothesis that disgust causes an attentional bias.

Studies 3 and 4 turn to the impact of disgust in conceptual tasks involving impression formation and moral assessment. Specifically, Study 3 establishes if disgust interacts with cognitive processing to influence impression formation even when the experience of disgust is irrelevant to the processing task at hand. Study 4 examines if disgust and cognitive processing interact to influence moral impression formation.

For all four studies, I hypothesized that happiness would act as a “go” signal that would promote the currently active processing style, leading participants to show effects that are consistent with the primed processing style. In contrast, I hypothesized that disgust and sadness would act as “stop” signals that will inhibit the currently active processing style leading participants to show effects that are consistent with the alternative processing style. Furthermore, I anticipated finding this interactive effect for tasks of both low and high relevance to disgust, as well as in both perceptual and conceptual domains. Thus, I hypothesized that those in the global prime and happy conditions would act similarly to those in the local prime and disgust/sad conditions, and likewise those in the local prime and happy conditions would act similarly to those in the global prime and disgust/sad conditions.

CHAPTER 2

STUDY 1

This experiment sought to extend the cognitive malleability literature by examining disgust (vs. happiness and sadness), and systematically investigating whether incidental disgust interacts with cognitive processing styles in an affectively neutral visual perceptual task. I hypothesized that disgust would act similarly to sadness (vs. happiness), and would lead to a rejection of currently accessible cognitive processing styles. Thus, when primed with global processing, I expected that disgust and sadness would narrow attentional scope compared to happiness; however, when primed with local processing, I expected that disgust and sadness would lead to broadened attention relative to happiness.

This study was conducted twice, because initial data collection coincided with the Boston Marathon bombing and the four days that authorities searched for the perpetrators in April 2013. I not only had concerns about the participants' affective states during that week and how those states would likely differ from the usual baseline, but I also was concerned that these states would interfere with one of the main goals of the study. Indeed, I manipulated affect by having participants write about a recent life event. Coding of the participants' stories revealed that participants tended to write about this attack. In fact, I found that participants who wrote about the Boston Marathon bombing often wrote about feeling several emotions simultaneously: sadness, disgust, fear, anger, and even optimism (about how the people of Boston responded to the attack). Although this data is still useful from a research standpoint, I had concerns about relying on it to test the main hypothesis in this study. For this reason, I ran the study a second time, the

following semester. The methods for the two studies are identical and are reported in separate sections (1A and 1B).

In this experiment, participants first completed a computerized cognitive processing style priming task in which they were asked to focus on either local or global elements of a letter display (Navon, 1977). Next, participants wrote a story to induce the target emotion (happiness, sadness, disgust) before completing a flanker task (Eriksen & Eriksen, 1974) followed by an optical illusion task, with the latter two tasks designed to assess participants' attentional scope. Finally, participants completed an affective manipulation check and a short demographics questionnaire.

Method

Participants and Design

Study 1A. A total of 178 participants (80.3% female) from the psychology participant pool were recruited for Study 1A and received 1 research credit as compensation to be used as extra credit in their psychology course. The average age participants reported is 19.87 years ($SD = 1.38$) and the sample is 75.3% Caucasian, 5.6% African-American, 12.9% Asian, 2.2% Hispanic, 1.7% mixed race, 0.6% other race. An additional 1.7% of the participants chose not to report their race.

Study 1B. A total of 154 participants (72.1% female) from the psychology participant pool were recruited for Study 1B and received 1 research credit as compensation to be used as extra credit in their psychology course. The average age participants reported is 20.02 years ($SD = 1.41$) and the sample is 76.6% Caucasian, 2.6% African-American, 11.7% Asian, 5.2% Hispanic, 1.9% mixed race. An additional 1.9% of the participants chose not to report their race.

Participants in Studies 1A and 1B were randomly assigned to one of six conditions in a 2 (global vs. local processing prime) x 3 (happy vs. sad vs. disgust) experimental design.

Manipulations

Cognitive processing prime. Global and local processing styles were primed using a letter identification task (Navon, 1977; procedure from Förster, Liberman, & Kuschel, 2008). In this task, participants were presented with a large image of a letter (e.g., “F”) that is comprised of a number of smaller letters (e.g., “H”s, see *Figure 1*). Participants in the global condition were asked to focus on and identify the large, global letter (e.g., “F”), whereas those in the local condition were asked to focus on and identify the small, local letters (e.g., “H”s). Participants who scored lower than 90% accuracy on this task were excluded from the analysis (Study 1A: $n = 20$; Study 1B: $n = 16$).

Affect manipulation. Participants were prompted to write a story about a recent event in which they felt happy, sad, or physically disgusted (*Life Event Inventory task*, Bless et al., 1996; Schnall, et al., 2008). They were asked to write about this event for 5 minutes using the instructions found in Appendix A.

Attentional Scope Measures

Flanker task. Participants completed a task in which they were instructed to identify the central letter in a row of letters. This task presents participants with either compatible trials in which all letters are the same letter as the central letter (e.g., HHHHH) or incompatible trials, in which the letters that flank the central letter are different (e.g., SSHSS, Eriksen & Eriksen, 1974; Rowe, Hirsh, & Anderson, 2007). Generally, it takes participants longer to identify incompatible trials, but previous

research shows that this reaction time difference is more pronounced when individuals are processing globally, because their scope of attention is widened, leading the flanking letters to be more distracting (Navon, 1977; Huntsinger, 2012). In contrast, individuals processing locally tend to have a more narrowed scope of attention, leading incompatible trials to be identified more quickly, and even to have similar reaction times to the compatible trials. After completing seven practice trials, participants completed three blocks of 96 randomly presented trials each (with interstimulus interval = 200 milliseconds). Trials also varied as a function of flanker spacing, with only 3 millimeters separating letters in the near trials, but 7 millimeters separating the letters in the far trials. Participants were informed of incorrect responses through a red error message displayed on the screen. In this task, participants were instructed to identify the central image as quickly as possible by pressing a button on the keyboard that corresponds to the central letter (e.g., H or S).

As is typical with reaction time data (Huntsinger, 2012), I excluded trials in which participants made errors (4.3% of total trials) and trials in which reaction time exceeded 1,000 milliseconds (0.47% of total trials). I then examined whether there are any main effects or interactions for the cognitive processing prime and affect manipulation for average reaction time and error rate, and no significant effects emerged (all F s < 1). I then excluded participants who scored below 90% accuracy on the flanker task (Study 1A: $n = 8$; Study 1B: $n = 2$).

Reaction times for compatible and incompatible trials were compared in the analysis to provide an estimate for attentional scope. Incompatible trials with long reaction times relative to the reaction times for compatible trials indicate broadened

visual attention (consistent with global processing), whereas more similar reaction times on incompatible and compatible trials indicate narrowed visual attention (consistent with local processing). These measures and procedures are standard when examining flanker task reaction time data and they have been used in previous research (Huntsinger, 2012; Rowe et al., 2007).

Ebbinghaus illusion measure. Participants were next instructed to compare two figures for 10 seconds. These two figures are from a classic optical illusion (Ebbinghaus illusion; Weintraub, 1979), in which identical circles are either surrounded by a set of smaller or larger circles (see *Figure 2a*). The mind is tricked by this illusion because the surrounding circles make the interior circle appear either larger or smaller than they actually are. After viewing the images for ten seconds, participants were asked to select the relative sizes of the two central circles from a 5-option visual scale that systematically altered the circles' size difference (see *Figure 2b*). I expected that when participants processed information globally, they would also incorporate more of these surrounding circles into their perception of the central circles and subsequently view them as different sizes. In contrast, I expected that those processing locally would be more likely to ignore the surrounding circles, and instead view the two central circles as similar in size. Thus global processors were expected to be influenced more by context compared to local processors. I minimized the inclusion of participants who were familiar with the Ebbinghaus illusion by asking participants at the end of the experiment if they were familiar with the figures shown in this task (1- *not familiar*, 2- *familiar*, 3- *not sure/can't remember*). An open-ended follow up question next asked them to explain what, if anything, they knew about the figure. Independent coders then rated these responses as

either revealing knowledge about the illusion, or not revealing relevant knowledge (Study 1A: $Kappa = .794, p < .001$; Study 1B: $Kappa = .812, p < .001$). Thus, participants who were coded as having knowledge of the illusion were excluded from the analyses of this measure (Study 1A: $n = 35, 19.6\%$ of total; Study 1B: $n = 18, 11.7\%$ of total).

Affect Manipulation Check

Participants then indicated the extent to which they felt various emotions *while they were writing their story* on a 7-point scale (1-*Not at all*, 4- *Moderately*, 7-*Extremely*; i.e., happy, sad, disgusted, angry, afraid, anxious, bored, certain of their beliefs, cheerful, confident, confused, depressed, distracted, grossed out, observant, queasy, sickened, tense, thoughtful, tired, and upset). To create composite scales, happy, cheerful and amused were averaged together (Study 1A: Cronbach's $\alpha = .886$; Study 1B: Cronbach's $\alpha = .850$), as were sad, depressed, and upset (Study 1A: Cronbach's $\alpha = .859$; Study 1B: Cronbach's $r = .870$), disgusted, queasy, sickened, and grossed out (Study 1A: Cronbach's $\alpha = .864$; Study 1B: Cronbach's $\alpha = .874$), and anxious, tense, and afraid (Study 1A: Cronbach's $\alpha = .776$; Study 1B: Cronbach's $\alpha = .740$). I planned to compare these composite scales to a single item measure for anger.

Finally, participants answered a short demographics questionnaire, which asked them to report their gender, race, and age.

Results for Study 1A

Affect Manipulation Check

When examining reports of happiness, sadness, disgust, anger, and fear while participants were writing their stories, the expected interaction emerged between emotion rating and affect condition, $F(8,576) = 90.15, p < .001, \eta_p^2 = .556$. However, only the

happy and sad condition participants reported affect ratings in the predicted directions. *Table 1* shows that the affect manipulations for the happy and sad conditions was successful, however, participants in the disgust condition reported feeling equal levels of disgust and sadness, and greater levels of anger than disgust. When I excluded the participants who wrote about the Boston Marathon attack, the affect manipulation check results for disgust do not improve. The wide variation in how people felt when writing their story also made selecting statistical outliers difficult, as the outlier analysis for the disgust condition did not show any affective responses out of the norm. Further, if I rely on independent coder ratings of the stories to exclude people who did not write exclusively about their randomly assigned target emotion (e.g., a story from the disgust condition that coders rated as containing elements of disgust, anger, and sadness rather than only disgust), the participant number dropped well below what is needed for sufficient statistical power.

Attentional Scope

First, to determine if the presentation block or flanker trial spacing influenced reaction times on the flanker task, I conducted a mixed analysis comparing block, flanker spacing, trial type, affect, and processing prime. No differences emerged as a function of block or flanker spacing (all F s < 1), so these two factors were removed from subsequent analyses. To determine if the processing primes and affect manipulations influenced reaction time differences between compatible and incompatible trials on the flanker task, I conducted a 2 (incompatible vs. compatible trial reaction time) x 2 (global vs. local processing prime) x 3 (happy vs. sad vs. disgust) repeated measure ANOVA. An overall difference between incompatible and compatible trials emerged, $F(1,144) = 615.33$, $p <$

.001, $\eta_p^2 = .810$, and this was in the expected direction such that participants took longer to identify the central letter in incompatible trials ($M = 322.15$ ms, $SD = 49.58$ ms) than in compatible ones ($M = 283.85$ ms, $SD = 43.81$ ms). The reaction time difference between trial type did not vary as a function of processing style, $F(1,144) = .56$, $p = .46$, affect manipulation, $F(2,144) = .237$, $p = .790$, or their interaction, $F(2,144) = .67$, $p = .513$. Additionally, no between-subjects main effects or interactions emerged (all $ps > .26$). Similarly, when analyzing the results of the Ebbinghaus illusion task, no significant main effects or interaction emerged (all $ps > .30$).

Results for Study 1B

Affect Manipulation Check

When examining reports of happiness, sadness, disgust, anger, and fear while participants were writing their stories, the expected interaction emerged between emotion rating and affect condition, $F(8,524) = 76.84$, $p < .001$, $\eta_p^2 = .540$. As the means in *Table 1* show, the happy and sad manipulations were successful, but the disgust condition was not, with participants feeling sad, disgust, and anger to a similar extent. Just as in Study 1A, the wide variation in how people felt when writing their stories also made selecting statistical outliers difficult, as the outlier analysis for the disgust condition did not reveal any participants responses outside of the normal range. Likewise, if I rely on independent coder ratings of the stories to exclude people who did not write exclusively about their target emotion (e.g., a story from the disgust condition that coders rated as having disgust, anger, and sadness instead of only disgust), the participant number drops below what is needed for sufficient statistical power.

Attentional Scope

First, to determine if the presentation block or flanker trial spacing influenced reaction times on the flanker task, I conducted a mixed analysis comparing block, flanker spacing, trial type, affect, and processing prime. No differences emerged as a function of block or flanker spacing (all F s < 1), so these two factors were removed from subsequent analyses. To determine if the processing primes and affect manipulations influenced reaction time differences between compatible and incompatible trials, I conducted a 2 (incompatible vs. compatible trial reaction time) x 2 (global vs. local processing prime) x 3 (happy vs. sad vs. disgust) repeated measure ANOVA. There was an overall difference between incompatible and compatible trials, $F(1,131) = 419.81, p < .001, \eta_p^2 = .762$, and this was in the expected direction such that participants took longer to identify the central letter in incompatible trials ($M = 327.71$ ms, $SD = 49.66$ ms) than compatible trials ($M = 299.01$ ms, $SD = 53.04$ ms). The reaction time difference between trial type did not vary as a function of processing style, $F(1,131) = .17, p = .68$, affect manipulation, $F(2,131) = .53, p = .59$, nor their interaction, $F(2,131) = 1.62, p = .20$. Additionally, no between-subjects main effects or interactions emerged, all p s > .08. These results remain the same when examining reaction time differences across the three different presentation blocks as a repeated measure factor, and when examining reaction time differences for near or far flanker distance (which was randomly varied throughout the flanker task). Similarly, when analyzing the results of the Ebbinghaus illusion task, no significant main effects or interactions emerged (all p s > .32).

Studies 1A and 1B Combined Analysis

When analyzing the data from both studies together, the flanker task results remain the same, with a main effect showing that incompatible trials were identified more

slowly than compatible trials, $F(1,235) = 927.31, p < .001, \eta_p^2 = .798$, but no other effects or interactions emerged, all $ps > .17$. Likewise, this joint analysis produced no changes in the Ebbinghaus illusion task responses, all $ps > .19$.

Given that the affect manipulation for happy and sad were relatively successful, if I exclude the disgust conditions from the analysis, I find similar effects for the flanker task as those reported above, with the incompatible trials identified slower than the compatible trials, $F(1,191) = 781.11, p < .001, \eta_p^2 = .804$, but no other significant effects emerged (all $ps > .07$). In contrast, when analyzing the Ebbinghaus illusion measure for attentional scope, there is a marginally significant interaction between the affect manipulation and processing prime, $F(1,161) = 3.65, p = .058, \eta_p^2 = .022$, and in the predicted manner (see *Figure 3*), such that those individuals feeling happy and globally primed were relatively more fooled by the illusion ($M = 2.48, SD = 1.40$), as were those feeling sad and locally primed ($M = 2.77, SD = 1.55$). In contrast, those individuals feeling happy and locally primed were relatively less fooled by the illusion ($M = 2.88, SD = 1.47$), as were those feeling sad and globally primed ($M = 3.24, SD = 1.51$).

Discussion

The affect manipulation for the disgust condition was not successful for either study. Comparing my procedure to the previously published procedures in which disgust was induced through writing a story (Schnall, et al., 2008), the instructions used in Studies 1A and 1B differed slightly from previous instructions. In previous work, participants were asked to write about a “*specific event that made them feel physically disgusted or sick to their stomach*” (emphasis mine). Due to concerns about confounding the disgust manipulation instructions with global and local context, I avoided concrete

language in the instructions, and instead instructed participants to write their stories using the language provided in Appendix A. Further, I used the same writing task procedure used in this study to manipulate disgust successfully in Study 3 (to be described later) but the sample in Study 3 was larger, and perhaps was more robust to the individual variance in response to the affective manipulation.

Due to unexpected problems manipulating disgust in the current studies, I cannot draw any conclusions about the nature of disgust on neutral visual attention tasks.

Further, even when comparing happy and sad conditions, the flanker task effect did not replicate previous research (Huntsinger, 2012). It is unclear why the flanker task did not work as predicted, nor as previous research would suggest. One difference between my procedure for Study 1 and the previously successful study is that I manipulated affect by having participants write about a life event, whereas Huntsinger (2012) manipulated affect through emotional music that played throughout the flanker task. The flanker task is a fairly boring and tedious task, therefore, it is possible that my affective manipulation wore off very quickly once the flanker task began, whereas Huntsinger's simultaneous manipulation served to prevent the flanker task from interfering with the affective manipulation.

Additionally, even when examining a novel attentional scope measure (i.e., Ebbinghaus illusion), only a marginal interaction emerged. Notably, this is in the predicted direction and supports the cognitive malleability hypothesis— but this analysis excludes disgust. Unfortunately, despite the multiple attempts to conduct this experiment, the fickle nature of the disgust manipulation and the temporal issues related to collecting data during the week of the Boston Marathon attack, the results of Study 1A and Study

1B do not contribute any potential answers to the research questions of this dissertation, especially when compared to the remaining three studies, which do provide evidence related to the primary research questions.

Although the results from Studies 1A and 1B are inconclusive, especially regarding the influence of disgust and initially active processing styles on a neutral visual attention task, Study 2 instead induces affect *during* the visual attention task (by using emotional stimuli), so I did not anticipate that the same affect manipulation problems would occur when conducting Study 2. Further, Study 2 is designed to not only examine attentional scope, but also attentional preferences for emotional and neutral stimuli.

CHAPTER 3

STUDY 2

Study 2 investigates the extent to which feelings of disgust that are elicited during a visual attention task (and in direct response to the task stimuli) interact to impact attentional scope. Using a novel adaptation of the flanker task, this study also specifically tested if disgust has a unique biasing effect on attention as compared to sadness or happiness. In accordance with predictions derived from the cognitive malleability perspective, I expected that *integral* disgust would interact with currently accessible cognitive processing styles to influence perceptual tasks, and that disgust would have a similar effect as sadness (vs. happiness). If no attentional bias emerged for emotional images, I hypothesized that the standard flanker task attention effect would emerge, such that those individuals feeling happy and primed locally, or feeling disgust or sadness and primed globally would have smaller reaction time differences between compatible and incompatible trials. In contrast, I hypothesized that those individuals feeling happy and primed globally, or feeling disgust or sadness and primed locally would have slower reaction times on incompatible trials relative to compatible trials.

The current study is also designed to test an alternative prediction. That is, given that disgust is an intense and highly specific emotion, it is possible that in situations in which disgust is clearly integral to the task at hand, it may serve to create a local attentional bias regardless of whether a global or local processing style is primed. If so, this would place the first limiting condition on the cognitive malleability hypothesis. On the other hand, the emotional flanker task, however, also allows me to test for attentional biases for emotional stimuli more generally (even for happy and sad stimuli), especially

because participants simultaneously experience the affective reactions to the stimuli tested. If emotional images are distracting, it is possible that certain emotional images (e.g., disgust) are more distracting than others. But it is also possible that the visual attention to emotional images can be enhanced or diminished by cognitive processing style, and is also dependent on the emotional cue that is provided by the affective reactions to the images themselves. Due to a dearth of previous research on this matter, I did not have firm hypotheses about which emotional images might produce bias, other than disgust, as evidence exists that it might draw attention (Carretié, et al., 2011). Thus, in addition to the analysis to compare all incompatible and compatible trials, I also examined reaction time differences between compatible and incompatible trials with emotional central images, and compare those to the reaction time differences between incompatible and compatible trials with neutral central images.

Emotional Flanker Pilot Task Study

A modified, emotional flanker task was created using the images selected by a pretest described in Appendix B. In addition to this pretest, I piloted the emotional flanker task to ensure that affect was influenced by the task itself, and also to examine what influence control (in which global and local processing styles are equally primed) or default (no processing style prime) processing styles and affect conditions would have on reaction times for incompatible and compatible trials. Following this pilot test, I describe the main study, which was designed to test the full set of hypotheses.

Method

Participants, Procedure, and Design

One hundred twelve participants (70.5% female) completed the pilot study. Participants completed a task which primed global and local processing styles equally or no processing prime, and then completed three blocks of 96 trials each of an emotional flanker task. After completing the emotional flanker task, they then answered various questions about their affective state, for both “now” and “during the task”, before answering a short demographics questionnaire. Participants were randomly assigned to one of six conditions in a 2 (equally primed vs. control processing prime) x 3 (happy vs. sad vs. disgust flanker task) between subjects design. Those who had low accuracy on the processing prime task were excluded from the analysis, ($n = 10$), as were those who scored lower than 90% accuracy on the emotional flanker task ($n = 7$), leaving 95 participants’ responses for analysis. The processing prime task exclusions were equally distributed across emotional conditions ($F < 1.2$), and neither the processing prime condition (equally primed vs. no prime) nor the emotional condition influenced the accuracy score on the flanker task (all F s < 0.6).

Manipulations and Measures

Cognitive processing prime. Half of the participants completed a map task used to equally prime global and local processing styles (Isbell, et al., 2013; adapted from Förster, Liberman, & Kuschel, 2008). In this task, participants are presented with a series of state maps (*Figure 4a*), and are instructed to focus on both the cities listed within the state (local information) and the shape of the states (global information). They then answer questions about either the global or local information about the map that they just viewed, such that sometimes they are asked information about the cities on the map (local information, e.g., “Was Independence a city on the map?”, *yes/no*), whereas other times

they are asked about the state shape (global information; *Figure 4b*). This task has been used successfully in our previous research to induce a mixed processing style, where neither a local or global processing style is dominant (Isbell, Lair, et al., under review). The other half of the participants completed no cognitive priming task prior to the emotional flanker task.

Emotional flanker task and affect manipulation. Similar to Study 1, participants completed a task in which they identified a central image in a row of images. Rather than responding to a letter display as in Study 1, participants instead saw neutral and emotional pictures (happy, sad, disgusting) as the central images or the flanking images (see *Figure 5* for example images). Only two images were used for each block of trials: one neutral image, and one emotional image that matched participants' affect condition (happy, sad, or disgust). Thus, the affect manipulation occurred by participants viewing the emotional images displayed during the emotional flanker task. Participants completed three blocks of 96 randomly presented trials each (with interstimulus interval = 200 milliseconds). Given that a new emotional and a new neutral image was used for each block, participants completed seven practice trials for each block to orient participants to the new images. Trials also varied as a function of flanker spacing, with approximately 2 millimeters separating images in the near trials, and approximately 6 millimeters separating the images in the far trials. Aside from using pictures as the stimuli in the flanker task, this task used an identical flanker presentation procedure as the one described in Study 1.

Trial exclusions for this flanker task also needed to be modified, as the standard 1,000 millisecond cut-off (used in Study 1) resulted in a large subset of the trials being

excluded from analysis (over 5% of total trials, as compared to 0.47% of total trials in Study 1). This is likely because letters, compared to images, are fairly easy to identify. A new cut-off point of 1,500 milliseconds produced a trial exclusion rate similar to Study 1, at .29%. Likewise, 4.8% of total trials were also excluded for incorrect responses (an exclusion rate that was consistent with Study 1).

Affect Manipulation Check

Similar to Study 1, participants next indicated how they felt *during the task* for various emotion items (identical to Study 1) on a 7-point response scale (1-*Not at all*, 4-*Moderately*, 7-*Extremely*). Responses were averaged together to create composite emotion scores: happy, cheerful, and amused (Cronbach's $\alpha = .672$); sad, depressed, and upset, (Cronbach's $\alpha = .804$); disgusted, queasy, sickened, and grossed out; Cronbach's $\alpha = .900$); tense and anxious (Cronbach's $\alpha = .809$), and angry was used as a single item measure.

Results and Discussion

Affect Manipulation Check

The emotional flanker condition influenced *during the task* emotion responses, as revealed by a mixed design, $F(4,178) = 2.70, p = .032, \eta_p^2 = .057$. These ratings were generally in the right direction, such that those in happy condition were more happy ($M = 2.23, SD = 1.04$) than sad ($M = 1.36, SD = .68; t(28) = 4.12, p < .001$, Cohen's $d = .841^1$), or disgusted ($M = 1.27, SD = 1.04; t(28) = 4.94, p < .001$, Cohen's $d = .811$). Participants in the sad condition, however, reported significantly more happiness during the task ($M = 2.46, SD = 1.02$) compared to sadness ($M = 1.82, SD = 1.10; t(30) = -2.84, p = .008$,

¹ Within-subjects simple effects calculated according to Morris and DeShon (2002)

Cohen's $d = -.502$), but they did report feeling more sadness than disgust ($M = 1.50$, $SD = .94$; $t(30) = 3.19$, $p = .003$, Cohen's $d = .359$). A similar pattern emerged for those in the disgust condition, such that they felt more happiness during the task ($M = 2.48$, $SD = 1.15$) than disgust ($M = 1.94$, $SD = 1.09$ $t(34) = -2.49$, $p = .018$, Cohen's $d = -.424$), but they did report feeling more disgust than sadness ($M = 1.45$, $SD = .64$; $t(34) = 2.98$, $p = .005$, Cohen's $d = .652$). Participants reported feeling equally low on anger and anxiety during the task, $F_s < 2$. None of the affective responses varied as a function of the processing prime condition, all $F_s < 1$. Given that affect was only measured after the task was over, it is likely that during that task the stimuli produced a slightly larger effect than the one reflected here. Further, affect is often experienced at the implicit level, and the results from both the image pretest (see Appendix B) and the emotional flanker pilot study, taken together, suggest that the selected stimuli produce a sufficient affect manipulation.

Emotional Flanker Reaction Times

Reaction times did not vary as a function of block, nor did they vary as a function of flanker image spacing (near vs. far), all $F_s < 1.2$, and these factors were removed from the analysis. Average trial reaction times were analyzed in a 2 (incompatible vs. compatible trial type) x 2 (emotional vs. neutral central image) x 2 (equally primed vs. no prime) x 3 (happy vs. sad vs. disgust) mixed ANOVA. As expected, the cognitive processing task that equally primed global and local styles was not significantly different from a no prime condition, all $F_s < 1$, so a subsequent analysis was conducted with the processing prime factor removed for ease of interpretation. The final analysis compared average trial reaction times in mixed ANOVA comparing trial type (incompatible vs.

compatible), central image type (emotional vs. neutral), and affect (happy vs. sad vs. disgust). The analysis revealed a significant main effect for trial type, $F(1,92) = 78.08, p < .001, \eta_p^2 = .459$, a significant main effect for central image type, $F(1,92) = 19.15, p < .001, \eta_p^2 = .172$, a two-way interaction between central image type and trial type, $F(1,92) = 19.09, p < .001, \eta_p^2 = .172$, and finally a significant 3-way interaction between trial type, central image type, and affect condition, $F(2,92) = 3.98, p = .022, \eta_p^2 = .080$.

Unpacking this interaction (shown in *Figure 6*, see *Table 2* for *Ms* and *SDs*) reveals that all participants identified compatible trials relatively faster than incompatible trials (happy: $F(1,28) = 10.26, p = .003, \eta_p^2 = .268$; sad: $F(1,30) = 25.19, p < .001, \eta_p^2 = .456$, disgust: $F(1,34) = 57.58, p < .001, \eta_p^2 = .629$). For participants in the happy condition, despite faster identifications for trials with emotional (vs. neutral) central images, $F(1,28) = 11.54, p = .002, \eta_p^2 = .292$, their reaction time differences between incompatible and compatible trials did not vary as a function of central image type—meaning they identified compatible (vs. incompatible) trials faster, regardless of whether the central image was neutral or emotional, $F(1,28) = .399, p = .533$. This suggests that for happy stimuli, there might be an attentional boost for identifying happy stimuli in general, but no simultaneous attentional bias that detracts from identifying neutral images with happy flankers.

For participants in the sad condition, they also had faster identifications for trials with emotional (vs. neutral) central images, $F(1,30) = 5.50, p = .026, \eta_p^2 = .155$, but their reaction time differences between incompatible and compatible trials did vary as a function of central image type, $F(1,30) = 7.58, p = .010, \eta_p^2 = .202$. The observed reaction times indicate that participants in the sad condition took longer to identify

incompatible trials with a neutral central image compared to trials with a sad central image, but took nearly equal time to identify compatible trials (whether they were all neutral or sad stimuli). This result suggests that when sad images serve as flankers around a neutral image, there is an attentional cost to identifying the neutral image.

In contrast, for participants in the disgust condition, they did not have faster identifications for emotional (vs. neutral) central images, $F(1,34) = 3.78, p = .060, \eta_p^2 = .101$, but their reaction times for differences between incompatible and compatible trials varied as a function of central image type, $F(1,34) = 16.70, p < .001, \eta_p^2 = .329$. Reaction times indicate that this attentional cost for negative stimuli is even more pronounced in the disgust condition, suggesting that although sad and disgusting images both produce an attentional cost when trying to identify neutral images, disgust images are somewhat more distracting from neutral stimuli than are sad images. Further, disgusting flanker images are even distracting when the central image is also the same disgusting image (as shown in *Table 2* and *Figure 6*). These findings suggest that sad and disgusting stimuli produce an attentional distraction when identifying neutral images, and that happy images provide an attentional boost when identifying happy images.

