THE ATTRIBUTIONAL MODEL OF PRIMING: A SINGLE MECHANISM ACCOUNT OF
CONSTRUCTION, BEHAVIOR, AND GOAL PRIMING

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ABSTRACT

In this work I propose an attributional model of priming and provide three sets of studies testing basic predictions of this account. Although past theory has conceptualized construal, behavior, and goal priming as arising from separate processes, this model accounts for all with a single mechanism. In particular, I propose that these three outcomes all result when the information made accessible by priming biases a basic inference process. The model assumes that primes cause no default effects, but instead produce general construct accessibility. This accessibility then becomes capable of producing an observable priming effect when it is misattributed to one’s natural response towards some aspect of the situation. Once this occurs, the prime-related mental content can serve as information for answering whatever implicit question is afforded by the focal aspect of the current situation. The exact focal target and the implicit question it presents determine the outcome of this process. If one judges another person or object, this affords the implicit question “Who/What is that?” and construal priming can result. If one focuses on their behavioral options, this presents the implicit question “What will I do?” and behavior priming can result. And finally, if one attempts to determine their current motivational state, this affords the implicit question “What do I want?” and goal priming can result. Critically, these effects will only occur if the information made accessible by priming is perceived as relevant and diagnostic for answering the afforded implicit question. The studies I present provide evidence for some of the most basic aspects of this model. In particular, I demonstrate that primes are more likely to influence judgments and behavior when they are misattributed to one’s natural response to the situation and that priming effects emerge through a process in which prime-related content is used to answer the implicit question presented by the current object of focus. In line with the model’s predictions, the type of effect which emerges from priming appears to differ across targets of focus due to the different implicit questions they afford.
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INTRODUCTION

Traditional rationalist models of human behavior, such as those long popular within the field of economics (Friedman & Savage, 1948; Keeney & Raiffa, 1976; von Neumann & Morgenstern, 1944), have assumed that people’s thoughts, feelings, and behaviors are driven by active thinking and reasoning. In contrast to this perspective, considerable research over the last few decades has shown that much of human psychology is affected by the passive influence of seemingly inconsequential, and logically irrelevant, cues. For instance, incidental exposure to hostility-related stimuli prior to a social interaction leads individuals to behave in a more aggressive manner towards another person (Carver, Ganellen, Froming, & Chambers, 1983). Although there is no logically apparent reason why subsequent behavior should be affected in this manner, the behavioral implications of the previously seen information bleed over into participants’ later actions, producing what has been called behavioral priming. Interestingly, simply pre-exposing individuals to such stimuli has been found to have other effects as well. Thus, not only can subsequent behavior be affected (e.g., Bargh, Chen & Burrows, 1996; Carver et al., 1983), but so can a person’s motives and desires (as in goal priming; Chartrand & Bargh, 1996; Custers & Aarts, 2005a) and even their basic perceptions of other people and objects in the environment (as in construal priming; Herr, Sherman, & Fazio, 1983; Higgins, Rholes, & Jones, 1977). In all cases, simple passive exposure to some stimulus qualitatively changes a person’s subsequent judgment, behavior, or motivational state, often without any conscious awareness on the part of the person so affected (Bargh & Chartrand, 2000; Bargh & Pietromonaco, 1982).
Since the discovery of these priming effects, a great deal of effort has been put into describing the exact processes which lead to such striking outcomes.\(^1\) Although various mechanisms have been proposed for each of the three unique outcomes observed in this tradition of research (i.e., construal, behavior, and goal priming effects), all rely on the basic ideas of accessibility and association. In general (but not invariably), theorists in this area assume that exposure to some stimulus (i.e., a prime, such as the word *hostile*) increases the accessibility of all mental content which is associatively related to the priming stimulus (Anderson, 1983; Collins & Loftus, 1975). Thus, upon perception of the word *hostile*, other related concepts (such as *punch, hit, yell, and gun*) become activated in long-term memory, increasing their accessibility (Higgins, 1996; McKoon & Ratcliff, 1992; Neely, 1977). More highly accessible constructs can generally be viewed as especially “ready” for use in subsequent processing (Higgins, 1996). Critically, although most researchers in the area agree on this very basic underlying process, specific theories diverge greatly in their view of how exactly such a process produces the downstream consequences observed in construal, behavior, and goal priming. Thus, the mechanism by which a prime changes one’s perceptions of another object in the environment (i.e., construal priming) is proposed to be quite different from the process by which a prime alters one’s behavior (i.e., behavior priming) or motivation (i.e., goal priming).

Importantly, there are a number of prominent theoretical mysteries in the literature surrounding these priming effects (cf. Bargh, 2006). It is striking, for instance, that while construal, behavior, and goal priming have each been explained by unique mechanisms, all can be produced via the same kinds of priming procedures. Thus, a researcher subliminally exposing participants to ten words related to the concept of hostility could reasonably predict that

\(^1\) In the current work I limit my analysis to construal, behavior, and goal priming. I view other priming effects discussed in the literature largely as either part of the mechanism underlying these outcomes (i.e., semantic/associative priming; see McNamara, 2005; Meyer & Schvaneveldt, 1971) or due to qualitatively different processes (e.g., mindset/procedural priming; see Gollwitzer, Heckhausen, & Steller, 1990; Schooler, 2002).
participants would later judge an ambiguous target person as more hostile (producing construal priming; Srull & Wyer, 1979), behave in a more hostile manner themselves when irritated or provoked (producing behavior priming; Bargh et al., 1996), or instead become motivated to actively seek out an opportunity to aggress against some other person or object (producing goal priming; Todorov & Bargh, 2002). When exactly one of these effects will emerge as opposed to another remains unknown and multiple effects have been observed as the result of a single priming induction (e.g., construal and goal priming; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001, Study 3). In fact, other research has shown that even the direction of effect produced by a prime can change across situations (Jefferis & Fazio, 2008; Newman & Uleman, 1990), sometimes causing judgments and behavior to become more “prime-like” (i.e., producing assimilation, such as when a person becomes more hostile after seeing words related to this construct) and other times causing these outcomes to move in a direction opposite that of the prime (i.e., producing contrast, such as less hostile judgments or behavior).

In the current work I present a broad theoretical perspective which seeks to resolve such issues by consolidating construal, behavior, and goal priming effects under a single mechanism.² At its most basic level, this account proposes that the effects of priming on judgments, behavior, and motivation are the result of a process in which a person mistakenly attributes content made accessible by priming to their own natural reaction to the current situation. In discussing this attributional model of priming, I first outline the general model. I then compare it to past models within the construal, behavior, and goal priming literatures. Finally, I present three lines of research which test some of the basic predictions of the model. It is my hope that this overarching theoretical perspective will unite a great deal of research previously viewed as disparate and provide a more accurate understanding of how such priming effects emerge. Furthermore, with the attributional model, I seek to illustrate how outcomes often viewed as relatively thoughtless and “illogical” may actually be produced through a very adaptive and rational process. In this way,

² See Loersch and Payne (2009) for a comprehensive review of literature within the construal, behavior, and goal priming areas which supports the attributional model.
these priming effects may offer a window into the basic mental processes by which an incredible amount of human judgment and behavior are produced.
THE ATTRIBUTIONAL MODEL OF PRIMING

The attributional model is based on the premise that all priming effects begin with the simple construct accessibility created by associative priming (for review see McNamara, 2005). Through this process, a prime can potentially make all mental content that is experientially (Bearce & Rovee-Collier, 2006; Conway, 1990), semantically (Neely, 1977), and evaluatively (Fazio, Sanbonmatsu, Powell, and Kardes, 1986; Spruyt, Hermans, De Houwer, Vandromme, and Eelen, 2007) related more accessible. Thus, a great deal of information associated with the prime increases in accessibility, including memories of oneself and others which contain semantic, behavior, and goal-related content. Critically, I propose that this change in basic construct accessibility has no direct effect on judgment or behavior and simply represents an increased “readiness” to utilize the accessible information in subsequent processing (cf. Higgins, 1996). Priming effects then emerge when a person misattributes the information made accessible by a prime to his or her natural response towards some salient aspect of the situation. Because different situations afford very different options for judgment or behavior, the inferred meaning of these prime-related cognitions can vary greatly. Thus, the general construct accessibility resulting from a single prime can potentially result in many different outcomes.

As an individual moves through the environment, he or she is repeatedly confronted with multiple options for interpretation, judgment, and behavior. Is this object something I can sit on? How close to this person should I sit? Now that I’m at the bar, do I want a drink? I refer to these basic options for thought and behavior as the implicit questions afforded by the situation and propose that a person naturally uses highly accessible information to answer such questions. In this way, the most accessible information in mind guides judgment and behavior, reducing the number of possible interpretations and behavioral options available. Priming stimuli bias this
process because the mental content they make accessible can be difficult to distinguish from the information activated by one’s own internal thought processes.

As alluded to above, it is the specific implicit questions afforded by the current situation which determine exactly what effect prime-induced accessibility can have. In particular, construal priming tends to result when the situation focuses one on judging another person or object in the environment. In these situations, one is presented with the implicit question “Who/What is that?” and as long as prime-related mental content is misattributed to one’s natural thoughts about this target of focus then the content can serve as a source of information for answering the afforded question. To the extent that this accessible information biases participants answer to the implicit question, then judgments of the object will be affected and a construal priming effect will emerge.

Behavior priming effects occur through the same basic process, but are created when the situation instead draws one’s attention to the various behavioral options afforded by the local environment. In this case, the basic implicit question presented by the situation is “What will I do?” And finally, goal priming effects are produced when one is led to consider their current desires, presenting the implicit question, “What do I want?” In this way, construal, behavior, and goal priming all operate via the same basic mechanism. As long as the information made accessible by a prime is misattributed to one’s natural response to the situation, and is seen as a valid source of information for answering the implicit question under consideration, a priming effect will emerge. The critical variable which determines the prime’s effect is simply the kind of implicit question that is afforded by the focal aspect of the situation.

Because all such effects depend on misattribution, variables which help prevent this process will decrease the probability that judgments, behavior, or motivation assimilate towards a primed construct. If, for instance, the prime is especially distinctive (such as when primes are extreme or exemplar based; see Herr et al., 1983), this accessible information is likely to stand out in one’s mind and be seen as quite separate from any thoughts about the target of focus. Because of this, it will not be confused with one’s natural response and will only produce an effect on judgment or behavior by serving as a comparison standard or inducing effortful correction
(Moskowitz & Skurnik, 1999). If the information made accessible by the prime provides an indication of what the target is not (such as when thoughts about a particular professor or supermodel inform one about how they compare on the trait of intelligence; Dijksterhuis et al., 1998), contrast will be a result of comparing the target with this information. If its distinctiveness instead alerts one to the potential biasing impact on judgments, contrast will likely result from efforts to avoid the prime’s contaminating influence (Martin, Seta, & Crelia, 1990; Wegener & Petty, 1995). This is not always the case, however. Perhaps counterintuitively, very distinctive primes which seem inapplicable to perceivers but indirectly activate applicable information (through semantic/associative priming) may actually cause assimilative effects because individuals do not think to correct for any potential influence (Aarts & Dijksterhuis, 2002; Stapel & Winkielman, 1998; Wegener & Petty). Similarly, knowledge of a prime’s biasing influence will not produce correction efforts if one views this biasing influence as a legitimate source of information for later judgments (Loersch, McCaslin, & Petty, 2009).