Main Study 2

Although the emotional flanker pilot study confirmed that in a modified, integral affect flanker task, an attentional bias exists for disgusting and sad stimuli (away from neutral stimuli), whereas an attentional boost exists for happy stimuli, the main Study 2 examined these effects under global and local priming conditions. Therefore, Study 2 tested for evidence of cognitive malleability for attentional influences of emotional stimuli. I hypothesized that the global processing prime would produce effects similar to

those found in the emotional flanker pilot study, that is, the happy condition would produce an attentional boost for happy stimuli, whereas sad and disgust conditions would produce an attentional bias when identifying neutral stimuli in incompatible trials. I hypothesized that these effects would reverse under local priming conditions, such that happiness would now produce an attentional bias against identifying neutral stimuli in incompatible trials, but that sad and disgust would boost attention when emotional images are identified.

Study 2 also included the attentional scope Ebbinghaus illusion task used in Study 1, I hypothesized that Study 2 could produce the same effect as shown marginally in Study 1, but because it is a neutral visual task, which included no emotional stimuli, I considered that the implicit affective manipulation might be insufficient to reproduce the effect found in Study 1.

Method

Participants, Design, and Procedure

A total of 207 participants from the psychology participant pool were recruited for the study and received one research credit as compensation to apply toward extra credit in their psychology course. All participants were randomly assigned to one of six conditions in a 2 (global vs. local processing prime) x 3 (disgust vs. happy vs. sad) experimental design. Participants completed either the local or global Navon letter identification task to prime processing style, identical to the one used in Study 1. Participants then completed a modified flanker task in which they were asked to identify the central image in a display of emotionally evocative or neutral images. After this task, participants completed the Ebbinghaus illusion task, identical to the one used in Study 1. Finally, participants

completed an affective manipulation check and answered a short demographic questionnaire.

Participants were excluded for below 80% accuracy on the Navon task ($n = 17$), and for below 90% accuracy on the emotional flanker task ($n = 4$). A multi-way frequency revealed that these exclusions had no significant relationship to the conditions or their interactions, $\chi^2(8) = 1.89, p = .984$. The remaining 186 participants (86% female) reported an average age of 19.65 years, ($SD = 1.72$) and the participants are 74.7% Caucasian, 2.7% African-American, 14.5% Asian, 3.8% Hispanic, 3.2% of mixed race, 0.5% of another race, and an additional 0.5% of participants chose not to report their race.

Manipulations and Materials

Cognitive processing prime. As in Study 1, global and local processing styles were primed using a letter identification task (Navon, 1977).

Photographic stimuli. These images were also used in the emotional flanker pilot study (described earlier). Images were chosen from the International Affective Picture System (IAPS) and were pretested to ensure that they evoked the target emotions (see Appendix B). These images consisted of disgusting, happy, sad, and neutral pictures (see Appendix B and *Table 9*). These images were used to integrally induce mood during the emotional flanker task (described below).

Attentional Scope Measures

Emotional flanker task and affect manipulation. The emotional flanker task tested in the pilot study was used in this experiment. Trial exclusions followed the same standard, such that those trials over 1,500 milliseconds were excluded (.39% of total

trials). Likewise, 3.7% of total trials were also excluded for incorrect responses. The overall trial exclusion rate was consistent with the rate reported for Study 1, and the emotional flanker pilot study.

Ebbinghaus illusion measure. After the emotional flanker task, participants then completed the identical Ebbinghaus Illusion task that was used in Study 1. Independent coders rated participant responses about their knowledge of the illusion (Kappa = .821, $p < .001$.), and I excluded 32 participants for having knowledge about the illusion.

Affect Manipulation Check

Participants next indicated how they felt *during the task* for a variety of emotion items (identical to Study 1 and the emotional flanker pilot study) on a 7-point response scale (1-*Not at all*, 4- *Moderately*, 7-*Extremely*). Responses were averaged together to create composite emotion scores: happy, cheerful, and amused (Cronbach's $\alpha = .726$); sad, depressed, and upset, (Cronbach's $\alpha = .794$); disgusted, queasy, sickened, and grossed out; Cronbach's $\alpha = .902$); tense and anxious (Cronbach's $\alpha = .832$). The item assessing anger was used as a single item measure.

Finally, participants completed a short demographics questionnaire that asked them to report their age, gender, and race.

Results

Affect Manipulation Check

The affect manipulation was generally successful, with a 3 (happy, sad, and disgust affective ratings) x 2 (global vs. local prime) x 3 (happy vs. disgust vs. sad affect conditions) mixed ANOVA revealing an interaction between affect ratings and affect condition, $F(4,360) = 5.99, p < .001, \eta_p^2 = .062$. These ratings are similar to those

reported in the emotional flanker pilot study, such that those in happy condition were more happy ($M = 2.63, SD = 1.28$) than sad ($M = 1.43, SD = .76; t(65) = 6.88, p < .001$, Cohen's $d = .870$), or disgusted ($M = 1.25, SD = .56; t(65) = 8.31, p < .001$, Cohen's $d = 1.161$). Participants in the sad condition, however, reported significantly more happiness ($M = 2.49, SD = 1.08$) during the task compared to sadness ($M = 1.81, SD = .98; t(58) = 3.70, p < .001$, Cohen's $d = .488$), but they did report feeling more sadness than disgust ($M = 1.35, SD = .63; t(65) = 4.13, p < .001$, Cohen's $d = .529$). A similar pattern emerged for those in the disgust condition, such that they felt more happiness ($M = 2.68, SD = 1.15$) than disgust during the task ($M = 1.90, SD = 1.23; t(60) = 4.21, p < .001$, Cohen's $d = .507$), but they felt more disgust than sadness ($M = 1.40, SD = .80; t(60) = 3.48, p = .001$, Cohen's $d = .456$). Participants reported feeling equally low on anger and anxiety during the task ($F_s < 1.2$).

Importantly, Bonferroni corrected, post-hoc simple effects reveal that those in the sad condition reported feeling significantly more sadness than those in the happy condition ($M_{Diff} = .38, SE = .15, p = .043$), and the disgust condition ($M_{Diff} = .41, SE = .16, p = .029$). Likewise, those in the disgust condition felt more disgust than those in the happy condition ($M_{Diff} = .64, SE = .15, p < .001$), and sad condition ($M_{Diff} = .55, SE = .15, p = .002$). Those in the happy condition reported equal levels of happiness to those in the disgust and sad conditions (omnibus $F < 1$, no post-hoc tests performed). These results are consistent with the affective responses from the emotional flanker pilot study.

Visual Attention

First, I conducted an analysis that compared reaction times on all three blocks of the emotional flanker task for block (1 vs. 2 vs. 3), flanker spacing (near vs. far), trial

type (incompatible vs. compatible trials), central image type (emotional vs. neutral), processing prime (global vs. local) and affect (happy vs. sad vs. disgust) in a mixed ANOVA. As expected, reaction times on trials did not vary as a function of block or flanker spacing (all relevant F s < 1), so these factors were removed for a subsequent analysis.

To determine if affect and initial processing styles influence attention to emotional or neutral stimuli, I used the same analytical approach from the emotional flanker pilot study, described earlier. I compared reaction times for incompatible and compatible trials that had a neutral central image (and therefore the incompatible trial had emotional distracting flankers) to reaction times for incompatible and compatible trials that had an emotional central image (and therefore the incompatible trial had neutral distracting flankers). A mixed ANOVA comparing affect (happy vs. sad vs. disgust), trial type (incompatible vs. compatible), central image (emotional vs. neutral) and initial processing prime (global vs. local) revealed there was a 4-way interaction between trial type, central image type, affect, and processing prime, $F(2,180) = 3.54, p = .031, \eta_p^2 = .038$ (see *Table 3a* for means and *Table 3b* for mean differences). When global processing was primed, the disgust condition produced the typical, expected effect, such that disgusting central images were identified more quickly when surrounded by neutral flankers (*Figure 7a*), but neutral central images were identified more slowly when surrounded by disgusting flankers (*Figure 7b*). This suggests that disgusting stimuli draw attention, which aids performance when identifying a disgusting image, but hurts performance when identifying a neutral image.

In contrast, the happy condition shows a reversed pattern, such that trials with a happy central image were identified more quickly when surrounded by other happy images (*Figure 7a*), and trials with neutral central images were also identified more quickly when surrounded by happy flankers (*Figure 7b*). This suggests that, regardless of whether the central image was neutral or happy, happy stimuli flankers increased identification of the central image. In contrast to the disgust condition, there was no increase in performance on trials in which happy images were surrounded by neutral flankers, which suggests that happy stimuli does not draw attention away from neutral images. The results from the global priming condition support previous research in attention to emotional stimuli, and suggest that disgusting stimuli draw attention from neutral cognitive tasks in a way that happy stimuli do not.

Notably, these “typical” effects found under global priming conditions, reversed under local priming conditions. When local processing styles were primed, incompatible trials in which disgusting stimuli surrounded a neutral central image were more quickly identified than trials with all neutral images (*Figure 7b*), whereas incompatible and compatible trials with an emotional central image were identified equally quickly (*Figure 7*). This suggests that under local priming conditions, disgusting stimuli surrounding a neutral central image are not distracting, but rather aid performance, just as happy stimuli aids performance on these trials under global priming conditions. Likewise, we also find a reversed pattern of results for the happy condition under local priming conditions, such that incompatible and compatible trials with a neutral central image are identified equally quickly (*Figure 7b*), but the incompatible trial of a happy central image surrounded by neutral flankers is now identified more quickly than the compatible happy image trial

(Figure 7a). This suggests that under local priming, happy stimuli surrounding a neutral central image are not helpful, but rather lessen performance, just as disgusting stimuli lessened performance on these trials under global priming conditions.

The sad condition did not produce any interpretable effects, as the sad condition differences were of a smaller magnitude than happy or disgust, and the results mimic the disgust condition for the neutral central image flanker trials, but mimic the happy condition for the emotional central image flanker trials.

Surprisingly, no overall flanker effect was found, such that incompatible trials did not generally take longer to identify than compatible trials ($F < 1$), nor did the differences between these trial types vary only as a function of processing prime or affect condition (all F s < 1.8). Additionally, analysis for the Ebbinghaus illusion task failed to replicate results from Study 1, with no main effects or interaction emerging for processing prime and affect condition, all F s < 2.09 . These results, taken together, suggest no evidence for attentional scope differences between conditions, but they do suggest that affect directs initial processing styles to influence attention to emotional and neutral stimuli.

Discussion

These results suggest that, although processing style and integral affect did not interact to influence general attentional scope, the attentional preferences for emotional or neutral stimuli (and subsequent biases or boosts) were dependent on the initial processing style. I found support for the cognitive malleability hypothesis, such that participants under global priming conditions showed the typical effects on attention, with disgusting stimuli as flankers distracting from neutral and disgusting central images, and happy stimuli enhancing attention for both types of central images. In contrast, this effect

reversed under local priming conditions, such that attention for neutral central images was enhanced for trials with disgusting flankers, but was depressed in trials with happy flankers. These results are subtly different than the results that emerged for the emotional flanker pilot study, which importantly demonstrates what occurs when global or local processing styles are *equally* dominant. In this way, for happy and disgust conditions, global priming in Study 2 seems to enhance the default effects found in the emotional flanker pilot study, and local priming then reversed these globally primed effects. Overall, the results of Study 2 suggest that attention researchers interested in understanding affective influences on attention need to consider initial processing styles, as attention to emotional stimuli is dependent on the type of emotion and the initial processing style.

Studies 1 and 2 were conducted to determine whether disgust and initial processing styles influence basic cognition, specifically visual attention. After demonstrating that disgust interacts with initial processing styles to influence attention to emotional and neutral stimuli in Study 2, I now turn to Studies 3 and 4, which were conducted to determine whether disgust interacts with initial processing styles to influence higher-level cognition, specifically social and moral impression formation.

CHAPTER 4

STUDY 3

The goal of Study 3 was to determine whether the relationship between cognitive processing and disgust is consistent with the cognitive malleability approach in more typical social contexts. To examine this, I used methods that have been successful at demonstrating cognitive malleability effects in previous research, namely an impression formation task in which global trait information is provided (i.e., extrovert vs. introvert), along with a series of behaviors that are both consistent and inconsistent with this global information (see Hunsinger, et al., 2013; Isbell, 2004). Consistent with this previous research, I hypothesized that if participants processed the information in a global manner, they would categorize and evaluate the target individual based on the initial global trait information that was provided (an introvert or extrovert). In contrast, if participants processed the information in a more local manner, I expected that they would analyze the contradictory behaviors that the target performed and rely on this behavioral information more heavily than the global trait information. I first ran this study in the laboratory, examining the influence of affect (happy, sad, and disgusted states), global target trait information (introvert or extrovert), and information processing prime (global or local) on impressions of the target (Study 3A), but the results failed to replicate any previous findings (even for happy and sad, see Appendix C for Study 3A method and results).

Due to not replicating the typical effects, I considered that it was possible that participants at UMass were simply not reacting to the vignette as they had in previous years. Upon speaking to our research assistants, they suggested that the target's name (i.e., Carol) was not as popular for their age demographic, and that the name led them to picture someone much older than our target (who was described as 32 years old in the vignettes). Further, nearly equal numbers of men and women participated in the previous

published studies, whereas our sample consisted of 80.9% female participants. For this reason, I conducted a second study (Study 3B) using Amazon's Mechanical Turk workers as participants (which tend to be more evenly split in gender), and I also changed the name of the target from Carol to Jennifer. Due to limited financial resources, I compared only happiness and disgust, which are the focus of the primary research questions of this dissertation.

I hypothesized that disgust would lead individuals to reject whatever cognitive processing style is currently accessible, such that when global processing is dominant, local processing would result, and vice versa. In contrast, I predicted that happiness should lead individuals to maintain their currently accessible processing style. I expected that those individuals feeling happy and globally primed or those feeling disgust and locally primed should rely more on the global trait information and less on the individual behaviors as a basis for their target judgments, compared to those individuals feeling happy and locally primed or those feeling disgust and globally primed. Reliance on global trait information should lead participants to judge the target (Jennifer) as relatively more introverted than extroverted (when she is portrayed as an introverted librarian) and relatively more extroverted than introverted (when she is portrayed as an extroverted sales representative). I predicted that those focusing on local, behavioral information would rate the target to be equally introverted and extroverted, regardless of whether she was described as an introverted librarian or extroverted sales representative. I also predicted that favorability judgments for the target would follow the same pattern for extroversion ratings (as previous studies showed that participants tended to prefer the extroverted sales representative over the introverted librarian). Thus, I predicted that

when participants judge the target as highly extroverted, they will rate her more favorably than when they judge the target as highly introverted.

Furthermore, I expected that participants relying on global trait information would report using less information to form their impression of the target compared to those relying on local information. Lastly, I predicted that participants relying on global trait information would also report that their impression was easier to form and more clear (because of their reliance on the global stereotype) than those relying on local, behavioral information (due to the conflicting behavioral information present in the vignette).

Method

Participants, Design, and Procedure

Six hundred one participants were recruited through Amazon's online Mechanical Turk community and completed the study in exchange for \$1.00. All participants were randomly assigned to one of 8 conditions in a processing prime (global vs. local) x affect (happy vs. disgust) x global trait information (introvert vs. extrovert) between-subjects factorial design. Participants first completed a map task that primed either global or local processing styles (as used in the emotional flanker pilot study), after which they wrote a story about a recent life event in which they felt happy or physically disgusted (as used in Study 1). They then read a vignette about the target (Jennifer), which presented global trait information about her (i.e., that she is an introverted librarian vs. extroverted sales representative) as well as local behavioral information (that was identical in each vignette). After reading about the target, they then reported their overall evaluation of the target (favorability), as well as trait ratings of the target (introversion vs. extroversion).

Finally, participants completed an affect manipulation check and a brief demographics questionnaire.

To ensure the quality of the responses (given that this experiment was conducted online), I excluded participants who were in the bottom 5% of total time spent taking survey (<10 minutes, $n = 27$), as well as those who were 2.5 standard deviations (SDs) above the mean in time spent taking the survey (>30 minutes, $n = 15$). I also excluded those who answered less than 5 correct on the map task processing prime manipulation ($n = 16$) and those who could not recall the target's occupation ($n = 13$). A multi-way frequency analysis including all conditions revealed there were no significant differences in these 71 exclusions (11.8% of total sample) across conditions, $\chi^2(10) = 4.57, p = .918$. Of the remaining 530 remaining participants (58.4% female), the average age is 37.69 years ($SD = 12.87$), and 82.3% are Caucasian, 3.8% are African-American, 4.9% are Asian, 5.8% are Hispanic, 1.1% are mixed race, 1.5% are Pacific Islander/Native American, 0.2% are another race or ethnicity, and 0.2% of participants chose not to report their race. Participant education level was fairly high as 15.1% earned a post-baccalaureate degree, 38.3% earned a bachelor's degree, 10.8% earned an associate's degree, 25.7% attended some college, 9.2% earned a high school degree or GED, and 0.9% attended some high school.

Manipulations

Processing prime. Information processing styles were primed using the same map task as described in the emotional flanker pilot study, but this time participants were instructed to focus on either the shape of the state (global prime) or the cities in the state (local prime). After a practice trial, participants viewed 7 maps, each of which was

followed by a question asking either about the shape of the state or about the cities within the state (procedure adapted from Förster, et al., 2008; used successfully in an online setting, Isbell, Rovenpor, et al., under review; see *Figure 4*).

Affect manipulation. To manipulate affect, participants wrote about a recent life event in which they felt happy or physically disgusted (identical to the task used in Studies 1A and 1B, see Appendix A; Bless et al., 2001; Schnall, et al., 2008). Two independent coders rated the content of the stories, and agreed that over 90% of participants wrote about the target emotion in their stories. The coder agreement for the happiness content of the stories was quite high ($Kappa = .970, p < .001$), and the agreement for the physically disgusting content of the stories was also adequate ($Kappa = .760, p < .001$).

Global trait information. Participants read a vignette describing an unknown person named Jennifer (see Appendix D). One version of the vignette described the daily life of an introverted librarian and the other version described the daily life of an extroverted salesperson. The detailed behaviors that the target performed are identical, as both vignettes contained equal numbers of introverted and extroverted behaviors. This vignette and adaptations of it have been successful in showing affect-induced cognitive processing style effects in previous research (Hunsinger et al., 2012; Isbell, 2004).

General Evaluations of the Target

Feeling thermometer rating. After reading the vignette, participants rated their feelings toward Jennifer using a feeling thermometer on which they could choose a number between 0 to 100 to capture their impression. On this measure, ratings between 0 and 49 meant that they felt unfavorable toward Jennifer, whereas those from 51 to 100

meant that they felt favorable toward Jennifer. A rating of 50 meant that they felt neutral toward Jennifer.

Overall favorability. Participants also reported the extent to which they felt favorably toward Jennifer, how positively they felt toward her, and how likable they found her to be on three separate scales, which ranged from -5 (*very unfavorable/negative/unlikable*) to +5 (*very favorable/positive/likable*). These three items were averaged together to create an overall favorability score (Cronbach's $\alpha = .913$).

Target Trait Judgments

Social thermometer rating. Participants rated how much they felt Jennifer is introverted or extroverted on a social thermometer scale, where ratings between 0 and 49 indicate that Jennifer is introverted and shy, and ratings between 51 and 100 indicate that Jennifer is extroverted and sociable. Ratings of 50 indicate perceptions of Jennifer as equally introverted and extroverted.

Trait ratings. Participants next rated the extent to which they thought Jennifer exhibited extroverted traits (talkative, self-confident, extroverted, sociable, outgoing; Cronbach's $\alpha = .879$) and introverted traits (withdrawn, shy, introverted, a loner, and quiet; Cronbach's $\alpha = .854$) on an 11-point scale (from 0-*Not at all*, 5-*Somewhat*, 10-*Extremely*).

Impression Formation Process

Amount of information used for impression formation. Next, participants reported how much of the information they considered when forming their impression of Jennifer (1- *Very Little Information*, 2- *Only about Half of the information*, 3- *Most of the information*, 4- *Almost all of the information*).

Impression clarity. Participants also rated how difficult it was to form an impression of Jennifer on an 11-point scale, (0-*Not at all difficult*, to 10- *Very difficult*, reverse scored for composite), and how clear of an impression they were able to form (0- *Not at all clear*, to 10- *Very clear*). These two items were averaged together to create an impression clarity score (Cronbach's $\alpha = .80$).

Affect Manipulation Check

Participants reported the extent to which they felt particular emotions (happy, disgusted, sad, angry, anxious, cheerful, sickened, tense, and upset) *when they were writing their story* on an 11-point scale (0- *Not at all*, 10- *Extremely*). Happy and cheerful were averaged together to create a happiness composite (Cronbach's $\alpha = .950$), disgusted and sickened were combined to create a disgust composite (Cronbach's $\alpha = .958$), sad and upset were combined to create a sadness composite (Cronbach's $\alpha = .902$), and tense and anxious were combined to create an anxiety composite (Cronbach's $\alpha = .843$). Anger remained a single item affect measure.

Results

For presentation clarity, when discussing the results from Study 3 (and also from Study 4) I will sometimes refer to those “processing globally” (global prime + happy and local prime + disgust conditions) and those “processing locally” (local prime + happy and global prime + disgust conditions). Given that the cognitive malleability account only argues for inhibition or promotion of already active processing styles, this shorthand wording simply groups participants together by the predicted manner in which I expected participants in these particular conditions to respond. This wording is neither meant to

imply that there is additivity of these effects, nor that the results described definitively infer that either global or local processing occurred.

Affect Manipulation Check

A repeated measure ANOVA comparing happy and disgusted composite emotions revealed that the affect manipulation was successful, $F(1,465) = 554.94, p < .001, \eta_p^2 = .516$. Participants in the happy condition reported feeling more happy ($M = 7.21, SD = 2.49$) than disgusted ($M = 0.29, SD = .97; t(253) = 38.79, p < .001$, Cohen's $d = 3.660$) and those in the disgust condition reported feeling more disgust ($M = 5.13, SD = 3.64$) than happiness ($M = 2.54, SD = 2.76; t(274) = 7.18, p < .001$, Cohen's $d = .802$). Those in the happy condition also reported significantly more happiness than anger or anxiety (both simple effects $ps < .001$), likewise those in the disgust condition reported feeling more disgust than anger or anxiety (both simple effects $ps < .01$).

General Evaluations of the Target

Feeling thermometer rating. Consistent with the cognitive malleability approach, and my hypotheses, the results demonstrate that affect and information processing primes interact to influence general evaluations of Jennifer. For the feeling thermometer rating², a significant three-way interaction emerged, $F(1,379) = 7.71, p = .006, \eta_p^2 = .020$. As shown in *Table 4* and *Figure 8*, when Jennifer was described as an extroverted sales representative, those processing globally (global + happy and local + disgust) rated Jennifer more favorably than those processing locally (local + happy and

² Note: Due to the online survey presentation of a gray response box on a gray background, 27% of participants had trouble seeing the box and failed to enter a response for the feeling thermometer. I had intended to standardize all favorability judgments and create a composite favorability rating, but given that 27% of participants did not respond to the feeling thermometer item, I had concerns about the interpretability of this composite measure.

global + disgust; $F(1,188) = 6.40, p = .012, \eta_p^2 = .033$). This pattern reversed when Jennifer was described as an introverted librarian, such that those processing globally (global + happy and local + disgust) rated Jennifer less favorably than those processing locally (local + happy and global + disgust; $F(1,191) = 1.78, p = .184$). No other significant main effects or interactions emerged (all $ps > .29$).

Overall favorability. The overall favorability score (which included favorability, likability, and positivity judgments) showed a similar pattern of results, $F(1,522) = 5.46, p = .020, \eta_p^2 = .010$. As shown in *Table 5* and *Figure 9*, when Jennifer was an extroverted sales representative, those processing globally (global + happy and local + disgust) rated Jennifer more favorably than those processing locally (local + happy and global + disgust; $F(1,257) = 4.55, p = .034, \eta_p^2 = .017$). This pattern reversed when Jennifer was an introverted librarian, such that those processing globally (global + happy and local + disgust) rated Jennifer less favorably than those processing locally (local + happy and global + disgust; $F(1,265) = 1.26, p = .263$). No other significant main effects or interactions emerged (all $ps > .19$). Both the feeling thermometer and the overall favorability ratings produced results that support the cognitive malleability account. The similarity of these results was expected, as the feeling thermometer and overall favorability ratings were highly correlated, Pearson's $r(387) = .829, p < .001$.

Target Trait Judgments

Social thermometer rating. Contrary to expectations, affect, processing prime, and stereotype information did not interact to influence participants' social thermometer ratings; however, a main effect emerged for stereotype information, revealing that participants rated the sales representative ($M = 63.22, SD = 16.41$) to be more extroverted

than the librarian ($M = 51.63$, $SD = 15.57$; $F(1,516) = 68.09$, $p < .001$, $\eta_p^2 = .117$).

Additionally, a main effect of affect emerged with those feeling disgusted rating Jennifer as more extroverted ($M = 59.28$, $SD = 16.97$) than those feeling happy ($M = 55.29$, $SD = 16.82$; $F(1,516) = 7.82$, $p = .005$, $\eta_p^2 = .015$). No other interactions or main effects emerged, all $ps > .065$. As expected, the social thermometer rating was positively correlated with trait ratings of extroversion, Pearson's $r(524) = .671$, $p < .001$, and negatively correlated with trait ratings of introversion, Pearson's $r(524) = -.641$, $p < .001$.

Trait ratings. Consistent with the findings just reported, a mixed analysis of participants' ratings of the target on the introverted and extroverted traits as a function of affect, processing prime, and stereotype information, failed to reveal the predicted interaction, $F(1,522) = 0$, $p = .984$. Participants perceived Jennifer to be more extroverted ($M = 5.94$, $SD = 1.81$) than introverted ($M = 5.04$, $SD = 1.88$, $F(1,522) = 51.72$, $p < .001$, $\eta_p^2 = .090$); however, this main effect was qualified by three two-way interactions. First, not surprisingly, an interaction between the trait ratings and stereotype information emerged, revealing that participants rated the librarian to be more introverted ($M = 5.73$, $SD = 1.70$) than extroverted ($M = 5.23$, $SD = 1.64$) and the sales representative to be more extroverted ($M = 6.66$, $SD = 1.68$) than introverted ($M = 4.33$, $SD = 1.80$; $F(1,522) = 123.12$, $p < .001$, $\eta_p^2 = .191$). This finding essentially confirms that the stereotypic, global trait information was successfully manipulated.

A second, unpredicted interaction emerged between trait ratings and information processing prime, $F(1,522) = 5.97$, $p = .015$, $\eta_p^2 = .011$, revealing that locally primed participants judged the target to be more extroverted ($M = 6.08$, $SD = 1.82$) than introverted ($M = 4.85$, $SD = 1.89$), whereas globally primed participants rated the target

similarly on both extroversion ($M = 5.80$, $SD = 1.78$) and introversion ($M = 5.23$, $SD = 1.85$). Finally, the third, unpredicted two-way interaction emerged between trait ratings and affect, $F(1,522) = 4.61$, $p = .032$, $\eta_p^2 = .009$, revealing that those in the happy condition rated the target to be only slightly more extroverted ($M = 5.80$, $SD = 1.83$) than introverted ($M = 5.21$, $SD = 1.88$), whereas those in the disgust condition rated her to be significantly more extroverted ($M = 6.06$, $SD = 1.78$) than introverted ($M = 4.89$, $SD = 1.87$). No other significant within-participant effects emerged³, all $ps > .36$. It is unclear why these two unpredicted interactions emerged and, given the absence of a higher-order interaction involving all of the manipulated variables, the findings are difficult to interpret; however, these findings do not lend support to the cognitive malleability hypothesis.

Impression Formation Process

Amount of information used for impression formation. Participants reported differences in how much information they used when forming their impression. A between-subjects ANOVA as a function of processing prime, affect, and global trait information factors revealed a 2-way interaction between processing prime and affect condition, $F(1,522) = 4.11$, $p = .043$, $\eta_p^2 = .008$. These differences occurred in the expected direction, such that those primed globally and in the happy condition reported using relatively less information when forming their impression of Jennifer ($M = 3.66$, $SD = .55$), compared to those in the disgust condition ($M = 3.77$, $SD = .45$; $t(269) = 1.84$, $p = .066$). In contrast, those locally primed and in the happy condition used relatively

³ The only other significant effect in this analysis was a between-subjects interaction between processing prime and affect, $F(1,522) = 5.24$, $p = .023$, $\eta_p^2 = .010$. Functionally, this is an average between the introvert and extrovert trait ratings, which is not interpretable.

more information ($M = 3.78$, $SD = .43$) than those in the disgust condition ($M = 3.72$, $SD = .46$; $t(257) = 1.012$, $p = .312$).

Impression clarity. As expected, participant ratings of impression clarity also reveal the predicted pattern of results. Participants' composite impression clarity ratings were analyzed as a function of processing prime (global vs. local), affect (happy vs. disgust) and stereotype information (librarian vs. sales representative). As expected, this analysis revealed a three-way interaction between these variables, $F(1,520) = 5.79$, $p = .016$, $\eta_p^2 = .011$. As shown in *Table 6* and *Figure 10*, those who processed globally (global + happy and local + disgust) reported greater ease and clarity in forming their impression of Jennifer when she was an extroverted sales representative compared to when she was an introverted librarian. Those who processed locally (local + happy and global + disgust) reported no differences in impression clarity, regardless of whether she was an extroverted sales representative or an introverted librarian. These results provide support for the cognitive malleability approach.