As highlighted above, the attributional model also stresses that priming effects emerge because this misattribution process allows prime-related content to be used to answer the implicit question presented by the current situation. If this is the case, accessible information should only produce a priming effect when a person trusts their current mental content and views it as diagnostic for answering the afforded implicit question. Thus, when people experience cues of validity such as the sense of ease (Schwarz et al., 1991), positive affect (Briñol, Petty, & Barden, 2007; Custers & Aarts, 2005b; Fishbach & Labroo, 2007; Schwarz & Clore, 1988), or head nodding (Briñol & Petty, 2003) accessible information should be more likely to affect subsequent judgments or behavior. When a person instead experiences cues of invalidity such as the sense of difficulty, negative affect, or head shaking, he or she is likely to associate any accessible information with low confidence or invalidity and view it as non-diagnostic for the subsequent inference process (Petty, Briñol, & Tormala, 2002). Because of this, such cues reduce the normal effect of primes, making both assimilation and contrast less likely.
Critically, because every stimulus we perceive makes related information more accessible, any inference made after a priming induction will also serve as grist for later iterations of the proposed process. If, for example, a perceiver uses the information made accessible by a prime to infer that another individual is hostile, this inference will itself serve as a new prime. Because of this, all mental knowledge related to hostile people (in particular) will now become more accessible and can serve as information for answering whatever implicit questions are next presented by the situation. Thus, if the perceiver was asked to interact with the individual they had just judged as hostile, they might use the information made accessible by this recent inference to decide that they should behave in a relatively defensive manner. In this way, the basic process I’ve described above is simply one iteration of an infinite priming loop which is affected by both external stimuli and the internal inferences generated by people’s own mental processes (see Figure 1 for a schematic depiction of the model).

Finally, it is important to note that the idea that attributional processes may be involved in priming phenomena is not without precedent. For instance, Schwarz and Clore’s (1988; 2003) mood-as-information model proposes that similar attributional processes affect the use of mood in subsequent judgments and these authors have applied this analysis to understand the trait priming literature (see Clore, 1992; Schwarz & Clore, 1996). Similarly, in his work on the “aboutness principle,” Higgins (1998) proposed that primes affect judgments because perceivers mistakenly assume that the source of their categorization of any target is the object itself. Thus, they ignore the possible influence of recently encountered information and the other personal biases they bring to the situation, instead assuming that their response is wholly “about” the current target of perception (see also the “immediacy principle” of Clore et al., 2001). In the realm of behavior priming, Wheeler, DeMarree, & Petty (2007) have proposed that primes sometimes affect behavior because people mistakenly attribute prime-related content to their active self-concept. When this occurs, behavior is moved in the same direction as the prime’s influence on the active self-concept because people tend to act in a manner consistent with their perceived self-traits. As can be seen, all of these perspectives are highly compatible with my own and have
in part informed the current work. The attributional model, however, provides a novel advance over this previous theorizing by providing an integrative framework that explains how one basic process can produce the many different consequences observed in construal, behavioral, and goal priming.

Attribution and Consciousness

At its heart, the attributional model of priming relies on the misattribution of information made accessible by a prime to one’s natural reaction towards some other aspect of the situation. When this misattribution process occurs, prime-relevant content becomes fodder for later inferences, biasing a person’s answers to implicit questions regarding how to judge another person or object, how to behave, or what they want. Although such inferences are sometimes considered conscious and effortful, evidence suggests that this need not always be the case. Instead, recent research has shown that these inferential processes often possess many of the hallmark features of automaticity (see Bargh, 1994). Thus, they can occur both quickly and efficiently and people seem to be aware only of the product – not the process – of the inference (Nisbett & Wilson, 1977). Based on this research, I argue that the processes described by the attributional model can occur both consciously and unconsciously. There is considerable evidence that supports this conclusion.

Unconscious inferences have been discussed most widely with regard to perception. Helmholtz (1867/1910) famously described perception as a process of unconscious inference, and this concept has been featured prominently in modern theories of perception as well (e.g., Rock, 1983). The perception of distance, for example, can be explained by unconscious inferences about the relationship between size and distance. A toy train close by and a real train in the distance may be very similar optically, but the visual system seems to infer that the real train must be further away to project the same retinal image as the toy train. This inference process is obviously not a conscious deliberation. Instead, we are aware only of the product of the inference, which proceeds unconsciously. This same idea has also been forwarded by Bruner (1957), who suggested that higher level social information (such as one’s values and needs)
affects perception through the same sort of inference process. In particular, Bruner argued that "perception is a process of categorization in which organisms move inferentially from cues to categorical identity and that in many cases... the process is a silent one. If you will, the inference is often an 'unconscious' one" (p. 129).

Perhaps most directly relevant to the attributional model is the idea that a person’s reaction towards one stimulus can be automatically and unconsciously misattributed to some other salient aspect of the current situation. In line with this hypothesis is research on the affect misattribution procedure (Payne, Cheng, Govorun, & Stewart, 2005). In this work, the authors found that people tend to mistake the evaluative response elicited by an attitude object as their evaluative reaction towards a subsequently presented Chinese pictograph. Thus, novel pictographs that are preceded by positive stimuli are more likely to be judged as pleasant (and visa versa for negative priming stimuli). Importantly, the authors also found evidence that this misattribution process occurs without conscious awareness, as the effect persists even when great lengths are taken to encourage participants not to let the primes bias their responses.