Discussion

The results of Study 3 suggest that disgust and happiness do confer relatively opposite types of information about currently active processing styles when forming an impression of a target individual. I showed that target favorability judgments were influenced by an interaction between affect, primed cognitive processing styles, and global stereotype information. I demonstrated that disgust does influence the currently active processing style, namely that those processing globally (participants in global + happy and local + disgust conditions) perceived the target more favorably when portrayed as an extroverted sales representative, but those processing locally (participants in local +

happy and global + disgust conditions) judged the target more favorably when portrayed as an introverted librarian. I had hypothesized that these favorability judgments would follow ratings of extroversion, as previous research had shown that the target in the story was more liked when she was perceived as more extroverted, but this finding did not emerge in this study, nor were they strongly correlated (extroversion with feeling thermometer, Pearson's $r(387) = -.208, p < .001$; extroversion with overall favorability: Pearson's $r(530) = .159, p < .001$).

One explanation for these results is that these differences in favorability are due to the fluency behind the impression formation, or also known as the ease with which participants formed their impressions. Importantly, the vignettes provided global information about Jennifer (extroverted sales representative vs. introverted librarian) and then proceeded to describe Jennifer's behavior in equally introverted and extroverted ways. These behaviors were not ambiguous, but were a balanced mix of introverted and extroverted behaviors. The people who were focusing on the details (those in the happy and local or disgust and global conditions) were likely confused by her contradictory actions. For instance, at some times in the story Jennifer was outgoing (i.e., in school), but then at other times in the story she was shy (i.e., in the bar with Greg). In contrast, those focusing on a general impression of Jennifer, and relying more on the global trait information (those in the happy and global or disgust and local conditions) were less likely to focus on these inconsistencies in her behavior. My results support this notion, as the analysis on the amount of information considered when forming the impression show that global processors (participants in global + happy and local + disgust conditions) relied on relatively less information than local processors (participants in local + happy

and global + disgust conditions). An interaction was also found on how easily and clearly they were able to form an impression of Jennifer, which show the same pattern as the favorability judgments. Therefore, the relative fluency or disfluency created by the interaction between affect and initial processing style likely bled over into their overall favorability judgment of Jennifer (as it is likely that people who are perceived as highly erratic in their behavior are often not perceived as highly favorable).

I did not find the expected pattern of interaction for the trait rating comparisons of introversion and extroversion. Notably, even those in the happy condition did not replicate the previous trait rating comparisons found in previous work. This suggests to me that it is possible that my manipulations were too subtle to influence these trait judgments, which were measured after the favorability ratings.

Overall, Study 3B produced nearly all of the expected effects, and happiness and disgust interacted with initial processing styles in the predicted manner, which provides support for the cognitive malleability account in a higher-level cognitive task with low disgust relevance.

CHAPTER 5

STUDY 4

The purpose of this study was to examine if affect and cognitive processing styles interact in a way consistent with the malleability approach in high disgust relevant contexts (e.g., moral judgments). Similar to Study 3, I manipulated global trait information about a target individual, so that I could determine whether participants relied on global or local information when forming an impression of the target individual. In this study, participants received global categorical information that was morally relevant (membership in a moral or immoral group) as well as a series of morally ambiguous behaviors that the target performed. As in Study 3, the information was varied in this way to allow me to identify under what conditions participants rely on the global categorical information (i.e., by processing information in a more global manner) versus the local behavioral information (i.e., by processing information in a more local manner). Given that cognitive processing styles have not previously been examined in moral judgment contexts, it was an open question as to whether the effects that have been identified in general social impression formation contexts would generalize to a more specific and emotionally charged context, (i.e., moral judgments). For instance, it is possible that when people make moral judgments about others, they might attempt to be as objective as possible. If this is the case, people might avoid using categorical information when morally judging others, and prefer judging a person based upon their actions, instead.

For this reason, I also considered the possibility that information processing styles (dependent on initial processing prime and affect) may influence the extent to which individuals incorporate a person's actions into an overall judgment of that person. In

other words, it is possible that in moral judgments a categorical or configural thinking style might promote a black and white view of morality (e.g., if a person's actions are bad, they are also a bad person). In contrast, an elemental or detailed thinking style might promote a more nuanced, grayscale view of morality (e.g., if a person's actions are bad, they are not necessarily also a bad person). That is, I expected that those processing globally (global + happy and local + disgust conditions) would not differentiate between Jack's actions and Jack, as a person, whereas those processing locally (local + happy and global + disgust conditions) would be more likely to make this differentiation between a person and their actions. Very recent research showing that third-person construal level (similar to abstract thinking) produces harsher moral judgments (e.g., Libby, et al., 2009), which supports my hypothesis that moral judgments would be harsher when affect and information processing primes interact to produce more reliance on categories (i.e., process information in more global manner).

In order to manipulate morally-relevant global trait information, participants needed to learn moral stereotypes that could be applied to an individual. To avoid confounds associated with real-life moral groups (e.g., criminals, volunteers at a soup kitchen), this study had participants learn about fictional groups of people that differed in their moral character. Therefore, participants first completed a group stereotype training session to learn stereotypes about these fictional groups (pilot test described below), before beginning the experimental manipulations. In the group stereotype training session, participants learned about group stereotypes and were also trained to identify members of each type of novel group. After a short distractor task, participants completed processing style and emotional manipulations, and then read a vignette about an

individual from either the fictitious moral or immoral group. Participants next answered questions about their impression and reported judgments of the target individual. This experimental design required extensive pretesting of stimulus materials and tasks prior to the full Study 4 description, and the pretests for the impression formation vignette (Appendix E) and group names (Appendix F) are included as appendices. The group stereotype training task was piloted before the main Study 4 to ensure that participants adequately learned the group stereotypes, and is described below.

Group Stereotype Pilot Study

This pilot study was conducted to establish that participants would be sufficiently aware of the moral group stereotypes to be used in the main study, to select the final prototypical member descriptions for use in the training portion of the experiment, and to assess the emotional impact of the group stereotype training and distractor tasks to be used in Study 4. The first goal of this pretest was to determine if participants implicitly learned that one group was moral (the Vassers), one group was immoral (the Haplins) and one group was sporty (the Watkins), as compared to explicitly reading information about the desired qualities of group members. In this pretest, half of the participants were only given information about prototypical group members, whereas the other half of participants were given additional information about the group itself (e.g., what values the group stands for). One reason I wanted to compare these two types of information, is because for the main study, I wanted to know that participants would be able to implicitly learn the different group stereotypes from the individual members descriptions alone, and without an explicit description of what values the groups stand for. The second goal of the pretest was to evaluate the perceived membership typicality of each prototypical

group member described, so that I could eliminate the least typical member description from the moral and immoral groups in an effort to strengthen the cohesion of the group stereotypes for the main study. The last goal of this pretest was to establish the emotional impact of the group stereotype training and distractor tasks, to ensure that they would not unduly influence subsequent tasks in the main Study 4.

Method

Participants, Procedure, and Design

Participants were recruited from psychology courses at UMass Amherst in exchange for extra credit in their courses (32 total, 78.12% female). The average age of participants is 20.13 years ($SD = 1.64$). The sample consists of 56.3% Caucasian participants, 3.1% African-American participants, 28.1% Asian participants, 6.3% Hispanic participants, and 6.3% mixed race participants. First, participants read information about the different groups and some of their members. After familiarizing themselves with the three different groups, participants then completed an identification task, in which they read a short information blurb about an individual and then selected the group to which they thought that individual belonged. Participants were randomly assigned to one of two experimental manipulations that varied the amount of information provided about the different groups (simple vs. elaborate).

Manipulations and Tasks

Informational manipulation. For each group description, participants were presented with basic information and a group logo (provided to help participants to distinguish groups from one another, see *Figure 11*). Initial instructions were as follows:

For the first part of this experiment we are interested in understanding how people form impressions about different groups of people, and how they

go about identifying group members. For this reason, we would like you to read some information about three different fictional groups of people. These groups are somewhat like fraternities or sororities, such that people want to join a group to be with people similar to them in some way. After you familiarize yourself with some typical members of each group, we will then provide you with descriptions of some individuals and ask you to select what group you think they belong to. For now, please read the information provided on the following screens about the individuals in these different group and try to form an impression of what people in this group are typically like.

On the next screen, participants were then given general information about a group, which read: “The following individuals are all members of a group called the Haplins/Vassers/Watkins. They are a tight-knit, community-based group, and meet up once a month, or more, for events. For each person in the group, a brief snapshot of his her daily experience is provided.”

In the elaborate information condition, another sentence was added about each group between the first and second sentences. For the immoral Haplins group the sentence read, “This group prides itself on having members that are ambitious, are always striving for success, and tend to believe that the end results justify the means used to get there.” For the moral Vassers group, the sentence read, “This group prides itself on having members that work hard, are always striving for their lives to have a greater impact in the world, and tend to believe that the way people go about achieving a goal, is just as important as the goal itself.” For the control and sporty Watkins group, the sentence read, “This group prides itself on having members that are dedicated, are always striving for a better individual or team performance, and put a high priority on personal fitness.”

Group stereotype task. Participants then read five prototypical member descriptions of the Haplins (immoral group) and the Vassers (moral group), and four

prototypical member descriptions about the Watkins (the sporty control group). The members were presented as a group, such that all members of the same group were presented before another group was presented to the participants. Within this blocked presentation order, the presentation order of the groups and the presentation order of the members within the groups were randomized. All of the vignettes were between 250 and 270 words in length, and are presented in Appendix G.

Identification task. After learning the novel stereotypes about the three different groups, participants were then given 26 short identification blurbs and were asked to identify the group to which that individual belonged. For example, if presented with, “I was at this festival downtown and there was a man walking along, counting his money. He had a lot of cash in his hands and dropped a five-dollar bill. I picked it up and returned it to him,” as the short identification blurb, they would then select the group to which that person belonged. In this case, the described individual belonged to the Vassers, or the moral group. Participants were given feedback about their answers, and if incorrect, were told the group to which that person belonged. In all, participants were randomly presented with 26 identification blurbs (see Appendix H for full list). This task was adapted from a previously used implicit stereotype categorization procedure (Stroessner, Haines, Sherman, & Kantrowitz, 2010).

Measures

Group-based moral judgments. Participants answered three questions about the Vassers and Haplins groups to assess their moral judgments about those groups, which included whether they thought the group was moral or immoral, morally right or morally wrong, and good or bad, (all on an 11-point scale, from -5- *Very immoral/morally*

wrong/bad, +5- *Very moral/morally right/good*, Vassers Cronbach's $\alpha = .95$, Haplins Cronbach's $\alpha = .97$).

Prototypical member ratings. Then, participants rated each prototypical member of the groups that were described in the group stereotype task. They were given the identical version of the description they read about the prototypical individual (but presented in a smaller font), and then were asked "When considering ____ as a person, how moral or immoral does s/he seem?" (11-point scale, from -5- *Very Immoral* to 5- *Very Moral*). After this item, participants were then asked, "When considering ____ as a member of the Vassers/Haplins/Watkins, to what extent do you think s/he fits in with the group?" (11-point scale, 0- *Not at all* to 10- *Very Much*).

Coloring Distraction Task. Participants then completed a 4-minute coloring distraction task (to be used in Study 4). The following cover story was given to participants:

We are interested in your visual preferences, specifically the colors and shapes you choose to use. To assess your color and shape preferences, we would like you to take the next 4 minutes to draw on the piece of paper provided on the desk. The screen will automatically advance to the next part of the experiment after 4 minutes, and a countdown clock is provided so that you can be aware of how much time is left in the task.

Participants were given 10 crayons of varying colors and a blank piece of paper upon which to draw.

Affect Manipulation Check. In order to assess the emotional impact of the group stereotype, identification, and coloring tasks, participants' affect was measured directly after the coloring task. They were asked to consider how they were feeling "at this moment" and to respond to a series of items, such as "To what extent do you feel happy?" on a 7-point scale (1-*Not at all*, 4-*Moderately*, 7- *Extremely*). Participants were

asked to what extent they felt happy, sad, disgusted, angry, certain of their beliefs, upset, anxious, confident, tense, grossed out, queasy, observant, bored, tired, calm, confused, sickened, distracted, afraid, thoughtful, and amused. The first three items (happy, sad, and disgusted) were randomly presented as the first three questions, and the remaining items were then randomly presented. Composite measures were created by averaging items for key emotions relevant to this study: happy and amused (Cronbach's $\alpha = .780$), sad and upset (Cronbach's $\alpha = .857$), disgusted, queasy, sickened, and grossed out (Cronbach's $\alpha = .760$), and anxious, tense, and afraid (Cronbach's $\alpha = .748$). Finally, participants answered basic demographics questions (age, race, and gender) and one question which asked about the difficulty of the identification task they completed earlier in the experimental session, (1-*Not at all Difficult*, 7-*Very Difficult*).

Results

Group-Based Moral Judgment Manipulation Check

I analyzed the group-based moral judgments that participants reported for the moral and immoral groups, in a mixed design with information condition and the expected main effect emerged, such that participants judged the Haplins as less moral ($M = -2.93$, $SD = 2.63$) than the Vassers ($M = 4.48$, $SD = .88$; $F(1,28) = 207.02$, $p < .001$, $\eta_p^2 = .881$). Importantly, these judgments did not differ as a function of whether participants received simple or elaborate information about the groups, and no other interactions or main effects were significant (all F s < 1).

Identification Task

To determine if simple or elaborate information about the groups led to greater accuracy on the identification task, I conducted an analysis comparing accuracy on the

task across information conditions (simple vs. elaborate). The informational condition did not influence participant accuracy, $t(1,26) = -.55, p = .585$. On average, participants correctly identified 23.86 blurbs (out of 26 total), with the elaborate group information condition scoring slightly (but not significantly) higher in accuracy ($M = 24.20$ out of 26, $SD = 2.33$) than the simple group information condition ($M = 23.46$ out of 26, $SD = 4.54$). Furthermore, the participants did not find the identification task very difficult ($M = 2.78, SD = 1.60$), nor did their difficulty ratings vary as a function of informational condition, $F(1,30) = -1.22, p = .230$. This finding, taken together with the result reported above (for group-based moral judgments) suggest that participants were able to sufficiently learn about the different group stereotypes, regardless of whether they were presented with additional information about the group's values.

Prototypical Member Judgments

To determine which prototypical member description should be eliminated from the group (for the main study), I analyzed participants' moral and fit judgments for each prototypical member. Participants judged the prototypical group members as appropriately moral or immoral, depending on the group to which the prototypical member belonged, and they also judged all members as highly typical of their group. All means for these judgments were above 8 (out of 11) for fit with group. The prototypical member with the lowest fit ratings for the Vassers (Patrick: $M = 10.30, SD = 1.88$) and the Haplins (Nick: $M = 8.17, SD = 2.18$) were excluded from the group stereotype task in the main study.

Affect Manipulation Check

Finally, to determine if the group stereotype, identification, or distractor tasks had a detrimental effect on affect, a repeated measures analysis comparing affective responses revealed that the tasks did not have a significant influence on participants' affective state. A repeated measure ANOVA compared how participants reported feeling for four composite affect measures (happy, sad, disgusted, and anxious) after the group stereotype, identification, and distraction tasks. Participants reported feeling significantly more happy than sad, disgusted, or anxious, $F(3,93) = 63.70, p < .001, \eta_p^2 = .67$, but these positive feelings were moderate, ($M_{Happy} = 4.48, SD = 1.13; M_{Sad} = 1.82, SD = 1.05; M_{Disg} = 1.36, SD = 0.64; M_{Anx} = 2.07, SD = 1.19$). Notably, such findings are consistent with what is typically obtained when measuring baseline affect in the laboratory.

Discussion

This pretest was designed to test the materials and procedures for individuals to learn the novel group stereotypes to be used in the main study. The results confirm that my group stereotype training procedure is successful in producing moral and immoral group stereotypes. Furthermore, the high accuracy rate for the identification task indicates that group stereotype learning took place regardless of whether simple or elaborate information was provided about the groups. Additionally, the simple group information condition was not rated as any more difficult than the elaborate group information condition. The individual judgments of the prototypical group members also confirmed that all members in the groups matched the target moral group stereotype. Likewise, participants also judged these prototypical members as having a high fit with their group, suggesting a high level of group cohesion. Last, participants' affective responses indicated that if the group stereotype training, identification, and distraction

tasks influenced mood at all, they only produced moderately positive affective responses. Thus, combining these tasks prior to the key affect and processing style manipulations of the main study is not likely to adversely influence the overall study goals.

Main Study 4

The primary goal of this study is to examine if affect and cognitive processing styles interact to influence moral judgments in impression formation contexts. The moral judgment context is one that previous research suggests is highly disgust-relevant, and therefore I was most interested in examining the cognitive malleability account in this stringent context. Initially, this experiment included happy, sad, and disgusting affective conditions. I selected a sad video that had been used successfully to induce sad affective reactions in previous studies (*One True Thing*, Isbell et al., 2013), but I failed to consider that it depicts a daughter who is being investigated for helping her mother end her own life when her terminal cancer becomes too difficult to manage- content that was unintentionally morally charged. When I analyzed the data, the sad condition only served to add noise to the analysis, and after reviewing the clip more carefully, I decided to eliminate this condition because of this potential confound (for the full study description and analyses including the sad condition see Appendix H). Given that the primary goal of this research is to investigate whether disgust serves to direct momentarily active cognitive processing styles in a highly relevant context, the exclusion of the sad condition does not unduly limit the study findings or my ability to test my main hypothesis. This exclusion, however, does eliminate the secondary goal of including a different negative emotion for the purpose of comparison to the disgust conditions.

Method

Participants, Procedure, and Design

Participants ($n = 196$) were recruited from psychology courses at UMass Amherst and took part in this study in exchange for course extra credit points. Participants first completed the group stereotype training (described above in the pilot study) by reading about the group information and then completing the identification task. Next, they then completed a distractor task where they colored for four minutes to equalize their mood and allow their cognitive baseline to settle after the group stereotype training. After this distractor, participants were primed with an either global or local processing style through the map task (identical to the one used in Study 3B) and then watched a video clip that induced either happiness or disgust. After these processing prime and affect manipulations, participants read a story about the target individual (Jack), where global trait information was provided (through Jack's membership in either the moral group or immoral group) as well as local behavioral information (which consisted of morally ambiguous behaviors). Next, participants answered questions about the impression that they formed of the target, including moral evaluations and general evaluations (e.g., favorability). Finally, participants answered an affect manipulation check questionnaire and a short demographics questionnaire. Participants were randomly assigned to one of 8 conditions in an affect (happy vs. disgust) by processing prime (global vs. local) by global trait information (moral vs. immoral stereotype) between-subjects factorial design.

Forty-seven participants were excluded from the analysis because they failed manipulation checks. Eighteen participants were excluded for scoring less than 85% correct on the processing style map task manipulation. I also followed existing protocols for excluding participants with non-standard responses to affective manipulations (e.g.,

Bower, Monteiro, & Gilligan, 1978; Schnall, et al., 2008; Storbeck & Clore, 2005), and 22 participants who were more than three boxplot lengths away from the average affective responses to the videos (and therefore considered statistical outliers) were excluded from the analysis. Finally, 17 participants were also excluded because they had participated in the pretest of the Jack vignette (and I had no a priori method of preventing their subsequent participation in this study). A multi-way frequency analysis showed no relationship between the experimental conditions and exclusions from the analysis (all $ps > .05$). Of the remaining 149 participants (76.5% female), the average age is 19.94 years ($SD = 1.72$), and 79.9% are Caucasian, 2% are African-American, 10.7% are Asian, 4.0% are Hispanic, 2.7% are of mixed race, and 0.7% did not report their race.

Tasks and Manipulations

Group stereotype training. Participants followed the same instructions as those used in the pilot study described above, and then read vignettes describing four prototypical members from the moral group (the Vassers), the immoral group (the Haplins), and the control sporty group (the Watkins). The groups were presented as blocks, but their presentation order and the presentation order of the individuals within groups were both randomized.

Identification task. Next, participants completed the same identification task from the pilot study, where they read 26 short identification blurbs, chose what group the individual belonged to, and then received feedback about their performance on each item.

Distractor task. Participants then completed a coloring-based distraction task (also used in the pilot study), in which they were given 10 crayons of varying colors and a blank piece of paper upon which to draw. This task was designed to provide time to

allow the group stereotype information settle, and also to restore the participant's affective and cognitive baseline prior to completing the main experimental manipulations and tasks.

Processing style manipulation. To experimentally manipulating information processing styles, participants were then randomly assigned to complete either the global or local map task used in Study 3B (adapted from Förster, et al., 2008, see *Figure 4*).

Affect manipulation. After the processing prime manipulation, participants watched one of two video clips to induce happiness (a scene from *The Simpsons*; Isbell, McCabe, et al., 2013) or disgust (a scene from *Train Spotting* used in Schnall et al., 2008).

Impression formation vignette and global trait information. Participants then read a story about an individual, named Jack. Global information was provided about Jack through his group membership, which was both verbally and visually described (using a small logo for the group, see *Figure 11*). Jack was initially introduced as a member of either the Vassars (moral group) or the Haplins (immoral group) and then a story was presented about Jack in which he engaged in a series of morally ambiguous behaviors (local behavioral information, see Appendix J) with the following instructions: “Please read all of the information below and form an impression of the character (Jack) in the story. After doing so, you will be asked some questions about the impression that you formed of Jack.”

Moral Impression Formations

Person-based judgments. After reading the story about Jack, participants answered three questions to assess their moral judgments about “Jack”, *as a person*,

which included whether they thought he was moral or immoral, morally right or morally wrong, and good or bad, (-5- *Very immoral/morally wrong/bad* to +50 *Very moral/morally right/good*, Cronbach's $\alpha = .904$).

Action-based judgments. After these items, they then answered three questions of a similar nature, but which assessed whether Jack's *actions* were moral or immoral, morally right or morally wrong, and good or bad (on the same scale, Cronbach's $\alpha = .930$).

Moral thermometer ratings. Participants also assessed Jack on a "Moral Thermometer", where scores between 0 and 49 indicate that Jack is an immoral person, or someone who usually does the wrong thing and scores between 51 and 100 indicate that Jack is a moral person, or someone who usually does the right thing.

Target Favorability Ratings

Then, identical to the procedure in Study 3B, participants rated Jack on the feeling thermometer. Next, participants answered the overall favorability items used in Study 3B (judging how favorable, likable, positive Jack was). After standardizing these four items, I averaged them to create a composite favorability score (Cronbach's $\alpha = .937$).

Target Trait Ratings

Participants rated the extent to which Jack exhibited positive (average of friendly, sincere, trustworthy, warm, generous, honest, helpful, and conscientious; Cronbach's $\alpha = .893$) or negative personality traits (average of deceitful, mean, hostile, cruel, cold, arrogant, calculating, thoughtless, and selfish; Cronbach's $\alpha = .832$) on an 11-point scale (from 0-*Not at all*, 5-*Somewhat*, 10-*Extremely*). These traits were similar to those used

for Study 3B, but instead included moral traits, as opposed to sociability traits (which were the focus of Study 3B).

Impression Formation Process

Amount of information used for impression formation. Also identical to Study 3B procedure, participants next answered a question asking how much information they considered when forming their impression.

Impression clarity. Then participants answered two questions (also from Study 3B) about the clarity and ease with which they formed their impression (Cronbach's $\alpha = .617$).

Manipulation Checks

Global trait information manipulation check. Participants were then asked two items about Jack's group membership, the first was a free-response answer where they were asked to name the group that Jack belonged to, and the following item was the same question, but with multiple-choice answers of the group names. Recall was very high, with 95.7% ($n = 220$) of the final sample remembering Jack's group membership (close alternative spellings of group names in the free response were coded as correct).

Affect manipulation check. Next, participants were asked to indicate the extent to which they felt a variety of emotions *while they were watching the video* (i.e., sad, happy, disgusted, angry, certain of their beliefs, upset, anxious, confident, tense, grossed out, tense, queasy, observant, bored, tired, calm, confused, sickened, distracted, afraid, thoughtless, amused). Participants reported their responses on a 7-point scale (from 1-*Not at all*, to 7-*Very Much*). Responses for emotion items were averaged together to create composite emotion scores: happy and amused (Cronbach's $\alpha = .829$); sad and upset

(Cronbach's $\alpha = .828$); disgusted, sickened, queasy, and grossed out (Cronbach's $\alpha = .963$); and tense, anxious, and afraid (Cronbach's $\alpha = .793$).

Group-based moral judgments manipulation check. Participants then answered three questions each about the Vassers, Haplins, and Watkins groups to assess their moral judgments about those groups. These three items were identical to those used in the group stereotype pilot study (described earlier), and composite items were created from all three judgments for each group (Vassers: Cronbach's $\alpha = .937$, Haplins: Cronbach's $\alpha = .976$, Watkins: Cronbach's $\alpha = .941$).

Finally, participants completed a basic demographics questionnaire, which asked them to report their age, race, and gender.

Results

Manipulation Checks

Affect manipulation. Participants in the happy video condition reported feeling significantly more happiness than those in the disgust condition, as revealed by a 2 (happy score v. disgust score) x 2 (happy video v. disgust video) x 2 (global v. local) x 2 (moral vs. immoral group stereotype) mixed ANOVA. An interaction between reported affect and the affect condition shows that the videos were successful at manipulating affect, $F(1,141) = 583.90, p < .001, \eta_p^2 = .805$. Those in the happy condition reported significantly more happiness ($M = 4.49, SD = 1.60$) than disgust ($M = 1.47, SD = 0.61$; $t(71) = 13.65, p < .001$, Cohen's $d = 1.69$), or sadness ($M = 1.60, SD = 0.81$; $t(71) = 12.45, p < .001$, Cohen's $d = 1.377$). Likewise, those in the disgust condition reported significantly more disgust ($M = 5.79, SD = 1.15$) than happiness ($M = 1.82, SD = 1.00$; $t(76) = 20.68, p < .001$, Cohen's $d = 2.37$) and sadness ($M = 2.32, SD = 1.27$; $t(76) =$

21.68, $p < .001$, Cohen's $d = 1.926$. Bonferroni-corrected post-hoc tests reveal that those in the disgust condition did report feeling slightly more anger, sadness, and anxiety than those in the happy condition, (all $ps < .019$). Those in both the happy and disgust conditions reported feeling significantly more of the target emotion than anger, sadness, or anxiety (all $ps < .001$).

Group-based moral judgments manipulation check. The group stereotype training was successful. A significant main effect of group type revealed responses in the expected direction, $F(2,282) = 295.46$, $p < .001$, $\eta_p^2 = .677$. Participants viewed the moral group as more moral ($M = 9.72$, $SD = 2.18$) than the immoral group ($M = 3.29$, $SD = 2.25$; $t(148) = 19.85$, $p < .001$, Cohen's $d = 1.630$) and the control group ($M = 7.27$, $SD = 1.62$; $t(148) = 10.71$, $p < .001$, Cohen's $d = .885$). They also viewed the immoral group as more immoral than the control group, $t(148) = -16.41$, $p < .001$, Cohen's $d = -1.358$.

Moral Judgments

Action- versus person-based judgments. I compared participants' judgments of the target "as a person" to their judgments of the target's actions. Person-based judgments and action-based moral judgments differed overall, with participants judging the target's actions slightly more severely ($M = -.76$, $SD = 1.33$) than Jack as a person ($M = -.41$, $SD = 1.56$), $F(1,141) = 23.66$, $p < .001$, $\eta_p^2 = .144$. Aside from this main effect, differences between person-based and action-based judgments varied as a function of processing style and emotional manipulation, $F(1,141) = 7.35$, $p = .008$, $\eta_p^2 = .050$. As shown in *Figure 12*, these results support the cognitive malleability account, as those processing globally (global + happy and local + disgust conditions) were more likely to incorporate the target's actions into their overall impression of him as a person (see *Table 7*). In

contrast, those processing locally (local + happy and global + disgust conditions) were more likely to judge the target and their actions differently, particularly by judging the person less severely than the person's actions. Notably, participants in the disgust condition were not significantly more punitive in their judgments of the target or his actions when compared to those in the happy condition (within-subjects interaction: $F(1,141) = 1.76, p = .187$; between-subjects main effect: $F(1,141) = .171, p = .680$). Unexpectedly, the group membership information did not influence the degree to which the actions were incorporated into the person-based moral judgment (all relevant F s < 1.94).

Moral thermometer ratings. Analyzing participant's ratings of Jack on the moral thermometer revealed a significant main effect in the expected direction for Jack's membership in either a moral group ($M = 49.67, SD = 14.04$) or an immoral group ($M = 44.42, SD = 15.42$), $F(1,141) = 5.65, p = .019, \eta_p^2 = .039$. Moral thermometer ratings of Jack also varied as a function of processing prime, emotional manipulation, and group stereotype information, $F(1,141) = 5.03, p = .026, \eta_p^2 = .034$. As shown in *Table 8* and *Figure 13*, this result supports the cognitive malleability account. Those processing globally (global + happy and local + disgust conditions) relied more on Jack's group membership information when forming their moral impression of him, as compared to those processing locally (local + happy and global + disgust conditions). The moral thermometer ratings were highly correlated with participants' person-based moral judgments (Pearson's $r(149) = .780, p < .001$), as well as the action-based moral judgments (Pearson's $r(149) = .729, p < .001$).