Earlier research on affective priming by Murphy and Zajonc (1993) also found that affect misattributions were most likely to happen when the prime items were presented subliminally. This provides direct evidence that misattributions do not require conscious deliberation of the stimuli that give rise to psychological responses.

Other research has shown that related effects can also occur incidentally, without participants’ intention to evaluate any of the critical stimuli. In this work, Jones, Fazio and Olson (2009) demonstrated that evaluative conditioning, a process in which neutral stimuli gain evaluative meaning when consistently paired with other valenced objects (Staats & Staats, 1958; Baeyens, Vansteenwegen, Hermans, & Eelen, 2001), can also be driven by an implicit misattribution process. They provide evidence of this mechanism by directly manipulating the confusability of neutral stimuli and the evaluative primes with which they were paired. When the two are easily confusible (such as when they are in close special proximity), evaluative conditioning is enhanced. Critically, these effects appear to emerge without participants’
conscious intention to judge the critical stimuli, as participants were incidentally exposed to the neutral and valenced objects while they completed an unrelated surveillance task. And, as in the work by Payne et al. (2005), there was evidence that this process occurred without individuals’ conscious awareness. Participants were entirely unaware of the conditioning contingencies.

As in the work by Murphy and Zajonc (1993), research by Jacoby and Whitehouse (1989) has shown that subliminally presented stimuli can be implicated in similar attribution based processes. In particular, these authors have demonstrated that memory illusions (i.e., incorrectly judging a novel stimulus as previously seen) often occur when individuals attribute their fluent processing of a stimulus to its familiarity. By preceding the judged stimuli with a related word, these investigators were able to provide an external source of fluency, thereby increasing the probability of a memory illusion. In particular, preceding a novel item with a related word made the processing of this item easier, and participants tended to misattribute this sense of fluency to their (false) recollection of the object. Critically, this occurred even when the first word was presented subliminally, providing evidence that people do not need to be consciously aware of the stimulus to experience misattribution effects. Together, these various lines of research provide evidence for the automaticity of attributional inferences, suggesting that such misattributions can occur without one’s conscious awareness, can take place without the intention to evaluate or judge the relevant stimuli, and can occur even when one is unable to consciously perceive these objects.

The idea that attributional processes can occur implicitly is also consistent with a great deal of work outside the misattribution domain. For instance, research has demonstrated that people automatically integrate situational and dispositional information when judging others (Trope, 1986), spontaneously and effortlessly draw both causal and trait inferences from others’ behavior (Hassin, Bargh, & Uleman, 2002; Winter & Uleman, 1984), and automatically use attributional cues to inform their thought process (Briñol & Petty, 2003; Whittlesea, Jacoby, & Girard, 1990). Other theories, such as Whittlesea’s selective construction and preservation of experience (SCAPE) framework of memory (Whittlesea, 2002a, 2002b), also propose similar
implicit attributional processes. According to this perspective, people “unconsciously examine their cognitive and perceptual processing at a variety of levels” (Whittlesea, 2002a, p. 97), a process which cues an unconscious attributional search for meaning whenever one’s mental processes “lack coherence.” Together, these various theoretical perspectives and research findings suggest that attributional and inferential processes like those I propose are indeed capable of operating at both implicit and explicit levels.
CHAPTER 2
COMPARISONS TO OTHER MODELS

Now that I have introduced the attributional model of priming, I briefly review construal, behavior, and goal priming effects and outline the other models which have been proposed to account for these outcomes. In doing so I seek to highlight both the overlap and major points of departure between my account and those proposed by others. I conclude this chapter with a direct application of the attributional model to these three priming outcomes, outlining exactly how this perspective consolidates construal, behavior, and goal priming effects.

Construal Priming

Work on construal priming largely began during the 1970's, a time in which many social psychologists began adopting methodologies from cognitive psychology to study a wide variety of mental processes (Greenwald, 1992). Inspired by groundbreaking work on semantic priming (e.g., Meyer & Schvaneveldt, 1971; Neely, 1977), some of the most influential research in this area was based on the finding that the changes in accessibility produced by a priming manipulation could actually alter participants' construal of subsequently encountered objects. For example, in a seminal study by Higgins et al. (1977), participants were either exposed to words related to the trait of “recklessness” (i.e., conceited, aloof, stubborn, etc.) or “adventurousness” (i.e., self-confident, independent, persistent, etc.). They then read about an individual who behaved in an ambiguously risky manner and were asked to rate the positivity of this target. Those individuals who had been primed with the reckless-related words subsequently construed the target less positively than those who had been exposed to the adventurous-related words. Since this initial demonstration of construal priming, numerous studies have replicated the basic outcome, showing effects both on evaluation (as in Higgins et al.) and more general trait judgments (e.g., Srull & Wyer, 1979; 1980). Together, these studies demonstrate that construal
priming occurs for a large variety of primed traits and constructs (for review see DeCoster & Claypool, 2004), can alter perceptions of both other people and the self (Stapel & Koomen, 1996), applies to both social and non-social stimuli (Herr et al., 1983), and can occur even when participants never consciously see the priming stimuli (e.g., with subliminal priming manipulations; Bargh & Pietromonaco, 1982).

One of the most popular accounts of construal priming comes from Higgins (1996). According to this perspective, the basic process by which a prime affects judgments of other people or objects is through the biasing impact of accessible constructs. In order to make a certain general construct accessible, researchers in this area often present participants with a variety of priming stimuli so as to jointly activate the particular trait or category which itself serves as the “prime” of interest. Because each separate stimulus is associated with this overarching category to some degree, the semantic priming effect from perceiving each item serves to increase the general category’s accessibility, eventually making it more accessible than other, incidentally related constructs. This accessibility then makes a person especially “ready” to use the primed category upon encountering any ambiguous target to which the category is applicable. Upon perception of this object, the highly accessible construct is automatically used to disambiguate the target, resulting in a direct change in one’s construal of this object. Thus, someone primed with hostility-related stimuli will perceive a person behaving in an ambiguously aggressive way as more hostile because this highly accessible construct has directly altered their construal of the person’s behavior.

Importantly, although the above mechanism outlines the process by which an accessible construct causes judgments to move in a prime-congruent direction, research has also identified judgmental contrast (Herr, 1986; Herr et al., 1983; Sherif, Taub, & Hovland, 1958). In this work, primes instead cause judgments to move in the opposite direction, leading perceivers to view a target as especially unlike the highly accessible construct. In an effort to outline why such effects might emerge, a number of investigators have proposed alternative mechanisms of construal priming. Although the most prominent of these models have many differences, it is important here
to note their most pronounced similarities. In particular, all diverge from the “readiness” mechanism by proposing that priming often does not lead to direct effects on perception and construal. Instead, in line with my perspective, they generally hypothesize that primes make information available which is subsequently used as a source of information for coming to a conclusion regarding some target.

The first model I consider comes from Ford and Thompson (2000) who propose that “the perceiver’s understanding of ambiguous social behavior… may be reached through a two-stage post-conscious epistemic process of (a) generating interpretations (hypotheses) for the behavior and (b) evaluating the appropriateness or validity of the generated interpretations” (p. 324). According to this perspective, priming affects the judgment process by introducing prime-related cognitions that bias the hypotheses which are tested and a perceiver’s processing goals then affect the way in which these possible categorizations of the target stimuli are evaluated. Assimilation effects emerge when one’s processing goals lead them to seize on the first interpretations that come to mind. Contrast effects, on the other hand, come about when various cues in the judgmental situation suggest that these initial explanatory hypotheses are incorrect or are likely to be biased. When this occurs, perceivers become motivated to search out alternative interpretations which are inconsistent with the initial hypothesis. In this way even a highly biased hypothesis test (e.g., “Is Donald a really hostile person?”) can produce null or contrastive effects on subsequent judgments.

Similarly, Mussweiler’s (2003) selective accessibility model proposes that the information made accessible by priming has no direct effect on judgment and instead is used as a judgmental standard on which a hypothesis testing mechanism is based. The nature of the accessible information and certain critical features of the judged target then lead perceivers to engage in a process of either similarity or dissimilarity testing. Because these two testing mechanisms make different subsets of information about the target accessible, they then lead judgments of this object to become more or less “prime-like.” In general, the search for similarity makes prime-related information more accessible and causes judgments to assimilate towards the primed
construct while the search for dissimilarity makes prime-unrelated information more accessible and causes judgments to contrast away from it. Stapel and colleagues’ interpretation comparison model (Stapel, 2007; Stapel & Koomen, 2001) also proposes that primed information has a variable impact based on the information processing goals of the perceiver. When someone has the goal to comprehend or categorize a target, accessible information is used as an interpretation frame. This then leads to assimilative judgments of the target, in a manner similar to that described by Higgins (1996). When, however, one has a comparison or evaluation goal, accessible information is used as a comparison standard and contrastive target judgments are more likely. Although these differential processing goals can be brought to bear on any judgmental situation, certain features of the prime and target (such as prime distinctiveness) can also encourage processing via one particular route.

Although there are other important distinctions between (and within) these models, exploring these in detail is beyond the scope of the current work. From my perspective, what it is most important is that these more recent models all generally call for a mechanism by which the information made accessible by a prime has no automatic or default effect. Instead, the accessible content can be used in a variety of ways depending upon the goals of the perceiver and various features of the primed information and target. As highlighted in my discussion of the attributional model, I agree with this aspect of the theories and believe that primes affect judgments in a similarly flexible manner. Unlike these models, however, I highlight the role that ease of misattribution plays in producing the various assimilation and contrast effects discovered in this area of the literature (this aspect of the model is outlined in the “Consolidation” section of this chapter). Furthermore, although many of these perspectives require a perceiver to process a rather rich source of ambiguous information about the target for judgments to be biased, the attributional model suggests that one only needs a target that affords an implicit question for which the prime is applicable.
Behavior Priming

As research on construal priming progressed, investigators made the rather remarkable discovery that these priming manipulations also produced changes in participants’ subsequent behavior. That is, participants not only viewed ambiguous people and objects in a prime-congruent way, but actually behaved in a manner implied by the prime as well (Bargh et al., 1996; Carver et al., 1983). Carver et al., for instance, found that exposing participants to words related to hostility actually caused them to deliver more intense shocks to an incorrectly responding learning partner. Subsequent work on behavioral priming has demonstrated that this effect can occur automatically, without participants’ conscious awareness (Dijksterhuis & Bargh, 2001). Thus, behavioral priming can occur even when primes are presented subliminally (Bargh et al., Study 3) and extensive debriefing procedures have demonstrated that participants are largely unaware of any prime-induced changes in their actions (Bargh & Chartrand, 2000). As with construal priming, this effect has been documented for a diverse set of stimuli (for review see Dijksterhuis, Chartrand, & Aarts, 2007); including primes related to traits such as hostility (Carver et al.), rudeness (Bargh et al., Study 1), and introversion (Krolak-Schwerdt, 2003); primes related to group stereotypes such as soccer hooligans (Dijksterhuis & van Knippenberg, 1998), supermodels (Dijksterhuis et al., 1998), politicians (Dijksterhuis & Knippenberg, 2000), African Americans (Wheeler, Jarvis, & Petty, 2001), and superheroes (Nelson & Norton, 2005); primes related to individual exemplars such as Albert Einstein (LeBoeuf & Estes, 2004), Claudia Schiffer (Haddock, Macrae, & Fleck, 2002), and Micheal Schumacher (Macrae et al., 1998); and even primes related to animals possessing distinctive behavioral characteristics (e.g., cheetahs and turtles; Aarts & Dijksterhuis, 2002).