Target Favorability Ratings

Participants' favorability ratings of Jack also varied as a function of affect and processing style, $F(1,149) = 5.07, p = .026, \eta_p^2 = .035$. Favorability followed the same pattern as the person-based moral judgments of Jack. Specifically, participants feeling happy and globally primed ($M = -.18, SD = .79$), and those feeling disgusted and locally primed ($M = -.12, SD = .92$) rated Jack less favorably than those feeling happy and locally primed ($M = .15, SD = .81$), or those feeling disgusted and globally primed ($M = .13, SD = 1.10$). As shown in *Figure 14*, these results support the cognitive malleability account. No other effects were significant, all $ps > .066$.

Target Trait Judgments

Analyzing participants' target trait ratings on the positive and negative personality traits, only Jack's group membership influenced their relative judgments, $F(1,141) = 6.45, p = .012, \eta_p^2 = .044$. Specifically, when Jack was a member of the immoral group, participants' mean endorsement of negative traits was higher ($M = 4.29, SD = 1.59$) than their mean endorsement of positive traits ($M = 3.57, SD = 1.54, t(72) = -2.28, p = .026$, Cohen's $d = -.267$). This essentially demonstrates that the immoral group membership information successfully manipulated beliefs about whether the target was a positive (good) or a negative (bad) person. A different pattern emerged when Jack was a member of the moral group, such that participants equally endorsed positive traits ($M = 4.23, SD = 1.32$) and negative traits ($M = 3.99, SD = 1.38,; t(75) = .94, p = .35$).

Impression Formation Process

Jack's group membership significantly influenced the amount of information participants used in forming their impressions, $F(1,141) = 3.93, p = .049, \eta_p^2 = .027$, such that participants reported using slightly more information when forming an impression

when Jack was a member of the moral group ($M = 3.37$, $SD = .54$), as compared to when Jack was a member of immoral group ($M = 3.16$, $SD = .78$). No other main effects or interactions emerged, (all F s < 2.4). Additionally, when analyzing participant's reports of impression clarity, no significant effects emerged (all F s < 1.02).

Discussion

The results suggest that information processing styles influence moral impressions through the incorporation of the actions into the overall moral judgment of the person, such that those processing globally (global + happy and local + disgust conditions) tend to equate people with their actions, whereas those processing locally (local + happy and global + disgust conditions) are more likely to differentiate between a person's actions and their personality. Further, both the disgust and happy affect manipulations served to direct the momentarily dominant (primed) processing style to influence these judgments, providing support for the cognitive malleability account. One explanation for this finding, is that perhaps processing in a more global manner promotes categorical thinking about morality, and therefore participants processing globally use more "black and white" criteria for moral judgment: if Jack's actions are bad, Jack, himself, is also judged to be bad. Local processing, in contrast, supports a more nuanced, less categorical view of morality, whereby participants could think that Jack's actions were morally wrong, but could separate their judgments of his actions from their judgment of Jack, as a person.

Interestingly, the group stereotype only seemed to interact with processing primes and affect conditions for the moral thermometer ratings, and not judgments of Jack (as a person) or his actions. It is possible that the moral thermometer rating captured a wider

moral impression of Jack than did the items asking participants to morally judge Jack or his actions, which could account for this discrepancy.

Additionally, cognitive processing styles and affect interacted similarly to influence favorability judgments of Jack. It is unclear from this experimental design, however, if these effects occurred independent of one another, if moral judgments influenced favorability judgments, or vice versa. The high correlation between the moral thermometer and the feeling thermometer ($r[149] = .782, p < .001$) suggests that even though participants were instructed to rate Jack on different constructs (social vs. moral) the thermometer ratings perhaps captured the same overall impression of Jack. The high agreement between these two items provides support for the notion that social and moral impression formation mechanisms work similarly to one another, and that cognitive processing styles are one potential theoretical mechanism to examine how people form moral judgments of others, especially when considering their actions.

Finally, previous research has shown that disgust creates more punitive moral judgments of ambiguous behavior (Schnall et al., 2008), and this effect was only partially replicated— but not for a global processing style, which is usually considered the default style (Bruner, 1957). In the current study, however, it is when participants are primed with a local processing style that I found the typical effect emerge, such that people feeling disgusted were more likely to judge a person harshly as compared to those feeling happiness. These results suggest that moral judgments and related decision-making tasks might induce local processing as a natural default style. For instance, processing style researchers argue that tasks in which people are motivated to process information in a

detailed manner, especially decisions for which they feel accountable, are more likely to naturally induce a local processing style (Bodenhausen, Kramer, et al., 1994).

CHAPTER 6

GENERAL DISCUSSION

This dissertation had three primary research goals. The first goal was to extend understanding of the cognitive malleability approach by examining whether affect (specifically disgust) and initial processing styles interact to influence moral judgments and attention to emotional stimuli. The second goal of this research was to examine whether disgust influences cognition in basic cognitive tasks (i.e., visual attentional) and higher-level cognitive tasks (i.e., impression formation). The third goal of this work was to determine if disgust influences cognition in both low relevance contexts (neutral stimuli, social judgments) and high relevance contexts (emotional stimuli, moral judgments).

Specific Contributions of this Dissertation

Visual attention. This dissertation provides some of the first evidence to suggest that both positive and negative emotional stimuli can either boost or bias visual attention. What few studies exist that examine disgust and its influence on attention have suggested that disgusting stimuli is more distracting than fearful stimuli when completing neutral cognitive tasks (Carretié, et al., 2011), and that disgust slows attention when attending to non-disgusting stimuli (Krusemark & Li, 2011). Likewise, only a few researchers have examined attentional biases for positive stimuli, but this research has generally focused on individual differences, and found that optimistic people process happy stimuli faster than pessimistic individuals (Segerstrom, 2001). Therefore, my research not only provides new evidence in the emotional stimuli attentional domain, but it also introduces the information processing context as an important moderator of how different discrete

emotional stimuli influence attention to either emotional or neutral stimuli. Thus, my research calls into question the notion that negatively valenced affective stimuli always distracts attention during neutral tasks, and prompts other investigators to consider initial processing styles when drawing conclusions about affective influences on attention.

Social impression formation. My dissertation also establishes that disgust can influence cognition in a low disgust relevant task (i.e., social impression formation). The social cognition literature has many examples of how affect influences cognitive processes, and early research on this topic examined how general affective states (e.g., positive and negative moods) impacted cognition. Given that discrete emotions often have eliciting causes, and often are more consciously experienced, the affect-as-information approach suggests that people are more likely to correct for information provided by a discrete emotion when making judgments or decisions, as opposed to information provided by a diffuse mood state (which does not usually have a specific, eliciting cause). Importantly, this informational correction generally only occurs when people consciously consider their emotional state. In the last few decades, social cognitive researchers have investigated how discrete emotional states influence cognition, and have found that even strongly felt emotions can influence cognition (see Isbell & Lair, 2013 for a review). However, to date, few studies have considered how disgust influences cognition, with most of the research on disgust examining its direct influence on judgments (i.e., *what* people think, not *how* people think). Additionally, most of the research on disgust has been conducted in highly disgust relevant domains (ones in which disgust is not likely to be corrected for, e.g., moral judgment). Thus, this dissertation provides one of the first steps to understanding how disgust influences cognition, by

demonstrating that disgust's influence on cognition can also generalize to low relevance tasks (just as other intensely felt emotions also generally influence cognition).

Moral Impression Formation. This dissertation also contributes to the moral cognition literature, as it establishes that cognitive processing styles influence moral judgments. In the last decade, there has been a surge in moral cognition research, and by extension, moral social cognitive research. Little research, to date, has considered the role of information processing styles in moral judgments. Instead, much of the research in moral cognition has revolved around differences in utilitarian and deontological judgment, and has therefore examined individual differences or situations that might promote these particular styles of thinking (e.g., Bartels, 2008; Moore, Clark, & Kane, 2008). Only recently have researchers begun to examine the role of construal level (distance, point-of-view, abstraction) in moral judgments, and this research has generally found that abstract thinking leads to more punitive judgments (Agerström & Björklund, 2009; Eyal, et al., 2008; Libby, et al., 2009). Likewise, research has recently shown that affective experiences are important drivers of moral judgments (e.g., Mendez, Anders, & Shapira, 2005; Valdesolo & DeSteno, 2006), and that disgust tends to produce harsher moral judgments (e.g., Wheatley & Haidt, 2005; Schnall, et al., 2008). Therefore, the results of Study 4 contribute to the moral cognition field by providing evidence that global and local cognitive processing styles influence moral judgment. Further, I also provide evidence that affective influences on moral judgments (a topic of great interest in the moral literature) are dependent on the initially active cognitive processing style, which is a finding that prompts researchers in the moral cognition field to consider initial cognitive processing styles within the moral context.

Additionally, my research on disgust and moral judgment also clarifies the current thinking regarding disgust's influence on moral judgments, particularly the notion that feeling physically disgusted always leads to a harsher moral judgment. The results of Study 4 contradict this view, as the results demonstrate that both happiness and physical disgust can lead to harsher moral judgments, but that these harsher judgments are dependent on affect and one's currently active processing style. As my dissertation provides evidence on this matter for judgments of morally ambiguous behaviors, future research should consider whether affect and initial processing styles influence judgments for different types of moral violations (e.g., purity).

Dissertation Goals

Primary research goals. Taken together, these studies fulfill my primary research goals, as they demonstrate support for the cognitive malleability approach in two domains that have not been previously examined: attentional bias for emotional stimuli, and moral judgments. My second goal for the dissertation was also fulfilled, as my dissertation shows that disgust influences cognition in basic cognitive tasks (Study 2) as well as higher-level cognitive tasks (Studies 3 & 4). Further, in regards to my third research goal, my dissertation demonstrates that disgust interacts with initial cognitive processing styles in domains where disgust is of low relevance (social judgments), as well as in areas where disgust is of high relevance (moral judgments, disgusting stimuli). My research demonstrates that disgust acts as a stop signal on one's currently active processing style.

Disgust versus sadness. A secondary goal of this dissertation was to determine if disgust produced unique cognitive effects from other negative emotions. Given that prior

research that explored the cognitive malleability approach compared happiness and sadness, I designed this dissertation to compare disgust to both happiness and sadness. Unfortunately, the only study in which sadness served as a reliable comparison for disgust was in Study 2, where sadness sometimes acted similarly to happiness, and other times acted similarly to disgust– which does not provide enough evidence for a conclusive understanding of how disgust might be similar to or different from sadness. Study 1 did not produce any interpretable effects, so comparing disgust and sadness in this study was precluded by null results. Study 3 (due to financial constraints) and Study 4 (due to the unintentional moral confound of video clip) also required elimination of the sadness condition.

Therefore, future research should consider how disgust might be similar to or different from other negative stimuli, particularly sadness and fear, because fear represents more of a threat-based emotion as compared to sadness (Olatunji & Sawchuk, 2005; Russell, 1980). These two emotional comparisons to disgust could help separate valence from threat, and determine whether valence, threat, or both, provide the information that is conferred on initial processing styles in the cognitive malleability approach. Furthermore, comparing different types of disgust (e.g., moral, visceral, or contamination) will also shed much light on the type of informational cue that disgust might confer on initial processing styles. Finally, not only does this dissertation begin to fill the gap in the social cognitive literature regarding this topic, but it also opens the door to future research that might investigate if people who are predisposed to feel disgust (i.e., those with high disgust sensitivity, Inbar, Pizarro, & Bloom, 2009) are differentially impacted in a wide array of social-cognitive contexts.

Conclusions

For decades, negative affect was generally known to narrow cognitive focus, whereas positive affect was generally known to broaden cognitive focus. Over the years, however, more exceptions to these general rules have emerged and researchers began the tiresome process of attempting to fit findings into existing theoretical frameworks that simply did not adequately describe the influence of affect on cognition. Although emotional theories have become more nuanced in recent history, there is still a glaring hole in this body of work, namely, systematic manipulations of cognitive processing styles. Relying on default processing styles is no longer sufficient when attempting to explain how emotion interacts with cognition, as this only sheds light on one half of the interactive process. Cognitive processing is extremely flexible, and often changes due to daily tasks and demands, which means that much of what we learn about emotion in experiments needs to reflect this cognitive landscape. This dissertation helps extend the cognitive malleability approach by showing that even a strongly felt emotion (e.g., disgust) interacts with cognition in a malleable way. The results from Studies 2, 3, and 4, taken together, support and extend the cognitive malleability account by demonstrating that affect interacts with initial processing styles for attention to emotional stimuli, impression formation, and moral judgments. Further, this set of studies provides important, novel contributions to the visual attention, social cognition, and morality domains, and also provides a comprehensive foundation upon which to build future investigations of the important emotion of disgust.

Table 1. Descriptive means and standard deviations for affective ratings across conditions.

Study 1A					
	Happy	Sad	Disgust	Anger	Fear
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Happy	4.55(1.29) ^{sda23}	1.55(.80) ^{hda23}	1.21(.68) ^{hsa23}	1.36(.78) ^{hsd23}	1.89(1.05) ^{hsda23}
Sad	1.57(.56) ^{saf1}	4.60(1.38) ^{hdaf1}	2.54(1.48) ^{hsaf13}	3.88(1.93) ^{hsdf13}	3.39(1.43) ^{hsda1}
Disgust	1.76(1.00) ^{saf1}	4.03(1.43) ^{haf1}	3.94(1.37) ^{haf12}	4.88(1.98) ^{hsdf12}	3.46(1.36) ^{hsda1}
Study 1B					
	Happy	Sad	Disgust	Anger	Fear
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Happy	4.60(1.29) ^{sda23}	1.71(.88) ^{hda23}	1.21(.52) ^{hsf23}	1.15(.51) ^{hsf23}	1.74(.92) ^{hda23}
Sad	1.62(.71) ^{saf1}	4.60(1.18) ^{hdaf13}	1.98(1.34) ^{saf13}	3.60(2.10) ^{hsdf1}	3.01(1.39) ^{hsda1}
Disgust	1.99(.91) ^{saf1}	3.91(1.43) ^{hf12}	4.05(1.23) ^{hf12}	4.21(1.95) ^{hf1}	3.11(1.35) ^{hsda1}

Note. Letters indicate significant paired-sample, simple-effects comparisons within conditions (all comparisons within the same row; h = happy, s = sad, d = disgust, a = anger, f = fear). Numbers indicate significant independent sample, simple-effects comparisons between conditions (all comparisons within the same column; 1 = comparisons to happy, 2 = comparisons to sad, 3 = comparisons to disgust).

Table 2. Reaction times in milliseconds as a function of central image type, affect condition, and trial compatibility.

Emotional Central Image				
	Incompatible Trial		Compatible Trial	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	276.08	64.36	267.41	61.73
Sad	270.92	71.30	265.08	72.48
Disgust	285.45	64.35	280.86	68.87
Neutral Central Image				
	Incompatible Trial		Compatible Trial	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	293.04	63.98	280.60	63.66
Sad	288.63	60.03	267.03	62.63
Disgust	309.26	66.88	275.27	72.85

Table 3a. Reaction times in milliseconds as a function of central image type, affect condition, processing prime, and trial compatibility.

Emotional Central Image								
	Global Prime				Local Prime			
	Incompatible		Compatible		Incompatible		Compatible	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	285.36	84.80	276.87	62.52	296.04	78.06	305.20	88.86
Sad	308.81	59.27	303.79	54.44	290.07	59.17	289.22	57.89
Disgust	286.15	70.55	292.50	65.16	297.34	61.75	295.90	60.52
Neutral Central Image								
	Global Prime				Local Prime			
	Incompatible		Compatible		Incompatible		Compatible	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	281.71	75.22	287.87	91.77	294.13	73.27	293.35	67.47
Sad	306.98	56.36	304.58	53.50	291.46	60.86	293.47	61.47
Disgust	296.06	73.38	291.43	64.41	294.77	55.68	301.49	58.66

Table 3b. Reaction times differences in milliseconds (incompatible – compatible) as a function of central image type, affect condition, and processing prime.

Emotional Central Image				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	8.50	47.59	-9.16	29.08
Sad	5.02	20.49	0.85	18.35
Disgust	-6.35	22.17	1.44	22.19
Neutral Central Image				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy	-6.15	45.52	0.78	24.45
Sad	2.40	24.48	-2.01	25.65
Disgust	4.63	31.03	-6.72	34.55

Table 4. Feeling thermometer ratings as a function of processing style, affect manipulation, and social stereotype.

Extroverted Sales Representative				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	73.22	13.84	63.70	17.71
Disgust Story	67.27	16.75	70.12	19.12
Introverted Librarian				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	67.20	15.29	69.98	13.70
Disgust Story	69.60	15.35	66.57	15.82

Table 5. Overall favorability ratings as a function of processing style, affect manipulation, and social stereotype.

Extroverted Sales Representative				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	2.57	1.45	1.83	2.15
Disgust Story	1.74	1.98	2.02	2.07
Introverted Librarian				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	1.91	1.68	2.34	1.59
Disgust Story	2.12	1.91	2.06	1.87

Table 6. Overall clarity and ease of impression formation as a function of processing style, affect manipulation, and social stereotype.

Extroverted Sales Representative				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	5.63	3.36	4.98	3.41
Disgust Story	5.34	3.42	6.16	3.78
Introverted Librarian				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Story	4.51	3.55	5.25	3.53
Disgust Story	5.36	3.53	4.62	3.45

Table 7. Within-subjects person-based and action-based moral judgments as a function of processing style and emotional manipulation.

Global Processing Prime				
	Person Judgments		Action Judgments	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	-.75	1.29	-.82	.95
Disgust Video	-.25	1.73	-.82	1.60
Local Processing Prime				
	Person Judgments		Action Judgments	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	-.03	1.57	-.48	1.33
Disgust Video	-.66	1.56	-.92	1.36

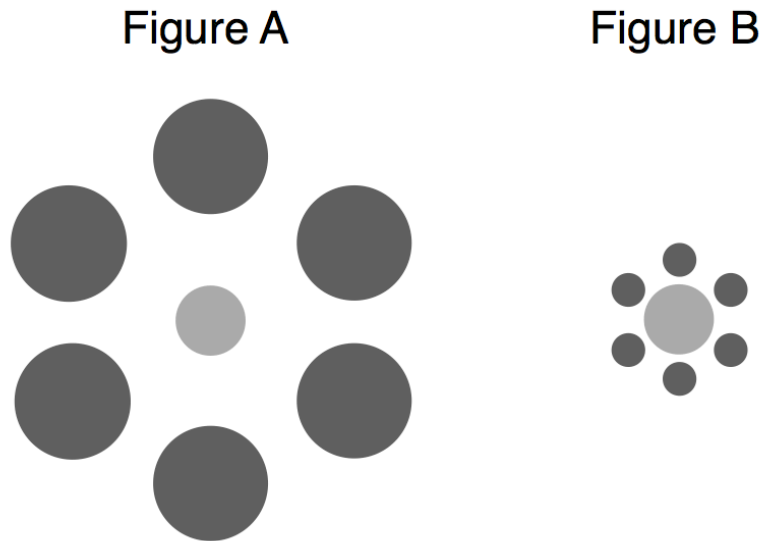
Table 8. Moral thermometer ratings as a function of processing style, affect, and moral group membership.

Moral Group Jack				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	53.95	12.51	48.33	14.68
Disgust Video	48.31	14.91	48.10	14.24
Immoral Jack				
	Global Prime		Local Prime	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	36.79	12.27	49.00	11.07
Disgust Video	47.00	19.30	42.95	14.97

H H H H
H
H H H
H
H

Figure 1. Navon (1977) task stimuli, here a global letter *F*, with local letters *H*.

(a) Ebbinghaus Illusion figures shown to participants in Studies 1 and 2



(b) Answer options presented to participants on the following screen.











	Figure A	Figure B
Option 1		
Option 2		
Option 3		
Option 4		
Option 5		

Figure 2. Stimuli used for the Ebbinghaus Illusion task to measure attentional scope.

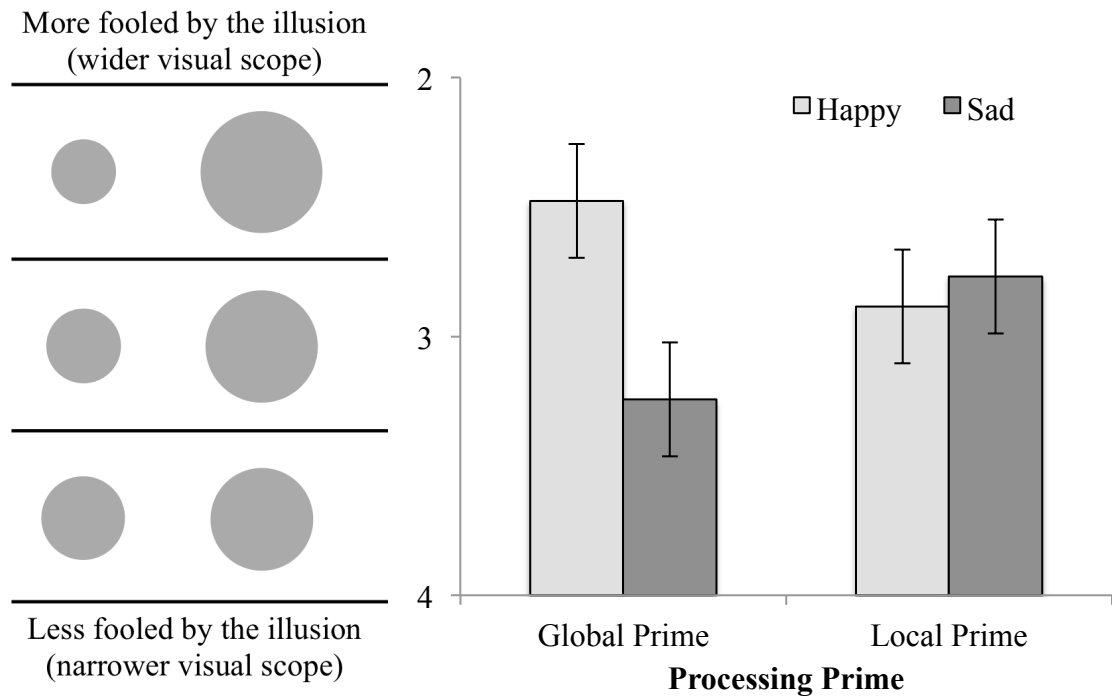


Figure 3. Participants' estimates of the relative sizes of the central circles in the Ebbinghaus illusion figures as a function of affect condition and processing prime (reverse scaled, excluding the disgust condition (error bars are +/- 1 SE).

(a) Example of state presentation image:



(b) Global question “Which is the correct state shape?” answer options:



Figure 4. Example stimuli from cognitive processing map task prime, adapted from Förster, Liberman, and Kuschel, 2008.

(a) Compatible Trial (with example emotional central image)



(b) Compatible Trial (with example neutral central image)



(c) Incompatible Trial (with example emotional central image)

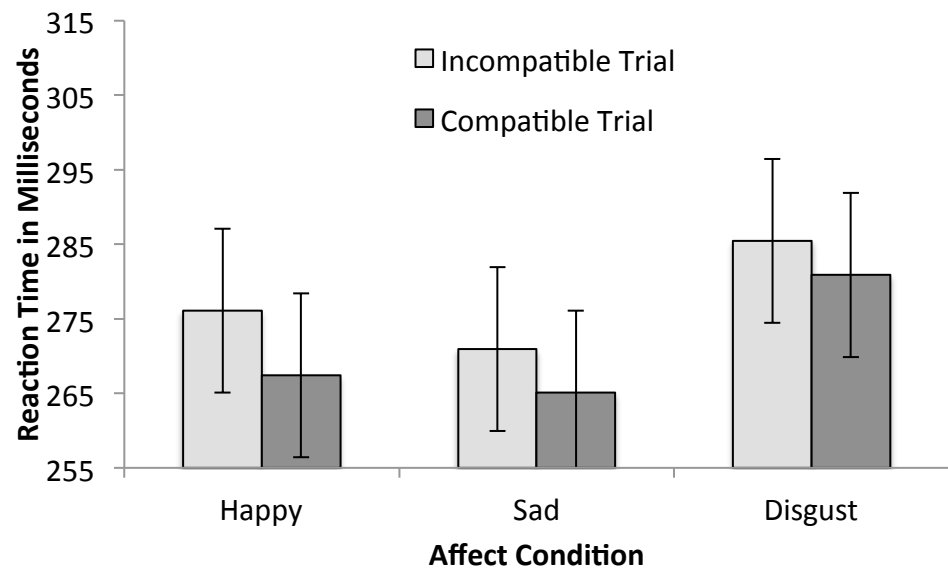


(d) Incompatible Flanker (with example neutral central image)



Figure 5. Emotional Flanker example trials by compatibility and central image type (images from IAPS).

(a) Emotional Central Image



(b) Neutral Central Image

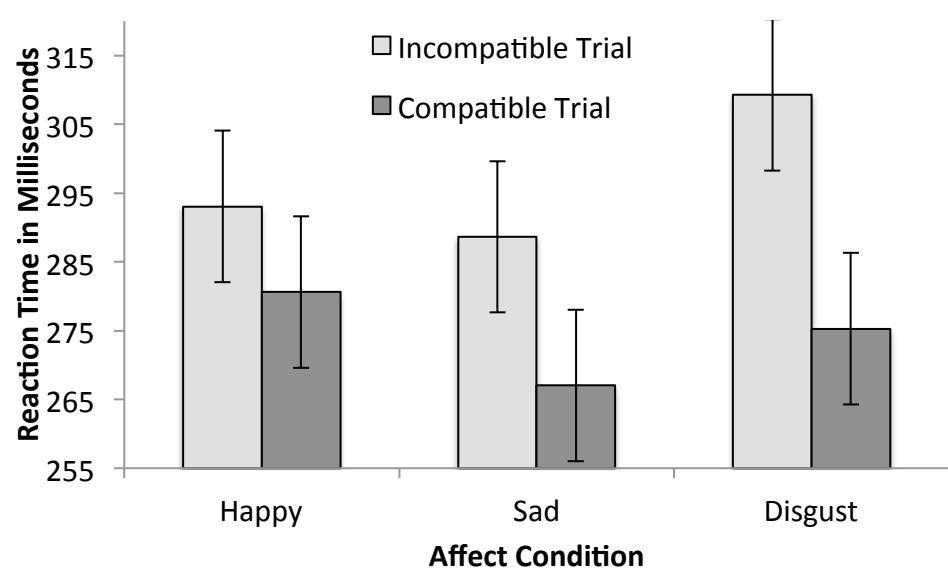
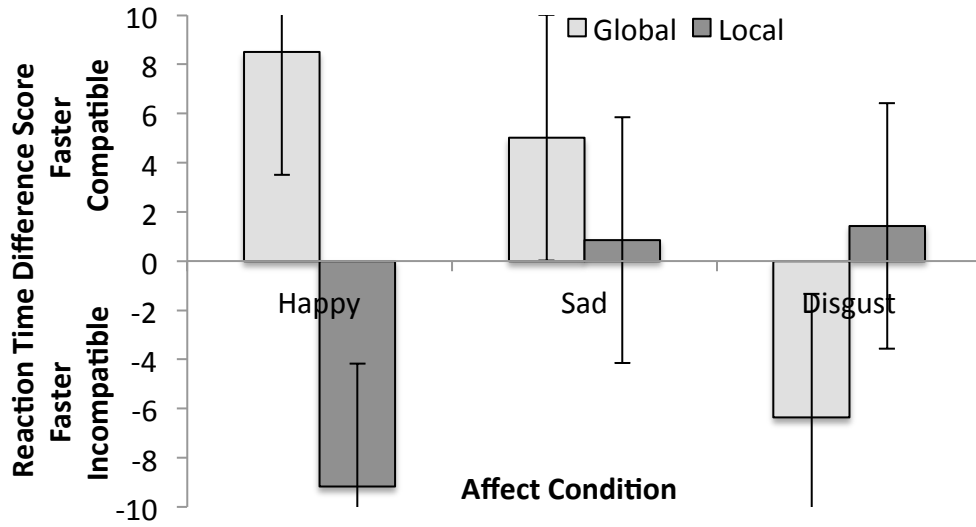


Figure 6. Emotional Flanker Pilot Study reaction time as a function of trial type, affect condition, and central image type (error bars are +/- 1 SE).