In many ways, the proposed mechanism(s) for construal priming suggest that judgmental effects emerge because of the biasing impact of accessible information. Thus, the primed content changes the way people view a target, or the kind of information they consider when attempting to judge this object. In contrast, the most prominent model of behavior priming proposes a very different process; one in which the information activated through priming causes a direct change
in subsequent behavior. For instance, in their ideomotor model of behavior priming, Dijksterhuis and Bargh (2001) suggest that such effects occur because of a direct link between the areas of the brain involved in behavior perception and behavior production. This link allows the simple perception of a prime to immediately activate a related behavioral representation in memory. Activation of this representation then directly alters behavior, causing reflexive and automatic behavioral assimilation to the primed concept. Importantly, one does not need to physically perceive the behavior which is being primed. It is instead sufficient for the behavior-relevant object to be associatively linked to the primed stimulus. Because of this, priming the overarching concept of the elderly (e.g., by exposing participant to words like worried, Florida, old, lonely, grey, selfishly, careful, sentimental, etc.) can activate the stereotype associated with this group which itself is linked to the behavior of interest (e.g., slow; see also Devine, 1989). When this occurs, perceivers are proposed to automatically engage in the primed behavior, reflexively incorporating it into their current actions (e.g., walking slowly like an elderly person; Bargh et al., 1996, Study 2).

Although the ideomotor model is the most influential account of behavior priming, findings of behavioral contrast (such as behaving less intelligently after thinking of a highly intelligent person; Dijksterhuis et al., 1998) fit poorly into this framework and have led researchers to begin proposing alternatives. For instance, Cesario, Plaks, and Higgins (2005) have recently argued that behavioral priming effects which are initiated by exposure to a social category are often due to the preparation to interact with a member of this group. Thus, participants who walk more slowly after activation of the elderly stereotype do so because they are anticipating an interaction with an elderly person, and one must slow down to interact appropriately with a member of this group. Yet another alternative mechanism has recently been proposed Kay and colleagues (Kay & Ross, 2003; Kay, Wheeler, & Smeesters, 2008; Smeesters, Wheeler, & Kay, 2009), who suggest that the behavioral effects of a priming manipulation are often mediated by changes in one’s construal of behavior-relevant targets in the environment. Thus, the primes do not directly affect behavior, and instead (as in construal priming) alter the way one perceives other objects in
the environment. One’s actions are then affected when the object is relevant to subsequent behavior, but it is through a mediational pathway in which the prime first alters construal of this stimulus.

Another perspective which is highly compatible with my own is outlined by Jefferis and Fazio’s (2008) accessibility-as-input account. In line with the process hypothesized by the attributional model, these authors have demonstrated that primes can affect behavior by serving as a source of information as people attempt to determine whether their current state matches the demands of the situation (see also the mood-as-input work of Martin, Ward, Achee, & Wyer, 1993). Because of this, manipulating the behavior which people see as appropriate within the current situation can cause a single prime to produce very different effects. If, for instance, participants were asked to work on a task until they had mastered it, primes related “fastness” lead them to stop rather more quickly than primes related to “slowness.” Presumably this is because one who has mastered a task should be moving through it rather quickly. If participants were instead asked to work on the task until they were tired of it, the primes had the exact opposite effects on behavior. Because one who is tired should be going relatively slow, now slow primes lead people to stop more quickly than fast primes. This provides evidence that primes do not necessarily have automatic behavioral effects. As I’ve proposed within the attributional model, the prime-related content appeared to be used as information for answering whatever question (i.e., stop-rule) was presented by the researchers.

Finally, according to Wheeler, DeMarree, and Petty’s (2007) active-self account, primes often affect behavior by changing one’s currently active self-concept. This occurs via two possible routes, both of which rely on the fact that the self-concept is too large for every aspect to be accessible at all times. First, because of the inherent ambiguity of the self-concept, it is possible for primes to alter the active self-concept by making some prime-related aspect of the self more accessible. By causing this aspect to become re-integrated into the active self-concept, behavior will be moved in a direction consistent with the primed construct. The second mechanism proposed by Wheeler et al. (2007) also relies on changes to the self-concept, but suggests that
these changes occur because people are often confused about the actual content of the self-concept. In line with the processes proposed within the attributional model, they suggest that the mental content activated by an external prime is sometimes mistaken for actual information about the self. When this occurs, this content is incidentally incorporated into the active self-concept and then guides judgment and behavior accordingly.

Critically, Wheeler et al. (2007) also suggest that misattributing prime-related content to one’s self concept is only one possible way in which attributional processes could lead to behavior priming and I agree. In particular, misattributing the same content to one’s thoughts about how to behave (instead of one’s own personality) would also affect later behavior, but could do so without changing the active self-concept. According to the attributional model, a person needs to view any prime-related accessibility as arising from some internal source for it to have an effect. That source could potentially be the self-concept but it does not need to be. For example, a person might use their thoughts regarding hostility to infer that they should be aggressive towards another individual. Making this behavioral inference does not, however, necessitate that one perceives themselves as a dispositionally hostile individual. Instead, the person could simply decide that this is one particular instance in which it is absolutely necessary to behave aggressively. In this way the active self-account describes the more specific circumstance in which accessible information affects behavior when it becomes misattributed to the self-concept, a process which should occur when one is especially likely to focus on their own personality after a priming induction (DeMarree & Loersch, 2009; Wheeler, Morrison, DeMarree, & Petty, 2008).

In summary, the ideomotor model (Dijksterhuis & Bargh, 2001) provides the most popular and influential perspective on behavior priming but other mechanisms have been proposed to account for findings which seem incompatible with this model. Although these newer models have a number of differences, it is important to note that each represents an effort to limit the proposed automaticity of behavioral priming effects. Thus, these theorists generally suggest that the reflexive mechanism proposed by the ideomotor model might be better described by a more
complex process in which primes do not have automatic, default effects and instead have multiple possible effects on behavior depending on how the primes are interpreted. The attributional model shares features with a number of these models and proposes a similar caveat.

Goal Priming

Also rising out of the construal priming literature, goal priming effects illustrate just how powerful a priming stimulus can be. Thus, not only can one’s overt behavior be changed by priming, but so too can one’s current motivational state (Chartrand & Bargh, 1996), a condition historically thought to be determined solely by conscious deliberation and choice (see Gollwitzer & Moskowitz, 1996). In one exemplary study, participants exposed to words related to the construct of achievement (e.g., achieve, succeed, win, etc.) actually performed better on a subsequent word search puzzle than those primed with neutral words (Bargh et al., 2001). Although this outcome may appear identical to a behavioral priming effect, research has been able to dissociate the two (for review see Förster, Liberman, & Friedman, 2007). In particular, Bargh et al. found that goal priming causes behavioral changes which display the hallmarks of conscious goal selection: an increase in strength over time, resumption after interruption, and persistence in the face of obstacles. Thus, it appears that simply priming individuals with words related to a goal can cause them to flexibly alter their behavior so as to maximize the chances of goal satisfaction. As with behavioral priming effects, such outcomes are nonconscious and extensive debriefing procedures demonstrate that participants have no conscious knowledge of the changes in their motivational state or behavior (Bargh & Chartrand, 2000; Chartrand & Bargh, 1996). Research in this area has documented the phenomenon for a variety of constructs (for a review see Dijksterhuis et al., 2007). Among others, this form of complex, motivated behavior has been identified for goals as diverse as seeking casual sex and making money (Aarts, Gollwitzer, & Hassin, 2004), competition and cooperation (Loersch, Aarts, Payne, & Jefferis, 2008), helping (Fitzsimons & Bargh, 2003), achievement (Shah, 2003), cleaning (Morrison, Wheeler, & Smeesters, 2007), forming impressions of others (Chartrand & Bargh, 1996), dieting (Fishbach, Friedman, & Kruglanski, 2003), and knowledge seeking (Riketta & Dauenheimer, 2003).
Mechanistically, goal priming has been postulated to occur through a process quite similar to that proposed by the ideomotor model of behavior priming (Dijksterhuis & Bargh, 2001). According to Bargh’s (1990) auto-motive model, goals are represented in memory in the same way as other mental constructs (e.g., word meanings and behavioral scripts). Because of this, perception of any stimulus that has been highly associated with past (conscious) pursuit of the goal can activate the goal’s mental representation. This activation then automatically initiates nonconscious pursuit of the goal, a process which creates the same behavioral changes as would a conscious decision to pursue the goal (Chartrand & Bargh, 1996). Although there are no alternative accounts for such priming effects (for related perspectives see also Custers & Aarts, 2005a; Shah, Kruglaski, & Friedman, 2003) this theory can be contrasted to that proposed by the attributional model. In particular, although the auto-motive model proposes that perception of goal-relevant primes should invariantly initiate goal pursuit, my account suggests that this should only occur when one misattributes information made accessible by the prime to thoughts regarding their personal desires.

Consolidating the Three Priming Effects

Although the preceding discussion should make it clear that a number of truly unique effects can result from a simple priming induction, investigators have not yet developed a theory for determining when any single manipulation will produce one instead of the other. Thus, one could logically predict that construal, behavior, and goal priming might all result from the exact same priming procedure and, theoretically, each outcome should be detected as long as the investigator has selected the proper dependent measure to tap the effect of interest. Unfortunately, other than the knowledge that selection of the appropriate dependent variable is critically important for measuring each effect, there is no known solution to this “many effects of one prime” problem (Bargh, 2006).

As I’ve highlighted above, the attributional model of priming provides one possible answer to this puzzle. In particular, I suggest that construal, behavior, and goal priming all occur through the same basic misattribution process. Thus, primes affect judgment and behavior by
introducing prime-related information which is mistakenly attributed to one’s natural reaction towards some aspect of the situation. The critical variable which determines whether construal, behavior, or goal priming results from this general process is the implicit question afforded by one’s current object of focus in the environment.