(a) Central emotional image trials (incompatible: NNENN, compatible: EEEEE)



(b) Central neutral image trials (incompatible: EENEE, compatible: NNNNN)

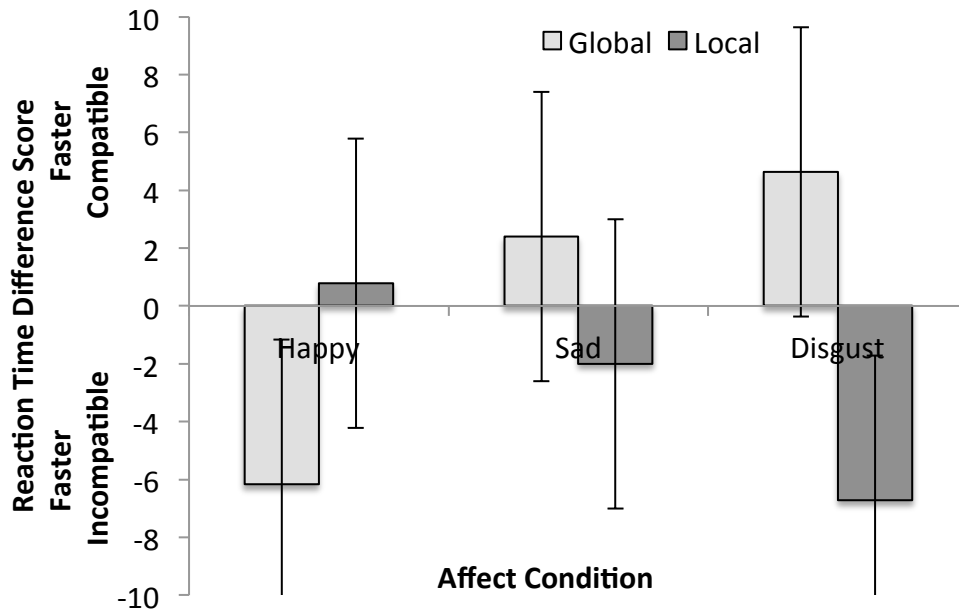
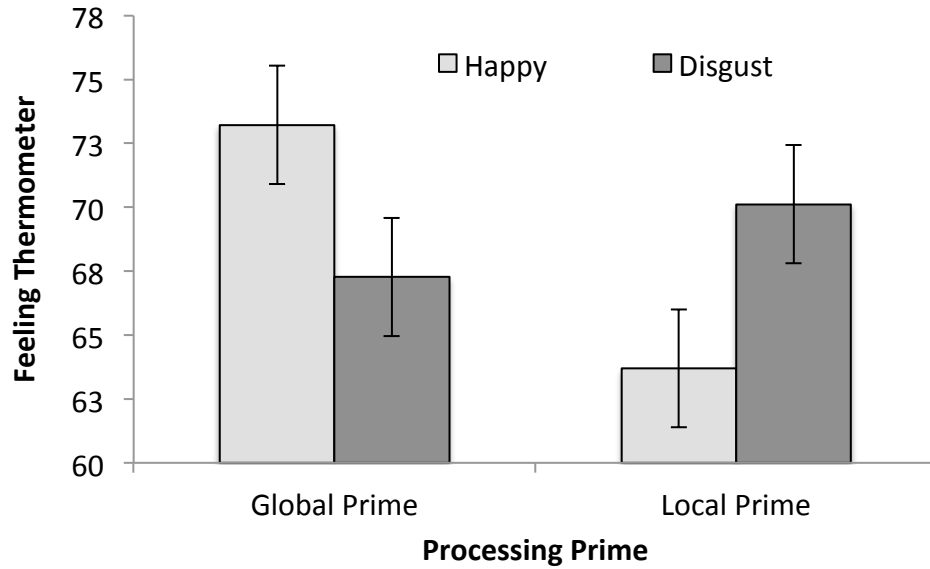


Figure 7. Reaction time difference scores in milliseconds (incompatible– compatible) as a function of processing prime, affect, and central image type (error bars are $\pm 1 SE$).

(a) Extroverted Sales Representative



(b) Introverted Librarian

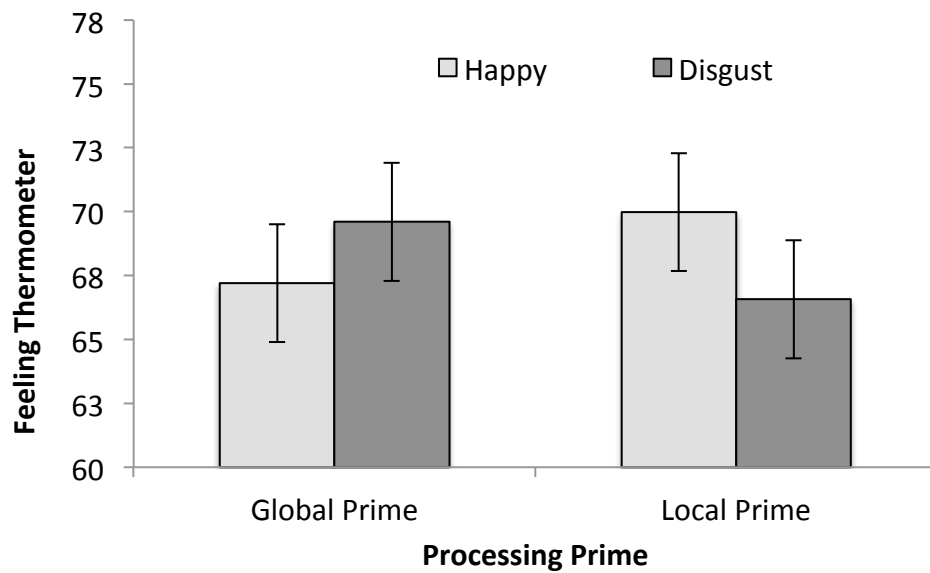
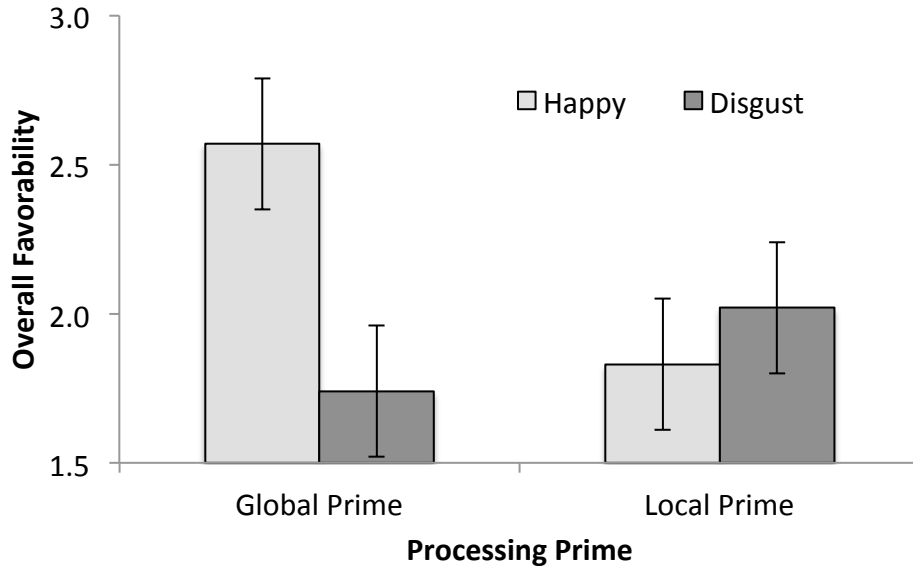


Figure 8. Feeling thermometer ratings as a function of processing style, emotional manipulation, and social stereotype (error bars are +/- 1 SE).

(a) Extroverted Sales Representative



(b) Introverted Librarian

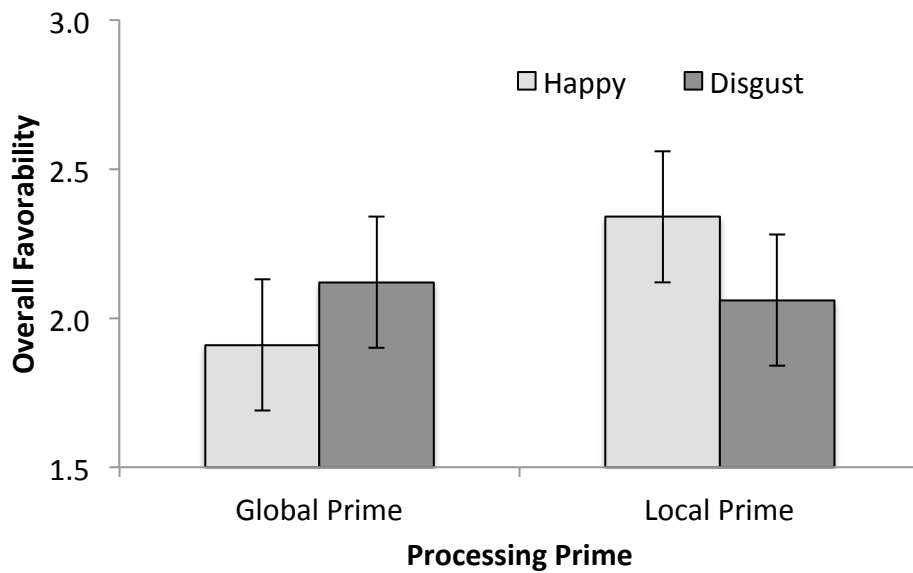
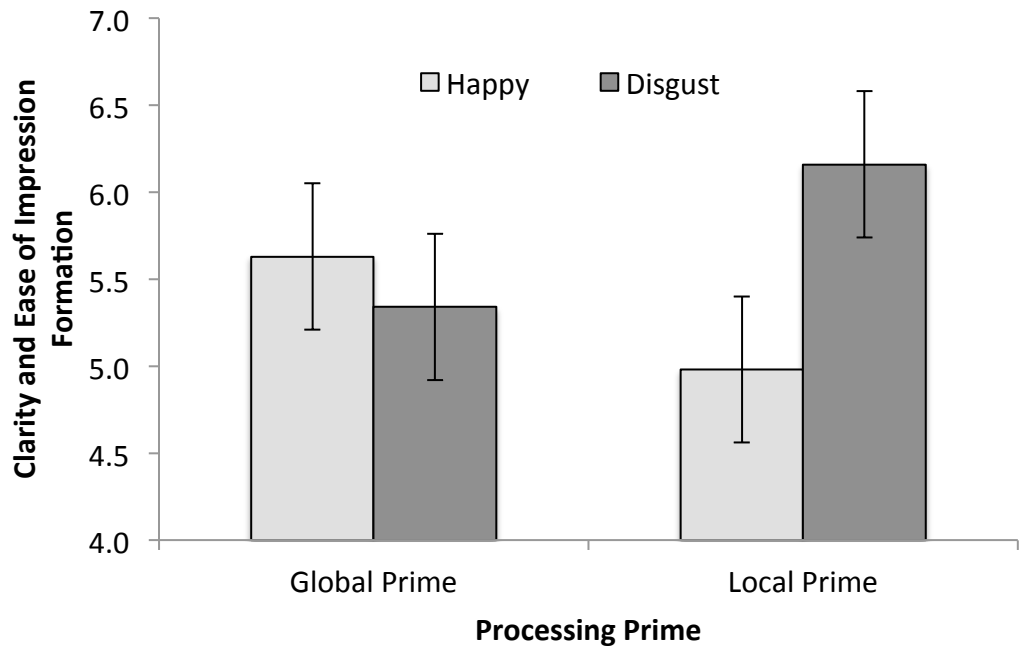


Figure 9. Overall favorability as a function of processing style, emotional manipulation, and social stereotype (error bars are +/- 1 SE).

(a) Extroverted Sales Representative



(b) Introverted Librarian

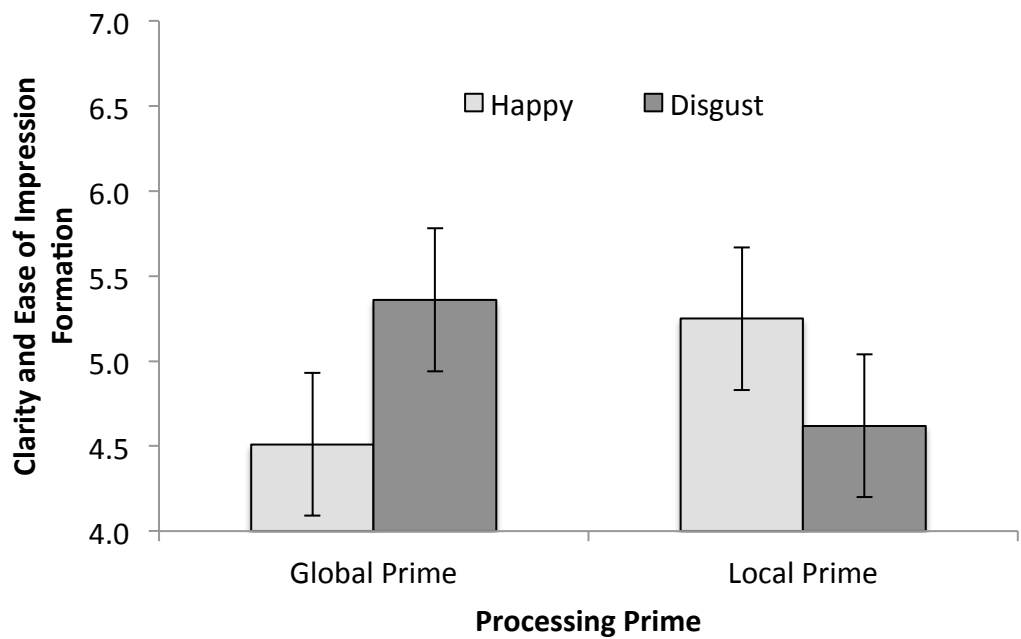
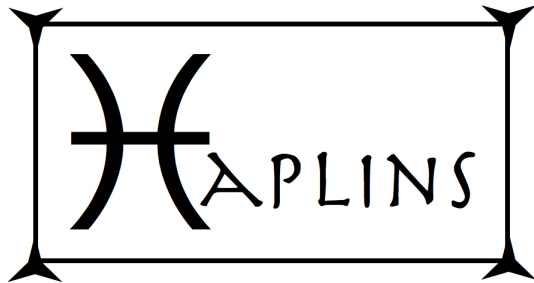


Figure 10. Overall clarity and ease of impression as a function of processing style, affect manipulation, and social stereotype (error bars are +/- 1 SE).

(a) Moral Group Logo



(b) Immoral Group Logo



(c) Control/Sporty Group



Figure 11. The logos presented with each group description and Jack vignette.

Processing Primes and Video Emotion Conditions

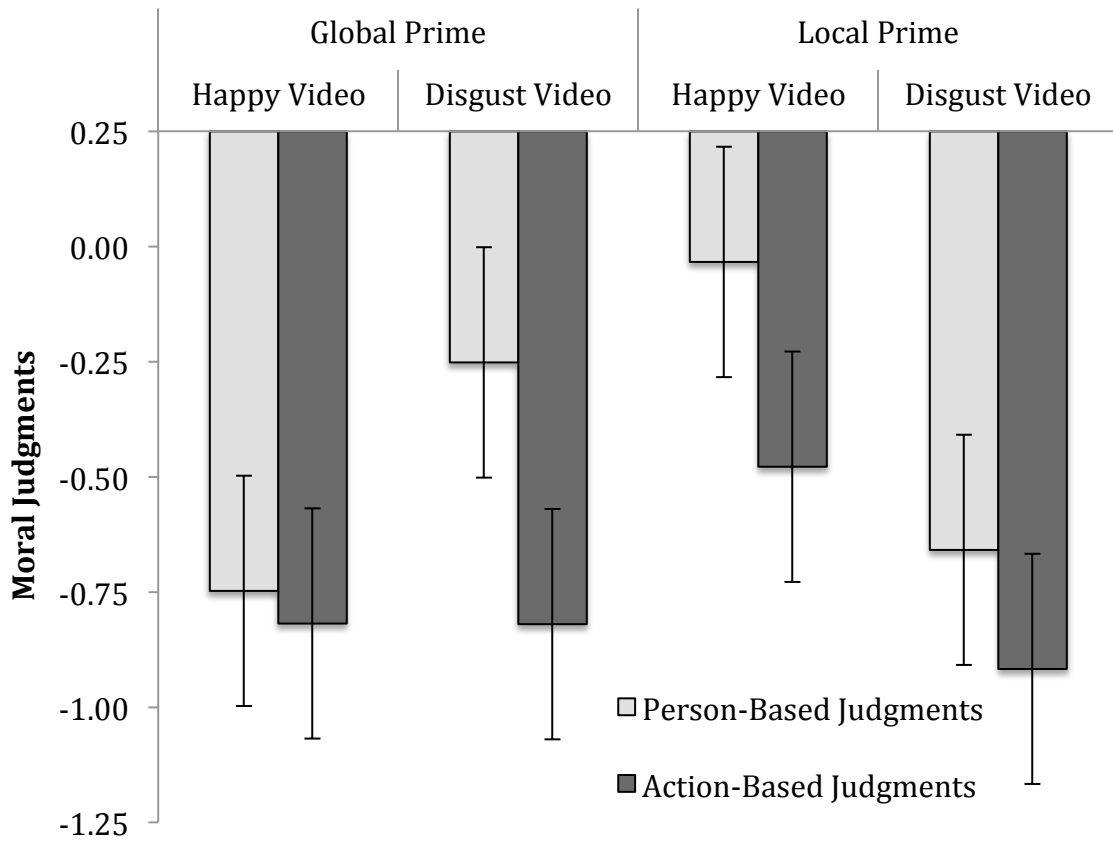


Figure 12. Person-based and action-based moral judgments as a function of processing style and affect (error bars are +/- 1 SE).

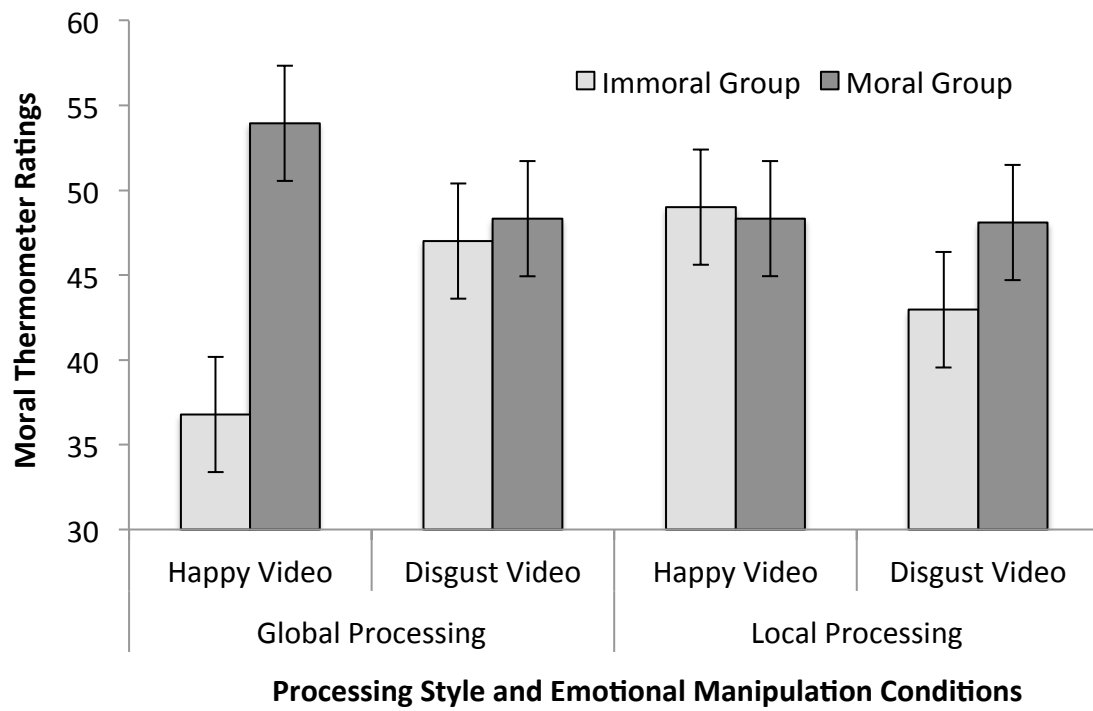


Figure 13. Moral thermometer ratings as a function of processing style, affect, and group stereotype information (error bars are $\pm 1 SE$).

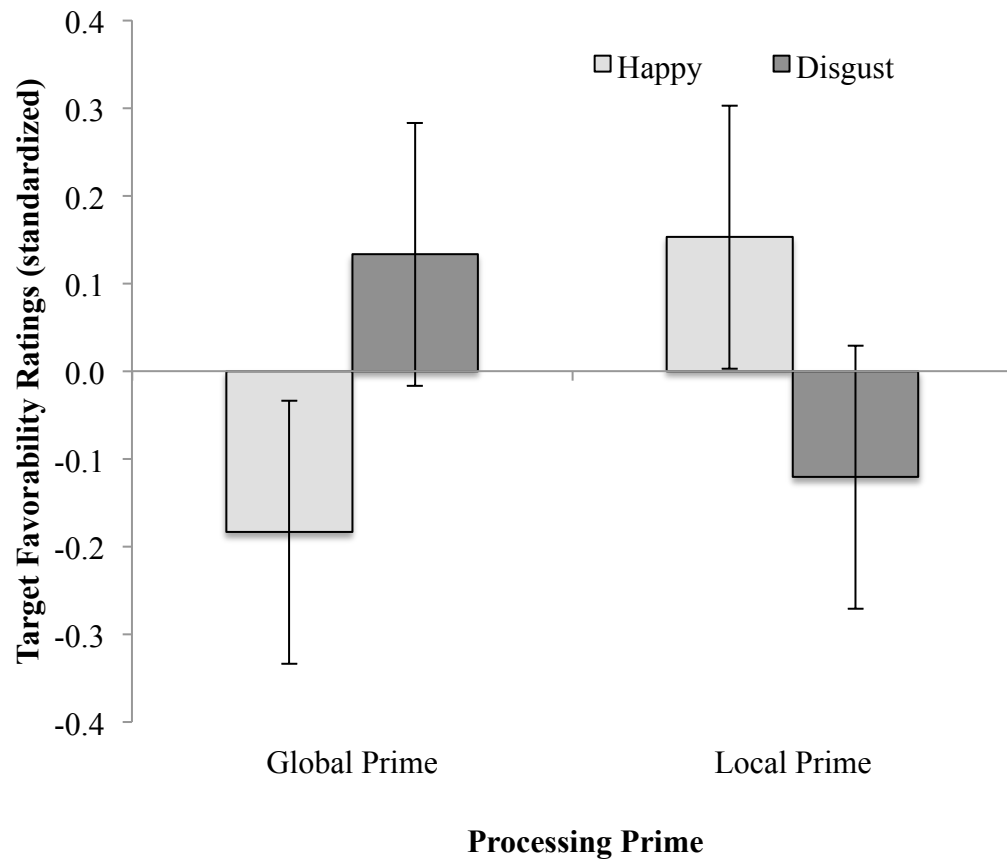


Figure 14. Target favorability ratings of Jack as a function of processing prime and affect (error bars are +/- 1 SE).

Appendix A

LIFE EVENT INVENTORY TASK INSTRUCTIONS

The following prompt was used in Study 1 and Study 3B:

Please think about the last few months. What made you really feel **happy/sad/physically disgusted** recently and continues to make you feel **happy/sad/physically disgusted** even when you think about it today? Please take time to imagine what this event was like that made you really feel **happy/sad/physically disgusted** and try to relive it again in your mind's eye. Then describe what made you feel **happy/sad/physically disgusted** as vividly and in as much detail as you can.

The following questions may help you with this task: What were you feeling? What made you feel that way? What was important for you? What lead up to that feeling? Did that event set off some chain of thoughts or fantasies that enhanced your feelings? What were they?

Please describe the event as vividly and in as much detail as you can. You'll be asked to reflect more on your story later in the experiment.

Appendix B

STUDY 2 IMAGE SELECTION PRETEST

To create a flanker task that would integrally induce affect, emotional images were pretested for eliciting the appropriate emotions. Participants were asked to rate a series of different images on how well each image elicited a target emotion. From these ratings, three images were selected for each target emotion (happy, sad, disgust, and neutral).

Method

Participants and Design

After completing Study 1A, participants completed a map task that equally primed global and local processing styles (procedure described in the emotional flanker pilot study). Then participants watched a short neutral video clip about the U.S. Postal system (to equalize mood after Study 1A). After these tasks, participants completed the image pretest. A total of 178 participants (80.3% female) from the psychology participant pool were recruited and received one research credit as compensation to be used as extra credit in their psychology course. The age of the participants is 19.87 years ($SD = 1.38$) and the sample is 75.3% Caucasian, 5.6% African-American, 12.9% Asian, 2.2% Hispanic, 1.7% mixed race, 0.6% of another race. An additional 1.7% of the participants chose not to report their race. Participants were randomly assigned to rate half of the image set, and to either a set image presentation order or a randomized image presentation order.

Materials and Measures

Photographic stimuli. Twenty-eight images (seven for each target emotion: happy, sad, disgusting, and neutral) from the International Affective Picture System

(IAPS; Lang, Bradley, & Cuthbert, 2008) were selected for pretesting. The IAPS set of images includes approximately 700 images, all of which are rated for how pleasant and arousing they are on a 1 (*highly unpleasant/low arousal*) to 8 (*highly pleasant/high arousal*) scale by a large dataset ($N > 10,000$). The images at the extremes of the arousal scale are quite graphic in the content, with extremely unpleasant, high arousal images being quite violent, frightening, disgusting, and overall distressing. Likewise, those at the other end, the extremely pleasant, high arousal images tend to be pornographic in nature. For these reasons, the overall pleasantness and arousal ratings for the 28 images I selected for the pretest were numerically closer to the middle of these arousal and pleasantness scales, even though they varied in terms of pleasantness according to whether the image evoked happiness, sadness, disgust, or a relatively neutral affect.

Image Ratings. Participants rated each image on three dimensions. First, they were asked to rate how pleasant or unpleasant the image was on a -5 (*very unpleasant*) to a +5 (*very pleasant*) scale. Then, on the next screen they rated the extent to which that image made them feel the target emotion (happy, sad, disgust, or unemotional) on a 0 (*Not at all*) to 10 (*Very Much*) scale. Last, they were asked to rate the extent to which that image was “visually interesting, or eye-catching” on a 0 (*Not at all Interesting*) to 10 (*Very Interesting*) scale. For each of these ratings, the image remained in the upper central portion of the screen for their reference.

Results and Discussion

Participant responses for the pleasantness, target emotion evocation, and visual interest ratings did not differ as a function of presentation order (randomized vs. set), all $ts < 1$. Therefore, this condition was removed from the analysis and descriptive statistics were examined for all images. First, I ranked the images by participants’ reports of target

emotion evocation rating, as this was the variable of greatest importance to the pretest (i.e., whether or not the image evoked the intended emotion). Given that these images would be used in the emotional flanker task, the five highest-rated images for the target emotion evocation ratings were then compared for their levels of arousal and visual interestingness, in order to create consistency across the different emotional flanker block presentations. *Table 9* shows the results of the final 12 images that were selected for use in the emotional flanker task.

Table 9. Mean ratings for image pretest taken from the IAPS

Image		Target Emotion		Pleasantness		Visual Interest	
Happy		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Block 1	Puppies	8.54	1.75	4.15	1.08	5.59	2.20
Block 2	Girls giggling	8.50	1.65	4.11	1.32	6.25	2.25
Block 3	Older people biking	8.06	2.20	3.66	1.83	6.50	2.40
Disgust							
Block 1	Flies on pie	8.75	2.21	-3.26	2.54	4.64	3.13
Block 2	Dirty toilet	7.80	2.87	-4.28	1.79	3.81	2.87
Block 3	Cockroaches on Pizza	7.13	2.84	-3.16	1.81	3.66	3.30

Table 9. Continued

Image		Target Emotion		Pleasantness		Visual Interest	
Sad		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Block 1	Boy crying	7.12	2.61	-2.90	2.02	5.79	2.89
Block 2	Parents at cemetary	6.52	2.73	-2.53	2.05	5.53	2.35
Block 3	Girl crying	6.48	2.75	-2.66	1.93	5.33	2.72
Neutral							
Block 1	A Building	7.44	2.97	0.05	1.28	6.74	2.27
Block 2	Bus profile	7.34	3.01	0.24	1.11	5.01	2.68
Block 3	Card dealer	6.76	3.11	0.12	1.61	3.48	2.83

Appendix C

STUDY 3A

Method

Participants, Design, and Procedure

A total of 296 participants from the psychology participant pool were recruited for the study and received 1 research credit as compensation to be applied to psychology courses for extra credit. Participants were randomly assigned to one of 12 conditions in a 2 (global v. local processing prime) x 3 (happy, sad, disgust) x 2 (introverted librarian v. extroverted sales representative) experimental design.

Participants first completed a cognitive processing priming manipulation that induced either global or local cognitive processing. They then watched videos that elicit disgust, happiness, or sadness. Next, participants read a vignette that describes a global trait that is later contradicted by detailed information- the purpose of which is to be able to determine what information the participants focused on (the global information or the detailed, local information). Participants then answered questions about the impression they formed, including favorability ratings, trait assessments of the individual they read about, and how clearly and easily they were able to form their impression. Then they answered questions about their emotional reactions. This emotional assessment will include both how they are feeling at that moment, as well as how they felt when they were watching the video. The reason these questions are not completed directly after watching the video is due to the possibility of correction effects that have been found when participants merely report their current mood (Macfarland, White, & Newth, 2003). Finally, participants will complete a demographics questionnaire and then will be debriefed, granted their research credit, and dismissed.

I excluded 29 participants, including those who were statistical outliers in their responses to the video clips ($n = 15$). I also excluded those who answered less than 85% correct on the Navon priming task ($n = 12$), and those who could not recall Carol's job ($n = 2$). A multi-way frequency analysis revealed there were no significant differences in these 29 exclusions (10% of total sample) across conditions, $\chi^2(18) = 8.73, p = .966$. Of the 267 remaining participants (80.9% female), the average age is 20.15 years ($SD = 1.65$), and the sample is 85.4% Caucasian, 2.6% African-American, 10.1% Asian, .4% Hispanic, 1.1% Mixed race, and 0.4% of participants chose not to report their race.

Tasks and Measures

Processing prime. Global and local processing styles were primed using the same letter identification task as in Study 1 and in the main Study 2 (Navon, 1977; procedure from Förster, Liberman, & Kuschel, 2008). Participants' total accuracy score (out of 80) were used to determine those who were sufficiently primed (in this case the cut-off was 85%). Those trials in which the participant took longer than 1000 ms to respond were dropped from the accuracy count.

Affect manipulation. Participants watched one of three video clips selected to induce happiness (a scene from *The Simpsons*, Isbell, McCabe, et al., 2013), sadness (a scene from *One True Thing*, Isbell, McCabe, et al., 2013), or disgust, (a scene from *Train Spotting*, Schnall, et al., 2008).

Global trait information. The identical procedure (as described in Study 3B) was used to manipulate global trait information about the target, portraying the target as either an introverted librarian or extroverted sales representative. The only difference from Study 3B, is that the target was named Carol instead of Jennifer.

General Evaluations of the Target

Feeling thermometer rating. Participants rated the target on a feeling thermometer using the identical procedure from Study 3B.

Overall favorability. Identical to Study 3B, participants also judged how favorable, likable, and positive they perceived the target to be, which were averaged together for an overall favorability score (Cronbach's $\alpha = .913$).

Target Trait Judgments

Social thermometer rating. Participants rated Carol's extroversion and introversion using the social thermometer scale (using the same procedure described in Study 3B).

Trait ratings. Next, participants rated the extent to which Carol embodied particular personality traits on an 11-point scale (from 0-*Not at all*, 5-*Somewhat*, 10-*Extremely*). Extroverted traits were averaged together (talkative, self-confident, extroverted, sociable, outgoing; Cronbach's $\alpha = .863$), as were introverted traits (withdrawn, shy, introverted, a loner, and quiet; Cronbach's $\alpha = .740$).

Impression Formation Process

Amount of information used for impression formation. Identical to Study 3B, participants reported how much of the information they considered when forming their impression of Jennifer (1- *Very Little Information*, 2- *Only about Half of the information*, 3- *Most of the information*, 4- *Almost all of the information*).

Impression clarity. Participants next rated how difficult it was to form an impression of Jennifer on an 11-point scale, (0-*Not at all difficult*, to 10- *Very difficult*, reverse scored for composite), and how clear of an impression they were able to form (0- *Not at all clear*, to 10- *Very clear*). These two items were averaged together to create an impression clarity score (Cronbach's $\alpha = .752$).

Affect Manipulation Check

Similar to the Study 3B procedure, participants then reported to what extent they felt various emotions *while they were watching the video*. Responses were averaged together to create emotion composite scores: happy and cheerful (Cronbach's $\alpha = .839$), sad and upset (Cronbach's $\alpha = .751$), disgusted, sickened, queasy, and grossed out (Cronbach's $\alpha = .792$). Anger was analyzed as a single-item measure.

Results

Affect Manipulation Check

A repeated measure ANOVA comparing happy, sad, and disgusted composite emotions revealed that the affect manipulation was successful, $F(4,510) = 335.55, p < .001, \eta_p^2 = .725$. Participants in the happy condition reported more happiness ($M = 4.49, SD = 1.39$) than disgust ($M = 1.66, SD = .95$), and sadness ($M = 1.71, SD = .97; F(2,186) = 184.90, p < .001, \eta_p^2 = .665$). Those in the sad condition reported more sadness ($M = 5.13, SD = 1.29$) than happiness ($M = 1.51, SD = .71$), and disgust ($M = 2.04, SD = 1.11; F(2,172) = 326.32, p < .001, \eta_p^2 = .791$). Finally, those in the disgust condition reported more disgust ($M = 5.85, SD = 1.34$) than happiness ($M = 2.01, SD = 1.15$), and sadness ($M = 2.69, SD = 1.23; F(2,170) = 207.52, p < .001, \eta_p^2 = .709$). No other interactions or main effects emerged for the processing prime or the global trait stereotype information (all F s < 1).

General Evaluations of the Target

Feeling thermometer rating. The expected three-way interaction between affect, processing prime, and stereotype failed to emerge for feeling thermometer ratings; however two unexpected two-way interactions emerged. First, an interaction between processing prime and stereotype information emerged, $F(1,255) = 4.50, p = .035, \eta_p^2 =$

.017. This interaction reveals that those who were globally primed rated the target equally favorable regardless of whether she was described as an extroverted sales representative or an introverted librarian ($M_{Ext} = 67.73, SD = 16.35$ v. $M_{Int} = 69.12, SD = 16.44$) whereas those who were locally primed evaluated Carol more favorably when she was described as an extroverted sales representative than an introverted librarian ($M_{Ext} = 72.56, SD = 12.75$ v. $M_{Int} = 65.89, SD = 15.90$). A second interaction between affect and stereotype information, $F(2,255) = 3.24, p = .041, \eta_p^2 = .025$ reveals that happy and sad participants rated Carol equally regardless of stereotype information (Happy: $M_{Ext} = 66.85, SD = 18.15$ v. $M_{Int} = 67.62, SD = 15.92$; Sad: $M_{Ext} = 69.94, SD = 11.91$ v. $M_{Int} = 70.23, SD = 14.82$), whereas those in the disgust condition rated Carol more favorably when she was described as an extroverted sales representative than when she was described as an introverted librarian ($M_{Ext} = 74.18, SD = 12.77$ v. $M_{Int} = 64.64, SD = 17.52$).

Overall favorability. As with the feeling thermometer ratings, I did not find the expected results for the favorability composite item. There was a 2-way interaction between affect condition and stereotype information, $F(2,255) = 3.50, p = .032, \eta_p^2 = .027$, with those in the happy and sad condition finding the introvert more favorable than the extrovert (Happy: $M_{Ext} = 5.86, SD = 2.43$ v. $M_{Int} = 6.49, SD = 2.05$; Sad: $M_{Ext} = 6.25, SD = 2.17$ v. $M_{Int} = 6.87, SD = 2.03$) and those in the disgust condition finding the extrovert more favorable than the introvert ($M_{Ext} = 6.97, SD = 2.14$ v. $M_{Int} = 6.04, SD = 2.30$). No other interactions or main effects emerged, (all F s < 1.1).

Target Trait Judgments

Social thermometer rating. Affect, processing prime, and stereotype information did not fully interact to influence participants' social thermometer ratings,

but there was a main effect for stereotype information, $F(2,255) = 37.74, p < .001, \eta_p^2 = .129$. This was in the expected direction, such that participants rated the sales representative ($M = 63.18, SD = 15.28$) to be more extroverted than the librarian ($M = 51.91, SD = 15.27$). No other effects emerged for the social thermometer item.

Trait ratings. A mixed ANOVA comparing ratings of introverted and extroverted traits found the same main effect of stereotype information, but no other effects or interaction emerged. The interaction between trait ratings and stereotype information was in the predicted direction, $F(1,255) = 72.37, p < .001, \eta_p^2 = .221$, as participants rated the sales representative as more extroverted ($M = 6.34, SD = 1.16$) than introverted ($M = 4.21, SD = 1.35$), but the librarian was rated equally on extroverted ($M = 5.36, SD = 1.51$) and introverted traits ($M = 5.31, SD = 1.39$). No other effects emerged for the trait ratings, (all $F_s < 1.3$).

Amount of Information Used for Impression Formation and Impression Clarity

There was an overall effect of processing prime on the amount of information considered when making an impression, such that those in the local condition considered slightly less information ($M = 3.37, SD = .58$) than those in the global condition ($M = 3.53, SD = .56; F(1,255) = 4.48, p = .035, \eta_p^2 = .017$).

Participants generally found that it was easier to form an impression of the sales representative ($M = 5.10, SD = 2.20$) than the librarian ($M = 4.40, SD = 2.08; F(1,255) = 7.90, p = .005, \eta_p^2 = .030$). An interaction between processing prime and global trait stereotype information emerged, $F(1,255) = 4.67, p = .032, \eta_p^2 = .018$, such that those in the global processing prime condition found Carol equally easy to form an impression of, ($M_{Ext} = 4.85, SD = 1.99$ v. $M_{Int} = 4.68, SD = 2.03$), but those in the local condition found

it easier to form an impression of the sales representative ($M_{Ext} = 5.38, SD = 2.40$) than the librarian ($M_{Int} = 4.13, SD = 2.11$).

Appendix D

STUDY 3 VIGNETTE

The following vignette was used to establish global traits and local behavioral information for Jennifer in Study 3B (formerly Carol in Study 3A).

BACKGROUND INFORMATION

NAME: Jennifer

AGE: 32

OCCUPATION: full time librarian/sales representative

INFORMATION OBTAINED FROM A CLOSE FRIEND:

“Jennifer is a shy, introverted person who likes quiet time and leads an orderly life, so she finds her job as a librarian to be very satisfying.”

“Jennifer is a sociable, extroverted person who likes meeting people, so she finds her job as a sales representative to be very satisfying.”

Jennifer woke up, turned the alarm clock off, and crawled out of bed. After dressing quickly, she got ready to leave. This morning, Jennifer had a doctor’s appointment before going to work. The mist had gathered on her new Toyota and she stopped just long enough to clean the windshield before starting off. While waiting to see the doctor, she kept a conversation going with another patient by talking animatedly about how much she enjoyed running and other sports. She had a real knack for controlling conversations.

After working at her librarian/sales representative job, Jennifer got ready to jog. She loved to run and seemed enthusiastic and cheerful even when the weather wasn’t exactly ideal. She gave the impression of having unlimited energy. Jennifer usually kept a busy schedule going from activity to activity and somehow she managed to remain friendly and outgoing despite her long day at work. During her run, Jennifer didn’t hesitate to speak to strangers, having a self-assured manner with every new face.

Two days later, Jennifer and a friend went to Happy Hour at a local bar. She spotted Greg, a guy she really liked a lot and was interested in dating. Jennifer froze and tried to remain unnoticed, avoiding interaction with other guys as well. Today, Greg tried to engage Jennifer in conversation. Jennifer appeared bashful and hesitant, but did begin to complain about how hard her job as a librarian had become. Amidst the noise of

the band, the crowds of people and her talkative friend, Jennifer's soft voice was hardly even heard. Later that evening, Jennifer ran into Greg and some associates on the street in front of her office. She remained reserved and discreet about her personal life. When Greg asked her for a date, Jennifer looked to the ground and seemed self-conscious. She walked away, angry with herself for not taking Greg up on his offer.

Jennifer's course schedule was heavy even though she was going to school part time. This week, she had entered a debate that was a prelude to her campaign for a position on the local school board. During the debate, Jennifer was forceful with her opinions, out-shouted her opponent, and cheered loudly along with the members of her team when they seemed to win a point. The local politicians considered that Jennifer's campaign would be a success because she was ambitious and seemed confident in her opinions. It was never really clear how these local races would turn out. Jennifer took a few hours off from her job as a librarian/sales representative to attend classes three times a week. As opposed to classes requiring group work and interaction with other students, Jennifer preferred classes that allowed her to work alone. During classes she felt inhibited and tried to think through a question completely before she would dare ask it. This week, she was particularly upset because she was not selected to be a research assistant for a project in which she was interested. Because Jennifer avoided him, the professor did not know she was interested in the project. Jennifer could have used both the experience and the money from the assistantship.

That weekend, Jennifer went to the park and daydreamed for hours. Sitting by herself among the other people in the park- mothers and their screaming, happy kids- Jennifer appeared to be deep in thought, withdrawn from the activity around her. Two friends walked by late in the day, and that night they all went to the Brentwood neighborhood block party. Jennifer was very entertaining that night and danced for much of the night.

The next morning, the alarm clock went off an hour early, at 7:00. Jennifer turned over in a groggy state of half-sleep, half-waking consciousness, then curled up to try to recover the pleasant state of drowsy unconscious. Jennifer was not better at falling back to sleep than the rest of us, so she got out of bed, took a shower, and prepared to start another week at her job as a librarian/sales representative.

Appendix E

STUDY 4 VIGNETTE PRETEST

A pretest was conducted to establish that the vignette to be used in Study 4 would provide a description of Jack that was morally ambiguous. These vignettes followed the same format as the Carol vignette in Study 3 and described a typical day in Jack's life. Three subtly different versions of the vignette were given to participants, with the goal of selecting the most morally ambiguous, or neutral description of Jack for use in Study 4. The first goal of this pretest was to determine if any of these descriptions of Jack conveyed an overall immoral judgment (as this could prevent any manipulation of a moral group membership from having an effect on judgments of Jack). A second goal of the pretest was that I wanted participants to have a movable impression of Jack (which could be influenced by Jack's group membership in a moral or immoral group) so I did not want participants to have extremely high confidence or clarity for their impressions of Jack.

Method

Participants, Procedure, and Design

Participants were recruited from a social psychology lecture class (266 total, 73% female). Participants were given a sheet of paper with one of the three vignettes (randomly presented) on the front side of the page, and with the questions about Jack on the back. Participants were randomly assigned one of three vignettes, in a one-way, between-subjects factorial design.

Materials

Participants read one of three different vignettes about Jack (see Appendix I), with the following instructions: "Please read all of the information below and form an

impression of the character (Jack) in the story. After doing so, you will be asked some questions about the impression that you formed of Jack.” On the back of the page, they were asked questions about Jack.

Measures

Moral Impression Formations

Person-based judgments. After reading the story about Jack, participants answered three questions to assess their moral judgments about “Jack”, *as a person*, which included whether they thought he was moral or immoral, morally right or morally wrong, and good or bad, (-5- *Very immoral/morally wrong/bad* to +5- *Very moral/morally right/good*, Cronbach’s $\alpha = .855$).

Action-based judgments. After these items, they then answered three questions of a similar nature, but which assessed whether Jack’s *actions* were moral or immoral, morally right or morally wrong, and good or bad (on the same scale, Cronbach’s $\alpha = .934$).

Feeling Thermometer Rating

Next, participants rated Jack on a feeling thermometer, identical to the one used in Studies 3 and 4.

Impression Formation Confidence

Participants then answered two questions about the impression that they formed (Cronbach’s $\alpha = .821$), one asking how clear of an impression they were able to form (0- *Not at all clear* to 6- *Very clear*), and how confident they were about their impression of Jack (0- *Not at all confident* to 6- *Very confident*).

The last item asked participants to report their gender.

Results

Moral Impression Formations

Descriptive Confirmation of Morally Neutral Depiction of Jack. First, I compared the moral judgments of Jack, *as a person*, across the different three vignettes, which confirmed participants rated Jack as morally neutral in all three of the vignettes (with average responses ranging from 0.75 to 1.5). This narrow range of responses demonstrates that all three vignettes depicted Jack as relatively neutral, but also slightly positive. Similarly, when I examined the judgments of Jack's actions, the average responses fell close to the scale midpoint (with average responses ranging from -0.35 to 0.56).

Person-based moral judgments. Next, I conducted a one-way, three-level ANOVA comparing the moral judgments of Jack across the three different vignettes. When judging how moral Jack was, *as a person*, a significant main-effect emerged, $F(2,262) = 6.62, p = .002, \eta_p^2 = .048$. Bonferroni post-hoc tests revealed that participants rated Vignettes 1 and 2 similarly to one another ($M_1 = 1.40, SD = 1.39$ vs. $M_2 = 1.50, SD = 1.49; ps > .05$), but that participants viewed Jack in Vignette 3 as slightly more neutral ($M_3 = 0.75, SD = 1.60$) than Jack as described in Vignette 1 ($p = .012$), and in Vignette 2 ($p = .003$).

Action-based moral judgments. I conducted a one-way ANOVA for the action-based moral judgments, and a significant main effect emerged, $F(2,263) = 9.30, p < .001, \eta_p^2 = .066$. The same patterns of differences found in the previous analysis were repeated here, as Bonferroni post-hoc tests revealed that Vignettes 1 and 2 were viewed relatively similarly, ($M_1 = 0.54, SD = 1.67$ vs. $M_2 = 0.56, SD = 1.62; ps > .05$), whereas Jack's actions in Vignette 3 ($M_3 = -0.35, SD = 1.51$) were viewed as less moral than in Vignette 1 ($p = .001$) and in Vignette 2 ($p = .001$).

Feeling thermometer rating

A similar pattern of results emerged for ratings of Jack's favorability from the feeling thermometer item, $F(2,262) = 5.31, p = .006, \eta_p^2 = .039$. Bonferroni post-hoc tests revealed that Jack in Vignettes 1 and 2 were viewed relatively similarly, ($M_1 = 61.55, SD = 16.13$ vs. $M_2 = 63.78, SD = 17.12; ps > .05$), whereas Jack in Vignette 3 ($M_3 = 55.91, SD = 16.51$) was viewed as slightly (but not significantly) less favorable than Jack in Vignette 1 ($p = .075$), but was viewed as significantly less favorable than Jack in Vignette 2 ($p = .005$).

Impression Formation Confidence

No significant differences between the vignettes emerged when analyzing participants' judgments of confidence and clarity for their impressions of Jack, $F(2,263) = 1.17, p = .31$, meaning that all vignettes were equally clear (or unclear) in their description of Jack.

Discussion

Participants viewed Jack from Vignettes 1 and 2 similarly across all of the dimensions (moral judgment, favorability, and impression clarity), and the mean responses for each of these ratings suggest that, as intended, participants judged Jack as fairly neutral, but slightly positive in both moral character and favorability. Participants viewed Jack from Vignette 3 somewhat more neutrally than in Vignettes 1 and 2, but when rating the morality of Jack's actions, the average response for participants who read Vignette 3 fell into the negative range of responses ($M = -0.35, SD = 1.51$). The goals of the pretest were to eliminate any vignettes with outright *immoral* evaluations from being used in Study 4, so this finding precluded Vignette 3 from being considered as the final vignette. When comparing Vignettes 1 and 2, these vignettes were statistically similar

throughout all measures, but Vignette 1 was consistently rated more neutrally (i.e., the mean responses for all ratings were always slightly closer to the midpoint than for Vignette 2). For these reasons, I decided to use Vignette 1 in Study 4.

Appendix F

STUDY 4 GROUP NAME PRETEST

A small pretest was also conducted to choose names for the three groups that would be used in Study 4. One goal of this pretest was to avoid conveying any moral or immoral connotations with the group names. A second goal was to select names that would be distinct and memorable to participants.

Method

Participants

Participants were 12 members (66% female) of the Affect and Cognition social psychology research lab at UMass Amherst. Participants took this survey through Qualtrics (an online survey distributor) and were aware of the study goals.

Name Choices

Thirty-eight potential group names were created by the primary investigator and from soliciting suggestions from lab members in the weeks leading up to the pretest. The names were nonsense words: Charvens, Lenmens, Watkins, Sanders, Prumbles, Sedlies, Flepps, Thilps, Cotinks, Gathras, Desnets, Consons, Gaffords, Pojums, Perners, Kiers, Emplis, Thouts, Fultons, Lobos, Bindles, Kooks, Phlobens, Mullors, Sunics, Rulnics, Wiltons, Abneys, Welches, Mindons, Larches, Vassers, Dubrays, Thaxters, Pliners, Haplins, Grixies, Murneys.

Name Preferences

Group name preferences were measured by asking participant to select and rank their top ten group names. Overall preference for a particular group name was considered by using both the popularity and relative ranking of the name across participants. First, I sorted by total choice count, computed by summing how many people selected that name

to be part of their top ten choices. Due to the large number of group name choices, six group names tied for the highest total choices (with five votes each: Kiers, Charvens, Gaffords, Watkins, Vassers, and Haplins). After excluding the list to these six choices, I then computed an average ranking score for each name, by summing the ranking preferences from all those who selected that name, and then dividing by the number of people who chose that name. The overall preference for each group name was then calculated as a ratio of these two scores (Average Preference = Total Ranking/Total Count). For example, if five people chose the Kiers, and those people ordered that group name as their first, third, fourth, sixth, and ninth choices, then the total ranking score for the Kiers name would be 23. For this example, the overall preference score for the Kiers group name would be 23 divided by 5, or 4.6.

Results and Discussion

Due to the large number of choices, no names gained a clear majority. Six name choices garnered 5 votes each (see *Table 10*) and their overall preference scores varied. The three names with the most vote counts and also the most prioritized average ranking, were selected for use in Study 4: the Haplins, the Vassers, and the Watkins.

Table 10. Group name sorted by count, ranking, and average preference.

	Total Count	Total Ranking	Average Preference
Haplins	5	14	2.80
Watkins	5	25	5.00
Vassers	5	25	5.00
Gaffords	5	27	5.40
Charvens	5	28	5.60
Kiers	5	32	6.40
Fultons	4	11	2.75
Wiltons	4	13	3.25
Sunics	4	16	4.00
Pliners	4	16	4.00
Murnies	4	20	5.00
Sanders	4	22	5.50
Bindles	4	24	6.00
Emples	4	28	7.00
Thaxters	4	29	7.25
Mindons	3	11	3.67
Kooks	3	13	4.33
Consons	3	17	5.67
Sedlies	3	18	6.00
Desnets	3	18	6.00

Table 10. Continued.

	Total Count	Total Ranking	Average Preference
Flepps	3	20	6.67
Thilps	3	20	6.67
Thouts	3	24	8.00
Welches	3	24	8.00
Prumbles	2	8	4.00
Abneys	2	8	4.00
Rulnics	2	10	5.00
Larches	2	10	5.00
Lenmens	2	11	5.50
Mullors	1	1	1.00
Dubrays	1	3	3.00
Cotinks	1	4	4.00
Grizies	1	4	4.00
Phlobens	1	5	5.00
Perners	1	10	10.00
Gathras	0	0	0.00
Pojums	0	0	0.00
Lobos	0	0	0.00

Appendix G

STUDY 4 PROTOTYPICAL GROUP MEMBER VIGNETTES

Vignettes used in Study 4 to establish group stereotypes, which describe archetypal members.

Moral Group Members (Vassers)

1) Anna has been a member of the Vassers for 4 years.

Waking up to her alarm, Anna rolled out of bed and started getting ready for the day. After grabbing some coffee, she drove to her local pharmacy, where she worked as a pharmacist. Today she was looking forward to training a new pharmacist, Jason, who was just out of pharmacy school and was looking for some hands on experience. Anna knew that some people might find her job boring, but she found that she really enjoyed it, and she particularly appreciated her colleagues. Everyone who worked with her took their job seriously, but they also seemed to know how to be friendly in the workplace.

After a few hours of work, Anna and another colleague, Tim, took Jason out to lunch, as they could tell that he was overwhelmed with his first day. During lunch, Jason admitted he was somewhat worried about how quickly he needed to change focus throughout the morning, and didn't know if he would be able to keep up. Anna and Tim tried their best to reassure him by saying that they also felt that way when just starting out, but that he would eventually get used to the hectic schedule. Later, after Anna got off work, she went to a nursing home where she volunteered for a few hours a week. She chatted with some patients for about an hour, before helping the nursing staff create an organizational layout for a new pharmaceutical storage area. That night, after returning home and eating dinner, she put some music on and began to relax from her busy day, and then went straight to sleep.

2) Patrick has been a member of the Vassers for 8 years.

Patrick woke up late, then ate a leisurely breakfast and read some news online. He worked as a 5th grade teacher, so he enjoyed the weekend, when he could sleep in. Later that morning, he went outside to get some yard-work done. While he was mowing his grass, he listened to music and tried to make the chore more enjoyable. When he was finished, he realized that his neighbor's yard could use mowing too. After knocking on her door and making sure it was okay with her, Patrick ended up mowing Martha's lawn that afternoon too. She was retired and seemed to have some trouble getting around, and he could tell that she really appreciated it. After he finished mowing her lawn, Patrick went back inside and got cleaned up.

That afternoon, he worked on a budget and a schedule for an upcoming class field trip to a nearby science museum. Patrick made certain that part of the budget was eating lunch in the museum's cafeteria, because he knew that some students in his class wouldn't have

lunch on the field trip otherwise. Then he emailed Paula, the other 5th grade teacher, to set up a meeting about sending the information out to all of the parents about the field trip. That night he met some friends to go bowling, they had joined a league that usually met on Thursday nights, but they liked to go and practice some weekends. After saying goodnight to his friends, he headed home and started getting ready for bed. He fell asleep quickly that night, because he was so exhausted.

3) Julie has been a member of the Vassers for 11 years.

Julie woke up early that day, and grabbed a quick bowl of cereal for breakfast before getting ready for the day. She worked at a non-profit agency that worked to improve adult literacy rates and was eager to head into work because they were finally reaching the end of an important outreach project. Julie and some colleagues had figured out that the agency needed to use TV, radio, and video internet ads to reach out to those adults in the community who couldn't read. Last week, she and her team had finally finished the ads, and they had begun airing earlier that week. Julie was hoping that they would start to see more people coming to the reading center as a result. They had already started to see a small increase in people coming in over the last few days, so they were already busier than usual at the reading center.

That day, Julie worked with a few different individuals, and she noticed that they were making good progress on their reading skills. She ended up staying late that day, so that he could make some calls to radio stations about when to air the ads in the next few weeks. Then, Julie went and met some friends, Tina and Emily, for dinner at a local sports bar. They ordered some wings and then watched the basketball game on TV. After the game was over, she went home and got ready for bed. She had some trouble falling asleep because of such an eventful day, but she eventually drifted off to sleep.

4) Joe has been a member of the Vassers for 2 years.

Joe got out of bed as soon as his alarm went off, and started getting ready for the day. He lived off-campus with a few other roommates, but he had a couple of classes that day so he packed his bag and went to grab breakfast on campus. After breakfast, Joe made his way to his first class, sat down and got out his notebook. The lecture was fairly interesting that day, and they even got to watch a video halfway through, so he felt like he was having a good start to his day. On his way to the next class, Joe saw a wallet someone had dropped on the sidewalk. Opening it up, he checked the ID and looked around to see if he could recognize the person nearby. Not seeing anyone familiar, he took a short detour to the student center to drop it off at the lost and found, before continuing on to his next class. Joe made it to class just as the lecture started and was able to grab a seat in the back of the room.

After class, he met his friend, Brian, at a sandwich place and they made plans to work in the library after lunch. They walked back to campus and studied for a few hours, before Joe decided to head to the gym. After his workout, Joe texted his roommates to ask if they wanted Pizza for dinner. On his way home, he picked up the pizza and then he

relaxed with his friends by watching some TV. When he started getting tired, he showered and then went to bed.

5) Eric has been a member of the Vassers for 6 years.

Eric woke up early, got dressed, and then went to meet a friend, Drew, at a diner for breakfast. They both were volunteer firefighters, and Eric had organized the group to go build a house that weekend, as part of the habitat for humanity project. After breakfast, they met the rest of their group at the build site and started getting to work. After a few hours of working on building the wood frames for the house, Eric had arranged for pizzas to be delivered for lunch and everyone seemed to be having a good time as they took a break from the construction. That afternoon went by quickly, and they made good progress on the house, and Eric enjoyed installing the kitchen cabinets with a few others, before calling it a day. As everyone started packing the tools away and cleaning up the build site, Drew asked if anyone was interested in going out for a drink later that night. A few people said they were too tired, but Kathryn, Pete, and Jacqueline decided to join Drew and Eric out at the bar.

That night, Eric arrived a little late to the bar. By that time, it was already clear that some of his friends were going to need help getting home later, so he offered to be the designated driver so that everyone else could relax and have a good time. Later that night, after dropping his other friends off at their places, he went home and went to sleep instantly, because he was tired after all the physical labor of the day.

Immoral Group Members (Haplins)

1) John has been a member of the Haplins for 5 years.

After waking up and getting ready for the day, John headed to the office. He was excited to be at work that day, because he and a few other colleagues had all worked hard as a team to finish an advertising project, and they were planning to pitch their idea to their client. John would be in a good position for a promotion if the meeting with the client went well, so the night beforehand he had strategized how to take ownership over parts of the project so that he would stand out to his boss. He knew he would have to be careful in his approach, because he knew that another member of the project team, Martin, was also angling for this promotion. During the meeting, he decided to criticize some of Martin's contributions and offered his own suggestions. The meeting seemed to go well, so after work he went out to celebrate with his coworkers. Normally his officemates were pretty friendly with him, but they all seemed distant that night, so he went home earlier than he thought he would.

Once he got home, John's mind drifted back over the events of the day. He mentally replayed the meeting with the client, and he felt confident that he had made it clear to his boss that he was the real reason for the success of the project. He was glad that everything with the client went so well and he thought about how he should approach his boss to discuss his promotion. After running through a few different ideas about how to handle the situation, he started to get tired and let himself drift off to sleep.

2) Sara has been a member of the Haplins for 7 years.

Sara woke up early and went for a jog, before grabbing breakfast and driving into the office. She worked at a local law firm and planned to meet with a new potential client, a small business owner, who was being sued for failing to pay workers their overtime wages. After asking him a few questions about the situation, she was able to determine that there wasn't any strong evidence that would implicate him and told him that she would be in touch about whether or not she would take the case. After lunch, Sara examined the financial documents the client had brought with him. Even though she knew that the business owner had set up an illegal pay schedule that was specifically designed to avoid overtime payment, she felt that she could produce a successful defense and felt good about taking the case.

After calling the client to confirm their next meeting, she left the office and met her fiancé for dinner. They spoke for most of the dinner about their plans to look at potential wedding venues that weekend. When she excused herself to the ladies' room, she was checking her makeup and noticed a pendant necklace on the floor. Sara thought the necklace looked cute, and she didn't think it looked overly expensive, so she decided to take it home with her. When she got home from dinner, she sat at her couch and wrote a few legal briefs that needed to be filed the next day. Exhausted from her long day, she got into bed and fell asleep as soon as her head hit the pillow.

3) Mike has been a member of the Haplins for 10 years.

Mike took his time waking up that morning, because it was a Saturday, and he didn't have to go in and teach high school students all day. He did have some grading to do, however, because his eleventh-grade class had turned in their 8-page essays that week. In all, he had about 40 papers to grade that weekend. It was nearing the end of the year, and he was exhausted from all the work he had been doing lately. After glancing at the pile of papers, Mike decided to go out and run some errands first.

Once he was back from the grocery store, he finally took a look at the student papers. He knew his students had worked hard on their papers and deserved quality feedback on them, but his heart just wasn't in it. Instead, Mike found himself going through the papers and making a few comments on each paper, and then giving students grades based on their previous assignment grades and their class participation. He took particular pleasure in grading a really annoying student's, paper fairly low. Mike knew it wasn't the best way to grade papers, but he had plans with his family the next day and didn't have the time to grade each paper in-depth. When he finished entering the scores into his grade book, he called his friend, Matt, and invited him out for a few drinks. When he returned home that night, Mike remembered that he had promised to make potato salad for his family's barbecue, so he set his alarm for earlier the next morning.

4) Meredith has been a member of the Haplins for 3 years.

Meredith woke up and made herself her usual breakfast of toast and yogurt, before getting ready for her classes. After parking in the commuter lot, she arrived early for her

first class of the day and sat near the back of the classroom, then she studied the flash cards she made last night. There was an exam that day, and she wasn't feeling confident that she would be able to do well. She always felt like she knew the material but couldn't remember it all for the tests in this class.

As the professor passed out the exams, she put her notebook and flashcards away, and slid her bag under her desk. Toward the end of the exam, Meredith realized that she was completely stumped on some of the questions, and couldn't even really make a guess at some of the answers. She was sitting too far away from other people to even make a glance at their exams, but then she noticed that her notebook was open to a page of notes in her backpack, and that she actually had some of the answers that she needed. She filled in the rest of the answers for her test, and then passed it in. After the test, she headed to a café for a Frappuccino, and then went to her next class. That night, when Meredith got home, she thought back to the test she took that day while she made dinner, and hoped that she got a passing grade. She settled on the couch with some of her roommates for a movie, before heading to bed.

5) Nick has been a member of the Haplins for 6 years.

That morning, Nick woke up quickly, got dressed for the day, and then grabbed a drive-thru breakfast sandwich before heading into work. He worked at a bank, as a mortgage lender and he usually met with about three to four clients a day. Some days were slower than others, but today he was fairly busy. Everything went smoothly for the first two clients of the day, but he eventually had to turn a client down for a mortgage right before lunch. Nick swung by Jim's office before lunch, and they both headed out to a burrito place down the street. After they got their food, Nick and Jim talked about the new guy at work, Darrell. He was kind of a nerdy guy, who seemed to be obsessed with no one touching the things on his desk. Nick suggested that they get him to loosen up by playing a prank on him and Jim thought it sounded good, and so they decided to brainstorm a few different ideas.

When they got back from the office, Nick saw another client, and then went to the break room to grab a snack. Later that afternoon, Jim came to Nick's office to let him know that Darrell had gone home already, so they went into his office and moved some of his stuff around. It wasn't the best prank, but Nick wanted to see how Darrell reacted to a mild prank before upping the ante. Nick then went home, made himself dinner, and finally watched some TV before heading to bed.

Control Group Members (Watkins)

1) Greg has been a member of the Watkins for 6 years.

Greg woke up to his alarm, and then got out of bed quickly. Before breakfast, he went for his daily run, and when he got back he made his usual high protein smoothie. After showering and getting dressed, he headed in to open up the nutrition store that he owned. That day they were conducting a store inventory, so he had asked Natalie and Ben to come in for some overtime hours so that they could help out. As they worked through the

items in the front of the store, Greg was pretty pleased that his predictions for what items would sell during the month were fairly close to the actual numbers. After finishing up the inventory late that afternoon, he decided to call it a day a bit early and headed to the gym.

Greg was a weight lifter and he had a few friends, Rob and Jake, that would show up at the same gym and they all would spot each other while lifting. He was planning on going to a competition later that month, so he was trying to carefully increase the weight he could lift. Greg was cautious because he was overcoming a knee injury from his time playing football in college and he didn't want to overdo it. Rob used to be a personal trainer, so he was great for knowing how much weight to add at a time. After a good day at the gym, Greg grabbed a burrito on the way home. Once he got home, he watched a bit of TV and then went right to bed.

2) Jenna has been a member of the Watkins for 5 years.

After sleeping in, Jenna got out of bed feeling refreshed. She usually woke up to an alarm, but she had been feeling under the weather lately and didn't want it to turn into a full-blown cold, so she figured she could use the extra sleep. After making an omelet for breakfast, she sat down to complete the newspaper crossword of the day. It was Jenna's day off of work, so she had minimal plans for the day other than doing some laundry and other household chores. As she put some clothes into the wash, she decided that she was feeling well enough that day to go to her yoga class. After changing into her yoga outfit and grabbing her mat, she walked to the downtown yoga studio, where she did yoga at least once a day, if not more.

As she settled into the session, Jenna began feeling more centered and relaxed. She let her mind sink down and started focusing on the movements and her breathing. At the end of the session, she was really glad that she decided to come after all because she was feeling much better. Before heading home, Jenna caught up with a friend, Claire, whom she hadn't seen in a few weeks, and made plans to grab dinner with her the next night. She was looking forward to hearing all about Claire's vacation to Fiji. When Jenna arrived home, she put the laundry in the wash, and then did a bit of cleaning up around her apartment. That night, she got into bed with a book, and read until she fell asleep.

3) Matt has been a member of the Watkins for 9 years.

Getting out of bed, Matt first did his usual morning workout- 30 pushups and 50 sit-ups, before grabbing some oatmeal for breakfast. After getting dressed, he headed into the university where he worked as the head soccer coach. His team had a game coming up later that week, so he wanted to make these next few practices really count. The team they were playing against was having a strong season, with only one loss, so his team really needed to be playing at their best to win. The opposing team was particularly strong at defense, so he wanted to make sure that these next few practices were going to help the offense on his team. That morning he worked up a few plays that might work against the other team and decided to run them by the assistant coach, Jerry, after lunch.

He took a quick lunch break down the street, and then when he got back he went into Jerry's office to go over the new plays. Jerry thought they were decent, but he had a few ideas in mind to make them more effective, so they worked together on them for the rest of the day, until practice time for the team. The team did a great job putting the plays into practice, and Matt felt good about their prospects in the upcoming game. That night, after making himself dinner, Matt watched the video of the practice from that day, so that he could deliver his feedback to his players for the next practice. After finishing his video feedback, Matt went to bed.

4) Leslie has been a member of the Watkins for 3 years.

Leslie woke up early, before her alarm could go off. She was excited to get the day started, because she was starting her new job as a personal trainer. She had worked as a personal trainer for the year before, but she had just been hired at the nice, new gym in town that had state-of-the-art facilities. After having breakfast and getting ready for the day, she headed into the gym and first met with the manager, Tom. Leslie filled out all her paper work, and then Tom showed her to the trainer's lounge. She had her own space where she could meet with clients and discuss their personal routines, in addition to the large open area where trainers could relax and get to know each other between clients. She was eager to get to work, and familiarize herself with the layout of the gym and all of the equipment.

After lunch, Leslie went on a tour of the gym with Tessa, who showed her around and then had Leslie watch one of her training sessions. Leslie was really looking forward to having her own clients, and was happy that it seemed like she would be able to start meeting clients by the end of that week. Leslie grabbed dinner at a restaurant in town with her friend, Rachel, and they talked all about her first day at the gym. After driving home, Leslie got into bed, but she had trouble falling asleep because she was excited to be back at work the next day.

Appendix H

STUDY 4 IDENTIFICATION BLURBS

The moral and immoral identification blurbs were taken from previous research (Knutson, et al., 2013, supplemental materials). The control (sporty) identification vignettes were created for this study.

Instructions to Participants

Now that you have read about these three groups, we would like to see if you can identify what group people are in based on reading a short example of their behavior. Last semester, we had participants write stories about life events, and then we took those stories and shortened them to describe one event for each person. We are interested in seeing if you can correctly identify what group, the Vassers, Haplins, or Watkins, to which these people belong. You will be given 30 short examples in all, once you have read the short event, please pick what group you think the person belongs to. After you make your choice, you will be told whether or not you were correct. Please try to get as many identifications correct as you can. When you are ready to begin, please press the continue button below.

Moral Group Identification Blurbs

- 1) "I was riding my bike and passed a Ford truck with the keys in the door. So I went into the apartment building facing that street and asked the man inside if he had a Ford truck. He did and he went outside to get the keys out of the car door."
- 2) "I knew a couple and their child through one of those "save-a-child" foundations. The family decided to move to California and I knew they were going to have a really hard time finding work. So I sold a bracelet that I had and sent them the money."
- 3) "Just a few weeks ago I got a call from my friend's niece. She was living in my town and having some financial difficulties. I told her that she could come live with me for one week just until she got her act together."
- 4) "I was running across the street one time, years ago, and a little old woman fell. She was carrying groceries and she slipped. I helped her get her bearings back and picked up the groceries."
- 5) "I used to ride the bus everyday to work. One day I noticed a pregnant woman who did not have a seat. So I took her by the arm and helped her find a seat."

6) "I was at this festival downtown and there was a man walking along, counting his money. He had a lot of cash in his hands and dropped a five-dollar bill. I picked it up and returned it to him."

7) "I bought a pair of shoes and the lady was busy, so she charged me the wrong price for the shoes. I didn't want to cheat her so asked her if she was sure that this was the right price for the shoes. It was the wrong price and she corrected the price and thanked me."

8) "My neighbor had a dog for 14 years and one day the dog disappeared. I went around putting up signs throughout the neighborhood, but when my friend found his dog, it was sick and needed to be put to sleep. I stayed up all night with him as he cried."

9) "A friend of mine decided to move to the city where I lived. My friend didn't know anyone in the city. So, I went to pick her up at the airport and drove her around the city throughout the next week so she could become familiar with the city."

10) "While I was working as the manager of a bar, part of my job was to make deposits in the bank's night box. One night when I was depositing money, I found someone else's bag of money. Instead of keeping it, I deposited it for them."

Immoral Group Identification Blurbs

1) "I went to the movies a couple of months ago, to see a film. When that film was done, instead of leaving the theater, I just went into another of the theaters within the complex. I watched another movie without paying."

2) "My husband thinks I shop too much. So now when I go shopping I put the items in the trunk of my car. I take the items out slowly over time, so my husband doesn't find out."

3) "In high school my friends and I were big shoplifters. Our favorite thing to do after school was go to a local drugstore and load up on candy bars. We did it quite a few times and no one ever found out."

4) "Once I was house-sitting and I took a bottle of perfume from under the sink. I think it belonged to a girl who didn't live there anymore. I didn't think anybody wanted it anymore because it was underneath the sink."

5) "I took my sister's ring that was given to her by our father's aunt. I had never met our father's aunt but my sister spent some time with her. I took the ring because I didn't think that my sister deserved it."

6) "I put a poster that I had on EBay. There was a man who bid on it and paid with a system that sent the money directly to me. He was kind of a jerk during the whole transaction, so I decided not to send the poster and just keep the money."

7) "I lied to a boss once. I said I delivered some paperwork for him that he needed delivered to complete this deal. He had been unclear in his instructions to me and I just forgot to send it."

8) "I remember when public transportation buses started charging a dollar per ride. My friends and I would tear the dollar into 4 pieces and fold it up so it looked like a dollar. I would use a dollar for four rides."

9) "A little while ago I had to go to the RMV to get my drivers license renewed. They told me that I had to take a written test in which I had three attempts to pass. I failed the first two times, so I cheated on the final attempt and passed."

10) "A few years ago I was staying with a friend who lived in a house of a very famous person. There were many autographed books in the house. I stole one of the books, which was autographed by a very famous celebrity."

Control (Sporty) Group Identification Blurbs

1) "I had a personal trainer a few years ago that wasn't really getting me to reach my exercise goals, so I ended up switching to a new person. Although I think that my first trainer was friendlier, I like the results that my new trainer gets me."

2) "I am on the school swim team, and these past few weeks were really hard because we were reaching our season's peak distance. I love swimming, but I am looking forward to next week when we will begin to lessen the distance we swim each practice."

3) "I work part-time at an office, and we don't really do anything together outside of work. I had found out about an office softball tournament in the area, and now we all get together a few times a month to play softball."

4) "A couple of weeks ago, I went with a couple of friends to run a marathon. We had trained together for a few months, so it was really great to cross the finish line. We both hit our target time, so we think we will sign up for another one soon."

5) "I really enjoy volleyball, but I got injured a year ago and can't play anymore. This year, I applied for a coaching job at the area high school, and I'm so glad I did. I wasn't sure what I was going to do after my injury, but I really like teaching the high schoolers how to play together as a team."

6) "Last week I finally bought myself a new bike. I bike into work and I also like to take long bike rides on the weekend. I've always bought used bikes, so I was excited to get my first new bike for myself and pick out all the special features that I wanted for it."

Appendix I

STUDY 4 METHOD AND RESULTS (INCLUDING SAD CONDITION)

Method

Participants and Design

Participants were recruited from psychology courses (292 total participants) and participated in exchange for course extra credit points. Participants first completed the group stereotype training (described in the group stereotype pilot study) by reading about the group information and then completing the identification task. Next, they then completed a distractor task where they colored for 4 minutes to repair their mood and allow their cognitive baseline to settle after the group stereotype training. After this distractor, participants were primed with an either global or local processing style through the map task (identical to the one used in Study 3B) and then watched a video clip that induced either happiness, sadness, or disgust. After these processing prime and affect manipulations, participants then read a story about the target individual (Jack), where global trait information was provided (through Jack's membership in either the moral group or immoral group) as well as local behavioral information was provided (which were morally ambiguous behaviors). Next, participants answered questions about the impression that they formed of the target, including moral judgments and general evaluations (such as favorability). Finally, participants then answered an affective manipulation check questionnaire and a short demographics questionnaire. They were randomly assigned to one of 12 conditions in a 3 (happy v. sad v. disgust) x 2 (global v. local) x 2 (moral v. immoral stereotype) between-subjects factorial design.

Some participants were excluded from the analysis because of failing manipulation checks. Twenty-three participants were excluded for scoring less than 85%

correct on the processing style manipulation. I also followed existing protocols for excluding participants with non-standard responses to affective manipulations (e.g., Bower, Monteiro, & Gilligan, 1978; Schnall, et al., 2008; Storbeck & Clore, 2005), and 31 participants who were more than three boxplot lengths away from the average affective responses to the videos (and therefore considered statistical outliers) were excluded from the analysis. Finally, 20 participants were also excluded because they participated in the vignette pretest (and I had no a priori method of preventing their subsequent participation in this study). A multi-way frequency analysis showed no relationship between the experimental conditions and exclusions from the analysis, Pearson Chi-square (12) = 2.03, $p = .999$. Of the remaining 230 participants (80.9% female), the average age is 20.01 years ($SD = 1.78$), and 75.2% are Caucasian, 3% are African-American, 13.9% are Asian, 2.6% are Hispanic, 3.5% are of mixed race, and 1.7% chose not to report their race.

Tasks and Manipulations

Group stereotype training. Participants followed the same instructions as those used in the group stereotype pilot study described earlier, and then read vignettes describing 4 individuals from the moral group (the Vassers), the immoral group (the Haplins), and the control sporty group (the Watkins). The groups were presented as blocks, but their presentation order and the presentation order of the individuals within groups were both randomized.

Identification Task. Next, participants completed the same identification task from the pilot study, where they read 26 short identification blurbs, chose what group the individual belonged to, and then received feedback about their performance on each item.

Distractor Task. Participants then completed a coloring-based distraction task (also used in the pilot study), in which they were given 10 crayons of varying colors and a blank piece of paper upon which to draw. This task served to help the group stereotype information settle, and also to restore the participant's affective and cognitive baseline which could have depleted during the previous tasks.

Processing Style Manipulation. Participants then completed the identical map task to the one that was used in Study 3B (adapted from Förster, et al., 2008, see *Figure 1*). Participants in the local condition were instructed to focus on the cities within the state, whereas those in the global condition were instructed to focus on the shape of the state.

Affect Manipulation. After the processing prime manipulation, participants watched one of two video clips to induce happiness (a clip from *The Simpsons*; Isbell, McCabe, Burns, & Lair, 2013), sadness (a scene from *One True Thing*, Isbell et al., 2013), or disgust (a scene from *Train Spotting* used in Schnall et al., 2008).

Impression Formation Vignette. Participants then read a story about an individual, named Jack, who engaged in a series of morally ambiguous behaviors (see Appendix J) with the following instructions: "Please read all of the information below and form an impression of the character (Jack) in the story. After doing so, you will be asked some questions about the impression that you formed of Jack."

Global Trait Information. In the beginning of the impression formation vignette, half of the participants were told that Jack was a member of the Haplins (immoral group) and the other half were told that Jack was a member of the Vassers. A small logo for the group was also included in the top right corner of the first page of the vignette so that

participants would be able to visually remember to what group Jack belonged (see *Figure 11*).

Moral Impression Formations

Person-based judgments. Participants answered three questions to assess their moral judgments about “Jack”, *as a person*, which included whether they thought he was moral or immoral, morally right or morally wrong, and good or bad, (-5- *Very immoral/morally wrong/bad* to +50 *Very moral/morally right/good*, Cronbach’s $\alpha = .904$).

Action-based judgments. After these items, they then answered three questions of a similar nature, but which assessed whether Jack’s *actions* were moral or immoral, morally right or morally wrong, and good or bad (on the same scale, Cronbach’s $\alpha = .930$).

Moral thermometer ratings. They also assessed Jack on a “Moral Thermometer”, where scores between 0 and 49 indicate that Jack is an immoral person, or someone who usually does the wrong thing and scores between 51 and 100 indicate that Jack is a moral person, or someone who usually does the right thing.

Target Favorability Ratings

Then, identical to the procedure in Study 3B, participants rated Jack on the feeling thermometer. Next, participants answered the overall favorability items used in Study 3B (judging how favorable, likable, positive Jack was). After standardizing these four items, I averaged them to create a composite favorability score (Cronbach’s $\alpha = .935$).

Target Trait Ratings

Participants rated the extent to which Jack exhibited good (average of friendly, sincere, trustworthy, warm, generous, honest, helpful, and conscientious; Cronbach’s $\alpha =$

.893) or bad personality traits (average of deceitful, mean, hostile, cruel, cold, arrogant, calculating, thoughtless, and selfish; Cronbach's $\alpha = .832$) on a 11-point scale (from 0-*Not at all*, 5-*Somewhat*, 10-*Extremely*). These traits were similar to those used for Study 3B, but instead included moral traits, as opposed to sociability traits (which were the focus of Study 3B).

Impression Formation Process

Amount of information used for impression formation. Also identical to Study 3B procedure, participants next answered a question asking how much information they considered when forming their impression.

Impression clarity. Then participants answered two questions (also from Study 3B) about the clarity and ease with which they formed their impression (Cronbach's $\alpha = .617$).

Manipulation Checks

Global trait stereotypic information manipulation check. Participants were then asked two items about Jack's group membership, the first was a free-response answer where they were asked to name the group that Jack belonged to, and the following item was the same question, but with multiple-choice answers of the group names. Recall was very high, with 95.7% ($n = 220$) of the final sample remembering Jack's group membership (close alternative spellings of group names in the free response were coded as correct).

Affect manipulation check. Participants were asked to what extent they felt various emotions *while they were watching the video* (i.e., sad, happy, disgusted, angry, certain of their beliefs, upset, anxious, confident, tense, grossed out, tense, queasy, observant, bored, tired, calm, confused, sickened, distracted, afraid, thoughtless, amused)

on a 7-point scale (from 1-*Not at all*, to 7-*Very Much*). Responses were averaged together to create emotion composite scores: happy and amused (Cronbach's $\alpha = .829$), sad and upset (Cronbach's $\alpha = .828$), disgusted, sickened, queasy, and grossed out (Cronbach's $\alpha = .963$), and tense, anxious, and afraid (Cronbach's $\alpha = .793$). Anger was analyzed as a one-item measure.

Group-based moral judgments manipulation check. Participants then answered three questions each about the Vassers, Haplins, and Watkins groups to assess their moral judgments about those groups. These three items were identical to those used in the group stereotype training pilot study, and composite items were created from all three judgments for each group (Vassers: Cronbach's $\alpha = .940$, Haplins: Cronbach's $\alpha = .972$, Watkins: Cronbach's $\alpha = .947$).

Participants then completed a basic demographics questionnaire, which asked them to report their age, gender, and race.

Results

Manipulation Checks

Affect manipulation. Participants in the happy video condition reported feeling significantly more happiness than those in the disgust condition, as revealed by a 2 (happy score v. disgust score) x 2 (happy video v. disgust video) x 2 (global v. local) x 2 (moral vs. immoral group stereotype) mixed ANOVA. An expected 2-way interaction between reported affect and the affect condition shows that the videos were successful at manipulating affect, $F(2,218) = 120.26, p < .001, \eta_p^2 = .525$. The pattern of results is in the expected direction, such that those in the happy condition reported significantly more happiness ($M = 4.49, SD = 1.60$) than disgust ($M = 1.47, SD = 0.61; t(71) = 13.65, p < .001, Cohen's d = 1.69$), or sadness ($M = 1.60, SD = 0.81; t(71) = 12.45, p < .001,$

Cohen's $d = 1.377$. Likewise, those in the disgust condition reported significantly more disgust ($M = 5.79$, $SD = 1.15$) than happiness ($M = 1.82$, $SD = 1.00$; $t(76) = 20.68$, $p < .001$, Cohen's $d = 2.37$) and sadness ($M = 2.32$, $SD = 1.27$; $t(76) = 21.68$, $p < .001$, Cohen's $d = 1.926$). Finally, those in the sad condition also reported feeling significantly more sadness ($M = 5.35$, $SD = 1.36$) than happiness ($M = 1.36$, $SD = 0.55$; $t(71) = 13.65$, $p < .001$, Cohen's $d = 2.602$) or disgust ($M = 1.95$, $SD = 1.04$; $t(80) = 20.14$, $p < .001$, Cohen's $d = 2.270$).

Bonferroni-corrected post-hoc tests reveal that those in the disgust condition did report feeling slightly more anger, sadness, and anxiety than those in the happy condition, (all $ps < .019$). All participants, regardless of condition, reported feeling significantly more of their target emotion than anger or anxiety (all $ps < .001$).

Group-based moral judgments manipulation check. The group stereotype training was successful. A significant main effect of group type revealed responses in the expected direction, $F(2,436) = 382.19$ $p < .001$, $\eta_p^2 = .637$. Participants viewed the moral group as more moral ($M = 9.54$, $SD = 2.33$) than immoral group ($M = 3.45$, $SD = 2.27$; $t(229) = 22.69$, $p < .001$, Cohen's $d = 1.495$) and the control group ($M = 7.36$, $SD = 1.68$; $t(229) = 11.38$, $p < .001$, Cohen's $d = .757$). They also viewed the immoral group as more immoral than the control group ($t(229) = -19.22$, $p < .001$, Cohen's $d = -1.278$).

Moral Judgments

Action- versus person-based judgments. I compared participants' judgments of the target "as a person" to their judgments of the target's actions. Person-based judgments and action-based moral judgments differed overall, with participants judging the target's actions slightly more severely ($M = -.85$, $SD = 1.36$) than Jack as a person ($M = -.45$ $SD = 1.55$; $F(1,218) = 53.35$, $p < .001$, $\eta_p^2 = .197$). There was also an interaction between

person-based and action-based judgments and Jack's group membership, $F(1,218) = 4.50$, $p = .035$, $\eta_p^2 = .020$. This was in the expected direction, such that when Jack belonged to the immoral (vs. moral) group he was judged more severely for both person-based judgments (immoral group: $M = -.73$, $SD = 1.59$; moral group: $M = -.17$, $SD = 1.45$), and action-based judgments (immoral group: $M = -1.04$, $SD = 1.44$; moral group: $M = -.66$, $SD = 1.25$). Aside from these two effects, differences between person-based and action-based judgments varied as a function of processing style and emotional manipulation, $F(2,218) = 3.92$, $p = .021$, $\eta_p^2 = .035$. The results for the disgust and happy conditions support the cognitive malleability account, as those processing globally (global + happy and local + disgust conditions) were more likely to incorporate the target's actions into their overall impression of him as a person (see *Table 11*). In contrast, those processing locally (local + happy and global + disgust conditions) were more likely to judge the target and their actions differently, particularly by judging the person less severely than the person's actions. Those in the sad condition, however, always judged Jack's actions more severely than Jack, as a person (see *Table 11*), regardless of processing prime. Notably, participants in the disgust condition were not significantly more punitive in their judgments of the target or his actions when compared to those in the happy condition (within-subjects interaction: $F(1,141) = 1.76$, $p = .187$; between-subjects main effect: $F(1,141) = .171$, $p = .680$).

Moral thermometer ratings. Analyzing participant's ratings of Jack on a moral thermometer revealed a significant main effect in the expected direction for Jack's membership in either a moral group ($M = 48.94$, $SD = 14.87$) or immoral group ($M = 43.37$, $SD = 15.10$), $F(1,218) = 8.30$, $p = .004$, $\eta_p^2 = .037$. Moral thermometer ratings of Jack also marginally varied as a function of processing prime, emotional manipulation,

and group stereotype information, $F(2,218) = 2.58, p = .078$. Again, the happy and disgust conditions support the cognitive malleability account, such that those processing globally (global + happy and local + disgust conditions) relied more on Jack's group membership information when forming their moral impression of him, as compared to those processing locally (local + happy and global + disgust conditions). Those in the sad condition, however, relied on Jack's group membership, and judged Jack in the immoral group ($M_{Global} = 42.05, SD = 10.60$ vs. $M_{Local} = 41.25, SD = 17.40$) more harshly than Jack in the moral group ($M_{Global} = 48.53, SD = 13.72$ vs. $M_{Local} = 46.28, SD = 19.42$), regardless of processing prime.

Target Favorability Ratings

Favorability ratings only varied as a function of Jack's group membership, $F(2,218) = 8.20, p = .005, \eta_p^2 = .036$. Participants' favorability ratings of Jack varied in the expected manner, such that when Jack belonged to the moral group he was viewed more favorably ($M = .16, SD = .89$), as compared to when Jack belonged to the immoral group ($M = -.16, SD = .91$). No other main effects or interactions were significant, all $ps > .070$.

Target Trait Judgments

Analyzing participants' target trait ratings on good and bad personality traits, only Jack's group membership influenced the differences between these two judgments, $F(1,218) = 11.63, p = .001, \eta_p^2 = .051$. These differences show that when Jack was in the immoral group, participants endorsed more bad traits for him ($M = 4.29, SD = 1.56$) than good traits ($M = 3.53, SD = 1.49, t(72) = -3.22, p = .002, \text{Cohen's } d = -.294$). This essentially demonstrates that the immoral group membership information successfully manipulated beliefs about whether the target was a good or a bad person. A different

pattern emerged, however, when Jack was in the moral group, such that participants equally endorsed good traits ($M = 4.21, SD = 1.47$) and bad traits ($M = 3.88, SD = 1.44$; $t(116) = 1.42, p = .159$).

Impression Formation Process

Jack's group membership significantly influenced the amount of information used in forming participant's impressions, $F(1,218) = 6.81, p = .010, \eta_p^2 = .030$, such that participants reported using slightly more information when forming an impression of Jack when he belonged to the moral group ($M = 3.37, SD = .55$), as compared to when Jack belonged to the immoral group ($M = 3.14, SD = .76$). No other main effects or interactions emerged for the amount of information used in forming their impression, (all $F_s < 1.18$). In contrast, no differences emerged for the clarity of the participant's impression (all $F_s < 1.63$).

Table 11. Within-subjects person-based and action-based moral judgments as a function of processing style and emotional manipulation.

Global Processing Prime				
	Person Judgments		Action Judgments	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	-.75	1.29	-.82	.95
Sad Video	-.60	1.33	-1.03	1.27
Disgust Video	-.25	1.73	-.82	1.60
Local Processing Prime				
	Person Judgments		Action Judgments	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Happy Video	-.03	1.57	-.48	1.33
Sad Video	-.47	1.71	-1.04	1.49
Disgust Video	-.66	1.56	-.92	1.36

Appendix J

VIGNETTES USED IN STUDY 4 VIGNETTE PRETEST

Jack Pretest Vignette 1 (this version used in main Study 4)

On Monday, Jack woke up early, dressed quickly and got ready to leave his house. He went to a doctor's appointment before going to work. While Jack was waiting to see the doctor, he kept a conversation going with another patient by talking about the upcoming football game that weekend. On his way out of the doctor's office, he noticed that someone had left their car lights on in the parking lot, but thought that it wasn't any of his business, and continued on his way to work.

After he arrived at his office, he worked diligently for the first hour or so, but he wasn't really in the mood for work, so he took a break by playing solitaire and surfing the web. Before going for lunch, he figured he should really get some more work done, so he responded to some emails and tried his best to look busy. Right before lunch, he remembered that he had promised to look over Rob's report on this month's expenses, and managed to make some good edits before sending it back to him.

In his rush to get to the doctor's office that morning, Jack hadn't had time to pack a lunch, so he invited Andrew, a colleague, for lunch at the diner down the street. Jack ordered his usual, the turkey and ham club, but the waitress accidentally brought him a turkey club. He was disappointed, even though he didn't say anything to her about it. Andrew and he chatted about the upcoming softball tournament that their office participated in, but then their conversation switched to complaining about their boss. When the lunch check came, Jack tipped a little less than usual because the waitress had screwed up his order.

When they got back to the office, Jack saw that people were heading over to the break room, and he remembered that today they were having a small birthday party for Kathryn, another co-worker. He grabbed the birthday card that he had brought for her off of his desk, and got to the break room just in time to sing the "Happy Birthday" song with everyone. He had just received the last piece of cake when Laura, another officemate, arrived to the party. He thought about offering to share with her, but remembered that she was a picky eater and probably didn't want the cake anyway. After the party, he went back to his desk to try and get some more work done before the end of the day. By the time he left the office and made it to the highway, it was already rush hour. Jack decided to take a side road that he could speed on to make it home quicker.

Once home, Jack went for a jog and took his regular route around his neighborhood. He enjoyed running because he could lose himself in his thoughts and let the worries of his day fade away. After getting home and showering, he made himself dinner and sorted through his mail. After dinner, his brother called his cell phone, but Jack decided he didn't feel like talking to him and let it go to voicemail.

After a few household chores, he began to feel tired because of his early wake-up, and decided to wind down for the day by watching a movie. Unsatisfied with his own

dated movie collection, he was happy to find a download link for a movie that just came out in theaters, and settled in to watch. After the movie, he phoned a friend to talk about dinner plans for the next night and then Jack went to bed so that he would be well rested to start another day at work.

Jack Pretest Vignette 2

On Monday, Jack woke up early, dressed quickly and got ready to leave his house. He went to a doctor's appointment before going to work. While Jack was waiting to see the doctor, he kept a conversation going with another patient by talking about the upcoming football game that weekend. On his way out of the doctor's office, he noticed that someone had left their car lights on in the parking lot, but thought that it wasn't any of his business, and continued on his way to work.

After he arrived at his office, he worked diligently for the first hour or so, but he wasn't really in the mood for work, so he took a break by playing solitaire and surfing the web. Before going for lunch, he figured he should really get some more work done, so he responded to some emails and tried his best to look busy. Right before lunch, he remembered that he had promised to look over Rob's report on this month's expenses, and managed to make some good edits before sending it back to him.

In his rush to get to the doctor's office that morning, Jack hadn't had time to pack a lunch, so he invited Andrew, a colleague, for lunch at the diner down the street. Jack was glad he was able to invite Andrew without Chris overhearing, because he didn't really like Chris, who often tagged along uninvited. When they arrived at the diner, Jack ordered his usual, the turkey and ham club, and then he chatted with Andrew about the upcoming softball tournament that their office participated in. They spent the rest of the lunch complaining about their boss, before paying and heading back to the office.

When they returned, Jack saw that people were heading over to the break room, and he remembered that today they were having a small birthday party for Kathryn, another co-worker. He had just received the last piece of cake when Laura, another officemate, arrived to the party. He thought about offering to share with her, but remembered that she was a picky eater and probably didn't want the cake anyway. After the party, he went back to his desk to try and get some more work done before the end of the day. By the time he left the office and made it to the highway, it was already rush hour. Jack decided to take a side road that he could speed on to make it home quicker.

Once home, Jack went for a jog and took his regular route around his neighborhood. He enjoyed running because he could lose himself in his thoughts and let the worries of his day fade away. On the way back to his house, he said hello to his neighbor, Dan, who asked to borrow his ladder and he was happy to help. After getting home and showering, he made himself dinner and sorted through his mail. During dinner, he noticed the library book sitting on his kitchen table that he was supposed to return last Friday, but put it out of his mind because he didn't need more things to do.

After a few household chores, he began to feel tired because of his early wake-up, and decided to wind down for the day by watching a movie. Unsatisfied with his own dated movie collection, he was happy to find a download link for a movie that just came out in theaters, and settled in to watch. After the movie, he phoned a friend to talk about dinner plans for the next night and then Jack went to bed so that he would be well rested to start another day at work.

Jack Pretest Vignette 3

On Monday, Jack woke up early, dressed quickly and got ready to leave his house. He went to a doctor's appointment before going to work. While Jack was waiting to see the doctor, he kept a conversation going with another patient by talking about the upcoming football game that weekend. On his way out of the doctor's office, he noticed that someone had left their car lights on in the parking lot, but thought that it wasn't any of his business, and continued on his way to work.

After he arrived at his office, he worked diligently for the first hour or so, but he wasn't really in the mood for work, so he took a break by playing solitaire and surfing the web. Before going for lunch, he figured he should really get some more work done, so he responded to some emails and tried his best to look busy. Right before lunch, he remembered that he had promised to look over Rob's report on this month's expenses, and managed to make some good edits before sending it back to him.

In his rush to get to the doctor's office that morning, Jack hadn't had time to pack a lunch, so he decided to invite Andrew, a colleague, for lunch at the diner down the street. On his way to Andrew's office, he heard Rebecca and Will talking in hushed voices. The conversation sounded personal, like they had started dating or something, so he listened for a minute or two before moving along to Andrew's office. When they arrived at the diner, Jack ordered his usual, the turkey and ham club, and then he chatted with Andrew about the upcoming softball tournament that their office participated in. They spent the rest of the lunch complaining about their boss before paying and going back to the office.

When they returned, Jack saw that people were heading over to the break room, and he remembered that today they were having a small birthday party for Kathryn, another co-worker. As he began eating some cake, he realized that he hadn't contributed any money to the office party fund that month, but figured nobody noticed and he was fine to eat the cake anyway. After the party, he went back to his desk to try and get some more work done before the end of the day. By the time he left the office and made it to the highway, it was already rush hour. Jack decided to take a side road that he could speed on to make it home quicker. Once home, Jack went for a jog and took his regular route around his neighborhood. He enjoyed running because he could lose himself in his thoughts and let the worries of his day fade away. After getting home and showering, he made himself dinner and sorted through his mail. After dinner, his brother called his cell phone, but Jack decided he didn't feel like talking to him and let it go to voicemail.

After a few household chores, he began to feel tired because of his early wake-up, and decided to wind down for the day by watching a movie. Unsatisfied with his own dated movie collection, he was happy to find a download link for a movie that just came out in theaters, and settled in to watch. After the movie, he phoned a friend to talk about dinner plans for the next night, whom he was taking out to dinner to celebrate his promotion at work. Then, Jack went to bed so that he would be well rested to start another day at work.

BIBLIOGRAPHY

- Agerström, J., Björklund, F., & Carlsson, R. (2009). Look at yourself! Visual perspective influences moral judgment by level of mental construal. *Social Psychology, 44*(1), 42-46.
- Ask, K., & Granhag, P. A. (2007). Motivational bias in criminal investigators' judgments of witness reliability. *Journal of Applied Social Psychology, 37*(3), 561-591.
- Bartels, D. M. (2008). Principled moral sentiment and the flexibility of moral judgment and decision making. *Cognition, 108*(2), 381-417.
- Bless, H. (2000). The interplay of affect and cognition: The mediating role of general knowledge structures. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition*. (pp. 201-222). New York, NY US: Cambridge University Press.
- Bless, H. (2001). Mood and the use of general knowledge structures. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's guidebook*. (pp. 9-26). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.
- Bless, H., Clore, G. L., Schwarz, N., Golisano, V., Rabe, C., & Wölk, M. (1996). Mood and the use of scripts: Does a happy mood really lead to mindlessness? *Journal of Personality and Social Psychology, 71*(4), 665-679.
- Bless, H., & Schwarz, N. (1999). Sufficient and necessary conditions in dual-mode models: The case of mood and information processing. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology*. (pp. 423-440). New York, NY US: Guilford Press.
- Bodenhausen, G. V. (1993). Emotions, arousal, and stereotypic judgments: A heuristic model of affect and stereotyping. In D. M. Mackie & D. L. Hamilton (Eds.), *Affect, cognition, and stereotyping: Interactive processes in group perception*. (pp. 13-37). San Diego, CA US: Academic Press.
- Bodenhausen, G. V., Kramer, G. P., & Süsner, K. (1994). Happiness and stereotypic thinking in social judgment. *Journal of Personality and Social Psychology, 66*(4), 621-632.
- Bodenhausen, G. V., Sheppard, L. A., & Kramer, G. P. (1994). Negative affect and social judgment: The differential impact of anger and sadness. *European Journal of Social Psychology, 24*(1), 45-62.
- Broadbent, D., & Broadbent, M. (1988). Anxiety and attentional bias: State and trait. *Cognition and Emotion, 2*(3), 165-183.
- Bruner, J. S. (1957). On perceptual readiness. *Psychological Review, 64*(2), 123-152.

- Burke, A., Heuer, F., & Reisberg, D. (1992). Remembering emotional events, *Memory and Cognition*, 20(3), 277-290.
- Carretié, L., Ruiz-Padial, E., López-Martín, S., & Albert, J. (2011). Decomposing unpleasantness: Differential exogenous attention to disgusting and fearful stimuli. *Biological Psychology*, 86, 247-253.
- Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin*, 135(2), 183-204.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39(5), 752-766.
- Chaiken, S., & Trope, Y. (1999). *Dual-process theories in social psychology*. New York, NY US: Guilford Press.
- Chapman, H. A., Kim, D. A., Susskind, J. M., & Anderson, A. K. (2009). In bad taste: Evidence for the oral origins of moral disgust. *Science*, 323(5918), 1222-1226.
- Christianson, S. (1992). Emotional stress and eyewitness memory: A critical review. *Psychological Bulletin*, 112(2), 284-309.
- Clore, G. L. (1992). Cognitive phenomenology: Feelings and the construction of judgment. In L. L. Martin & A. Tesser (Eds.), *The construction of social judgments*. (pp. 133-163). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.
- Clore, G. L., & Huntsinger, J. R. (2007). How emotions inform judgment and regulate thought. *Trends in Cognitive Sciences*, 11(9), 393-399.
- Clore, G. L., & Huntsinger, J. R. (2009). How the object of affect guides its impact. *Emotion Review*, 1(1), 39-54.
- Clore, G. L., Wyer, R. S., Jr., Dienes, B., Gasper, K., Gohm, C., & Isbell, L. (2001). Affective feelings as feedback: Some cognitive consequences. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's guidebook*. (pp. 27-62). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.
- Cushman, F., & Greene, J. D. (2012). Finding faults: How moral dilemmas illuminate cognitive structure, *Social Neuroscience*, 7(3), 269-279.
- Cushman, F., & Young, L. (2011). Patterns of moral judgments derive from nonmoral psychological representations, *Cognitive Science*, 35(6), 1052-1075.
- Damasio, A. R. (1994). *Descartes' error : emotion, reason, and the human brain*. New York: G.P. Putnam.

- Darwin, C. (1872/1965). *The expression of the emotions in man and animals*. Chicago: University of Chicago Press.
- Darwall, S. (2003). *Deontology*. Oxford: Oxford University Press.
- David, B., & Olutunji, B. O. (2011). The effect of disgust conditioning and disgust sensitivity on appraisals of moral transgressions, *Personality and Individual Differences*, *50*(7), 1141-1146.
- Davis, N. (1993). Contemporary deontology. In P. Singer (Ed.), *A companion to ethics* (pp. 205-218). Malden, MA: Blackwell Publishing.
- Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review*, *66*(3), 183-201.
- Ekman, P. (1992). Are there basic emotions? *Psychological Review*, *99*(3), 550-553.
- Eriksen, B. A., & Eriksen, C. W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception and Psychophysics*, *16*(1), 143-149.
- Eyal, T., Liberman, N., & Trope, Y. (2008). Judging near and distant virtue and vice. *Journal of Experimental Social Psychology*, *44*(4), 1204-1209.
- Förster, J. & Dannenberg, L. (2010). GLOMO sys: A systems account of global versus local processing. *Psychological Inquiry*, *21*, 175-197.
- Förster, J., Liberman, N., & Kuschel, S. (2008). The effect of global versus local processing styles on assimilation versus contrast in social judgment. *Journal of Personality and Social Psychology*, *94*(4), 579-599.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218-226.
- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, *19*(3), 313-332.
- Frijda, N. H. (1986). *The emotions*. New York, NY Paris USFrance: Cambridge University Press Editions de la Maison des Sciences de l'Homme.
- Frijda, N. H. (1988). The laws of emotion. *American Psychologist*, *43*(5), 349-358.
- Frijda, N. H., Kuipers, P., & ter Schure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, *57*(2), 212-228.

- Gable, P. A., & Harmon-Jones, E. (2010a). The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. *Psychological Science*, *21*(2), 211-215.
- Gable, P. A., & Harmon-Jones, E. (2010b). The effect of low versus high approach-motivated positive affect on memory for peripherally versus centrally presented information. *Emotion*, *10*(4), 599-603.
- Gable, P. A., & Harmon-Jones, E. (2011). Attentional consequences of pregoal and postgoal positive affects. *Emotion*, *11*(6), 1358-1367.
- Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information. *Psychological Science*, *13*(1), 34-40.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*(5537), 2105-2108.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition and Emotion*, *9*(1), 87-108.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*(4), 814-834.
- Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Scherer & H. H. Goldsmith (Eds.), *Handbook of affective sciences*. (pp. 852-870). New York, NY US: Oxford University Press.
- Haidt, J., & Kesebir, S. (2010). Morality. In S. T. Fiske, D. T. Gilbert & G. Lindzey (Eds.), *Handbook of social psychology, Vol 2 (5th ed.)*. (pp. 797-832). Hoboken, NJ US: John Wiley & Sons Inc.
- Haidt, J., Rozin, P., McCauley, C., & Imada, S. (1997). Body, psyche, and culture: The relationship between disgust and morality. *Psychology and Developing Societies*, *9*(1), 107-131.
- Harmon-Jones, E., Price, T. F., & Gable, P. A. (2012). The influence of affective states on cognitive broadening/narrowing: Considering the importance of motivational intensity. *Social and Personality Psychology Compass*, *6*(4), 314-327.
- Hauser, M., Cushman, F., Young, L., Jin, R. K., & Mikhail, J. (2007). A dissociation between moral judgments and justifications. *Mind & Language*, *22*(1), 1-21.
- Heider, F. (1958). *The psychology of interpersonal relations*. Hoboken, NJ US: John Wiley & Sons Inc.

- Horberg, E. J., Oveis, C., Keltner, D., & Cohen, A. B. (2009). Disgust and the moralization of purity. *Journal of Personality and Social Psychology, 97*(6), 963-976.
- Huebner, B., Dwyer, S., & Hauser, M. (2009). The role of emotion in moral psychology. *Trends in Cognitive Sciences, 13*(1), 1-6.
- Hunsinger, M., Isbell, L. M., & Clore, G. L. (2012). Sometimes happy people focus on the trees and sad people focus on the forest: Context-dependent effects of mood in impression formation. *Personality and Social Psychology Bulletin, 38*(2), 220-232.
- Huntsinger, J. R. (2012). Does positive affect broaden and negative affect narrow attentional scope? A new answer to an old question. *Journal of Experimental Psychology: General, 141*(1), 595-600.
- Huntsinger, J. R., Isbell, L. M., & Clore, G. L. (in press). The affective control of thought: Malleable, not fixed. *Psychological Review*.
- Isbell, L. M. (2004). Not all happy people are lazy or stupid: Evidence of systematic processing in happy moods. *Journal of Experimental Social Psychology, 40*(3), 341-349.
- Isbell, L. M. (2010). What is the relationship between affect and information processing styles? This and other global and local questions inspired by GLOMO^{sys}. *Psychological Inquiry*.
- Isbell, L. M., & Burns, K. C. (2007). Affect. In R. F. Baumeister & K. D. Vohs (Eds.), *Encyclopedia of Social Psychology* (Vol. 1, pp. 12-13). Thousand Oaks, CA: Sage.
- Isbell, L. M., Burns, K. C., & Haar, T. (2005). The role of affect on the search for global and specific target information. *Social Cognition, 23*(6), 529-552.
- Isbell, L. M., & Lair, E. C. (2013). Moods, emotions, and evaluations as information. In D. Carlston (Ed.), *Oxford handbook of social cognition* (pp. 435-462). New York, NY: Oxford University Press.
- Isbell, L. M., Lair, E. C., & Rovenpor, D. R. (2013). Affect-As-Information about processing styles: A cognitive malleability approach. *Social and Personality Psychology Compass, 7*(2), 93-114.
- Isbell, L. M., Lair, E. C., & Rovenpor, D. R. (under review). When identical feelings produce different information processing styles: The highly malleable nature of the Affect-Cognition relationship.
- Isbell, L. M., McCabe, J., Burns, K. C., & Lair, E. C. (2013). Who am I?: The influence of affect on the working self-concept. *Cognition and Emotion, 27*(6), 1073-1090.

- Isbell, L. M., Ottati, V. C., & Burns, K. C. (2006). Affect and politics: Effects on judgment, processing, and information selection. In D. Redlawsk (Ed.), *Feeling Politics* (pp. 57-86). New York: Palgrave Macmillian Publishing Company.
- Isbell, L. M., Rovenpor, D. R., & Lair, E. C. (under review). The impact of negative emotions on abstract and concrete thought depends on accessible cognitive scope.
- Isbell, L. M., & Wyer, R. S., Jr. (1999). Correcting for mood-induced bias in the evaluation of political candidates: The roles of intrinsic and extrinsic motivation. *Personality and Social Psychology Bulletin*, 25(2), 237-249.
- Isen, A. M. (1987). Positive affect, cognitive processes, and social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 20. (pp. 203-253). San Diego, CA US: Academic Press.
- Isen, A. M. (2002). Positive affect, cognitive processes, and social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 20. (pp. 203-253). San Diego, CA US: Academic Press.
- Isen, A. M., & Daubman, K. A. (1984). The influence of affect on categorization. *Journal of Personality and Social Psychology*, 47(6), 1206-1217.
- James, W., & Rouben Mamoulian Collection (Library of Congress). (1890). *The principles of psychology*. New York,: H. Holt and company.
- Keltner, D., Ellsworth, P. C., & Edwards, K. (1993). Beyond simple pessimism: Effects of sadness and anger on social perception. *Journal of Personality and Social Psychology*, 64(5), 740-752.
- Keltner, D., & Lerner, J. S. (2010). Emotion. In S. T. Fiske, D. T. Gilbert & G. Lindzey (Eds.), *Handbook of social psychology*, Vol 1 (5th ed.). (pp. 317-352). Hoboken, NJ US: John Wiley & Sons Inc.
- Keltner, D., Locke, K. D., & Audrain, P. C. (1993). The influence of attributions on the relevance of negative feelings to personal satisfaction. *Personality and Social Psychology Bulletin*, 19(1), 21-29.
- Kimchi, R., & Palmer, S. E. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology: Human Perception and Performance*, 8(4), 521-535.
- Knutson, K. M., Krueger, F. Koenigs, M., Hawley, A., Escobedo, J. R., Vasudeva, V., Adolphs, R., & Grafman, J. (2010). Behavioral norms for condensed moral vignettes. *Social Cognitive and Affective Neuroscience*, 5(4), 378-384.
- Köhler, W. (1929). *Gestalt psychology*. Oxford, England: Liveright.

- Krusemark, E. A., & Li, W. (2011). Do all threats work the same way? Divergent effects of fear and disgust on sensory perception and attention. *The Journal of Neuroscience*, *31*(9), 3429-3434.
- Lambert, A. J., Khan, S. R., Lickel, B. A., & Fricke, K. (1997). Mood and the correction of positive versus negative stereotypes. *Journal of Personality and Social Psychology*, *72*(5), 1002-1016.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2008). International affective picture system (IAPS): Affective ratings of pictures and instruction manual. *Technical Report A-8*. University of Florida, Gainesville, FL.
- LeDoux, J. E. (1994). Cognitive-emotional interactions in the brain. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 216-223). New York: Oxford University Press.
- Lerner, J. S., Goldberg, J. H., & Tetlock, P. E. (1998). Sober second thought: The effects of accountability, anger, and authoritarianism on attributions of responsibility. *Personality and Social Psychology Bulletin*, *24*(6), 563-574.
- Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition and Emotion*, *14*(4), 473-493.
- Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146-159.
- Lerner, J. S., Small, D. A., & Loewenstein, G. (2004). Heart Strings and Purse Strings: Carryover effects of emotions on economic decisions. *Psychological Science*, *15*(5), 337-341.
- Lerner, J. S., & Tiedens, L. Z. (2006). Portrait of The Angry Decision Maker: How Appraisal Tendencies Shape Anger's Influence on Cognition. *Journal of Behavioral Decision Making*, *19*(2), 115-137.
- Libby, L. K., Shaeffer, E. M., & Eibach, R. P. (2009). Seeing meaning in action: A bidirectional link between visual perspective and action identification level. *Journal of Experimental Psychology: General*, *138*(4), 503-516.
- Mathews, A., & MacLeod, C. (1985). Selective processing of threat cues in anxiety states. *Behaviour Research and Therapy*, *23*(5), 563-569.
- McFarland, C., White, K., & Newth, S. (2003). Mood acknowledgment and correction for the mood-congruency bias in social judgment. *Journal of Experimental Social Psychology*, *39*(5), 483-491.
- Mendez, M. F., Anderson, E., & Shapira, J. S. (2005). An investigation of moral judgment in frontotemporal dementia. *Cognitive Behavioral Neurology*, *18*(4), 193-197.

- Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: A review. *Psychological Bulletin*, *112*(2), 179-204.
- Moll, J., de Oliveira-Souza, R. & Zahn, R. (2008). The neural basis of moral cognition: Sentiments, concepts, and values. In A. Kingston & M. B. Miller (Eds.) *The year in cognitive neuroscience*. (pp. 161-180). Malden: Blackwell Publishing.
- Moore, A. B., Clark, B. A., & Kane, M. J. (2008). Who shalt not kill? Individual differences in working memory capacity, executive control, and moral judgment. *Psychological Science*, *19*(6), 549-557.
- Morris, W. N. (1989). *Mood: The frame of mind*. New York, NY US: Springer-Verlag Publishing.
- Morris, S. B., & DeShon, R. P. (2002). Combining effect size estimates in meta-analysis with repeated measures and independent-groups designs. *Psychological Methods*, *7*, 105-125.
- Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology*, *9*(3), 353-383.
- Neisser, U. (1976). *Cognition and reality: Principles and implications of cognitive psychology*. New York, NY: W H Freeman/Times Books/ Henry Holt & Co.
- Nichols, S. & Mallon, R. (2006). Moral dilemmas and moral rules. *Cognition*, *100*(3), 530-542.
- Nobata, T., Hakoda, Y., & Ninose, Y. (2010). The functional field of view becomes narrowing while viewing negative emotional stimuli. *Cognition and Emotion*, *24*(5), 886-891.
- Olatunji, & Sawchuk, (2005). Disgust: Characteristic features, social manifestations, and clinical implications. *Journal of Social and Clinical Psychology*, *24*(7), 932-962.
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. New York, NY US: Cambridge University Press.
- Ortony, A., & Turner, T. J. (1990). What's basic about basic emotions? *Psychological Review*, *97*(3), 315-331.
- Ottati, V. C., & Isbell, L. M. (1996). Effects on mood during exposure to target information on subsequently reported judgments: An on-line model of misattribution and correction. *Journal of Personality and Social Psychology*, *71*(1), 39-53.
- Park, J., & Banaji, M. R. (2000). Mood and heuristics: The influence of happy and sad states on sensitivity and bias in stereotyping. *Journal of Personality and Social Psychology*, *78*(6), 1005-1023.

- Parker, M. T., & Isbell, L. M. (2010). How I vote depends on how I feel: The differential impact of anger and fear on political information processing. *Psychological Science, 21*(4), 548-550.
- Pizaro, D., Inbar, Y., & Helion, C. (2011). On disgust and moral judgment. *Emotion Review, 3*(3), 267-268.
- Raghunathan, R., & Pham, M. T. (1999). All negative moods are not equal: Motivational influences of anxiety and sadness on decision making. *Organizational Behavior and Human Decision Processes, 79*(1), 56-77.
- Ritov, I., & Baron, J. (1990). Reluctance to vaccinate: Omission bias and ambiguity. *Journal of Behavioral Decision Making, 3*(4), 263-277.
- Roseman, I. J. (1984). Cognitive determinants of emotion: A structural theory. *Review of Personality & Social Psychology, 5*, 11-36.
- Rowe, G., Hirsh, J. B., & Anderson, A. K. (2007). Positive affect increases the breadth of attentional selection. *Proceedings of the National Sciences of the USA, 104*, 383-388.
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review, 94*(1), 23-41.
- Rozin, P., Haidt, J., & McCauley, C. R. (1999). Disgust: The body and soul emotion. In T. Dalgleish & M. J. Power (Eds.), *Handbook of cognition and emotion*. (pp. 429-445). New York, NY US: John Wiley & Sons Ltd.
- Russell, J. A., (1980). A circumplex model of affect. *Journal of Personality and Social Psychology 39*, 1161-1178.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*(1), 145-172.
- Scherer, K. (1984). Emotion as a multicomponent process: A model and some cross-cultural data. *Review of Personality and Social Psychology, 5*, 37-63.
- Scherer, K. (1997). Profiles of emotion-antecedent appraisal: Testing theoretical predictions across cultures. *Cognition and Emotion, 11*(2), 113-150.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality and Social Psychology Bulletin, 34*(8), 1096-1109.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior, Vol. 2*. (pp. 527-561). New York, NY US: Guilford Press.

- Schwarz, N. (2002). Feelings as information: Moods influence judgments and processing strategies. In T. Gilovich, D. Griffin & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment*. (pp. 534-547). New York, NY US: Cambridge University Press.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, *45*(3), 513-523.
- Schwarz, N., & Clore, G. L. (2007). Feelings and phenomenal experiences. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles (2nd ed.)*. (pp. 385-407). New York, NY US: Guilford Press.
- Seegerstrom, S. C. (2001). Optimism and attentional bias for negative and positive stimuli. *Personality and Social Psychology Bulletin*, *27*(10), 1334-1343.
- Siemer, M., & Reisenzein, R. (1998). Effects of mood on evaluative judgments: Influence of reduced processing capacity and mood salience. *Cognition and Emotion*, *12*(6), 783-805.
- Small, D. A., & Lerner, J. S. (2008). Emotional policy: Personal sadness and anger shape judgments about a welfare case. *Political Psychology*, *29*(2), 149-168.
- Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*(4), 813-838.
- Spranca, M., Minsk, E., & Baron, J. (1991). Omission and commission in judgment and choice. *Journal of Experimental Social Psychology*, *27*(1), 76-105.
- Strack, F., & Hannover, B. (1996). Awareness of influence as a precondition for implementing correctional goals. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior*. (pp. 579-596). New York, NY US: Guilford Press.
- Stroessner, S. J., Haines, E. L., Sherman, J. W., & Kantrowitz, C. J. (2010). Stereotype relevance moderates category activation: Evidence from the Indirect Category Accessibility Task (ICAT). *Social Psychological and Personality Science*, *1*(4), 335-343.
- Tiedens, L. Z. (2001). The effect of anger on the hostile inferences of aggressive and nonaggressive people: Specific emotions, cognitive processing, and chronic accessibility. *Motivation and Emotion*, *25*(3), 233-251.
- Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing. *Journal of Personality and Social Psychology*, *81*(6), 973-988.

- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, *117*(2), 440-463.
- Tooby J., & Cosmides, L. (2000). The evolutionary psychology of the emotions and their relationship to internal regulatory variables. In M. S. Gazzaniga (Ed.), *The new cognitive neurosciences*. (pp. 1167-1270). Cambridge, MA US: The MIT Press.
- Ugazio, G., Lamm, C., & Singer, T. (2012). The role of emotions for moral judgments depends on the type of emotion and moral scenario. *Emotion*, *12*(3), 579-590.
- Valdesolo, P., & DeSteno, D. (2006). Manipulations of emotional context shape moral judgment. *Psychological Science*, *17*(6), 476-477.
- Wegener, D. T., & Petty, R. E. (1997). The flexible correction model: The role of naive theories of bias in bias correction. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 29. (pp. 141-208). San Diego, CA US: Academic Press.
- Weintraub, D. J. (1979). Ebbinghaus illusion: Context, contour, and age influence the judged size of a circle amidst circles. *Journal of Experimental Psychology: Human Perception and Performance*, *5*(2), 353-364.
- Wheatley, T., & Haidt, J. (2005). Hypnotic Disgust Makes Moral Judgments More Severe. *Psychological Science*, *16*(10), 780-784.
- Wilson, T. D., & Brekke, N. (1994). Mental contamination and mental correction: Unwanted influences on judgments and evaluations. *Psychological Bulletin*, *116*(1), 117-142.
- Wyer, R. S., Jr., & Carlston, D. E. (1979). *Social cognition, inference, and attribution*: Lawrence Erlbaum.
- Wyer, R. S., Jr., Clore, G. L., & Isbell, L. M. (1999). Affect and information processing. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 31. (pp. 1-77). San Diego, CA US: Academic Press.