Thus, someone who reads about a person (e.g., Donald) after being primed with hostility must think about this individual and form some sort of impression of them, a situation which presents the implicit question, “Who is that?” As highlighted above, I diverge from past theory by suggesting that the priming effect normally observed in this situation (e.g., Srull & Wyer, 1979) does not result from direct changes to one’s judgments, but instead from changes in the accessible information that one considers when thinking about Donald and his behavior (see also Ford & Thompson, 2000; Jefferis & Fazio, 2008). Because of this, one infers that Donald is different because of the cognitive consequences of the prime-induced accessibility rather than directly perceiving his behavior to be more prime-like. That is, a person would conclude that Donald is aggressive because information related to hostility is accessible and Donald’s behavior seems like a reasonable cause of this accessibility (e.g., “If I’m thinking about hostility, it must be because Donald is such an aggressive person.”). Essentially, this prime-related information is mistakenly viewed as being made accessible by the perception of Donald. Because the mental content is relevant to the target of judgment, it is naturally used as a source of information just as if this object was their true causal source (see also the aboutness principle; Higgins, 1998). Such an effect would not emerge, however, if there was a strong alternative explanation for the presence of this accessibility (e.g., “I’m probably thinking about hostility because someone struck me in the face while I was reading about Donald.”). In this case, the accessible content would not be misattributed to one’s response towards the judgmental target and construal of this object would be unaffected.

Based on my analysis, behavior and goal priming occur via the same process. Thus, the exact same accessibility from priming can instead result in behavioral changes when the situation confronting a person focuses them on producing a behavioral response. When this is the case,
the situation presents the implicit question, “What will I do?” and the prime-induced accessibility serves as a potential source of information for inferring the answer to this question. As long as the content it makes accessible is relevant to the current situation and is not attributed to some other source, then the prime will alter inferences of how to behave, thereby influencing behavior (Aarts & Dijksterhuis, 2003; Hertel & Kerr, 2001; Postmes, Spears, Sakhel, & de Groot, 2001; Smeesters, Warlop, van Avermaet, Corneille, & Yzerbyt, 2003). Again, I suggest that this is not due to the direct activation of a behavioral tendency but instead results from the attributional inference process outlined above. Thus, someone primed with the concept of hostility will have aggressive information accessible in mind and will then infer that they should behave in a prime-consistent manner because of the presence of this mental content.

Goal priming also proceeds in this same fashion, with the only difference being that a perceiver now encounters a situation that presents the implicit question, “What do I want?” after the priming induction. When this is the case, the accessibility from priming will now have the opportunity to alter inferences of personal motivation and produce goal-directed behavior (Chartrand & Bargh, 1996). As before, this process results from the cognitive consequences of information made accessible by the prime. Thus, the prime will increase the accessibility of related mental content and this information can be used to infer the answer to this implicit question. What is critical across all of these priming effects is that the information made accessible by priming is relevant to the focal feature of the current situation and whatever implicit questions it affords. As long as this accessibility is not attributed to an alternative source, then it will naturally be used to inform decisions regarding how one should act or behave, leading to prime-congruent judgments, behavior, or motivation. If the information made accessible by a prime is not relevant to the current situation or clearly stems from some other source, it cannot be misattributed to one’s natural response to the focal aspect of the situation. Because of this it will either have no effect (e.g., Higgins et al., 1977) or influence judgments by either serving as a source of comparison information (Mussweiler, 2003) or motivating individuals to engage in judgmental correction efforts (Moskowitz & Skurnik, 1999; Wegener & Petty, 1997).
Importantly, this analysis also suggests that construal, behavior, and goal priming effects can be produced via multiple routes. If, for instance, a person is primed with the concept of hostility and is subsequently led to make judgments of their own personality, any changes in self-perception would easily lead to changes in behavior (cf. Wheeler et al., 2007). In this way, behavior priming would be produced via a route more typically associated with construal priming. Similarly, although priming participants with words related to cooperation has been conceptualized as activating a goal to cooperate (Bargh et al., 2001, Study 2), these effects could just as easily be produced by biasing participants’ judgments of the current situation (Kay & Ross, 2003; Kay et al., 2008), their self-perceptions (DeMarree, Wheeler, & Petty, 2005), or their perceptions of an interaction partner (Smeesters et al., 2009). In all cases, behavior would be altered, but the actual inferences that produce this effect would be very different. Importantly, while the initial behavior might be identical in all cases, each would produce very different ancillary effects. If, for instance, one inferred that they were motivated to cooperate, they would actively seek out an opportunity to engage in this behavior, after which time the goal would be fulfilled and would no longer affect behavior. If the situation was instead judged to be one in which cooperative behavior was appropriate, only behavior in that situation and those very similar to it would be affected. And if the primes altered one's impressions of their own personality (e.g., “I am a very cooperative person”), behavior might be affected in both current and all future situations. By understanding the exact facet of the situation that people are judging and the implicit questions that this target affords, one can better predict a prime’s effects on both current and future behavior.

Finally, although the attributional model is focused on the three basic classes of implicit questions which most directly lead primes to produce construal, behavior, and goal priming effects, the same analysis can apply to any implicit question presented by the current situation. For instance, a focus on one's internal state might afford the implicit question, “How do I feel?” which would be susceptible to all the same processes outlined above (Schachter & Singer, 1962; Sinclair et al., 1994). In this way, the model can account for a wide variety of priming effects, all of
which will be contextually determined by both the information made accessible by a prime and the various implicit questions afforded by the current target of attention.
CHAPTER 3
MISATTRIBUTION AND PRIMING

According to the attributional model, priming effects emerge when a person misattributes prime-related content to their own natural reaction towards the focal aspect of the situation. Only when this occurs can information made accessible by the prime be used to answer whatever implicit questions this target affords. The research presented in the current chapter examines this aspect of the model with three studies focused on behavioral priming. In each study, I made information accessible and then manipulated the degree to which participants believed it was due to their own cognitive response. By affecting the ability of participants to easily attribute the primed content to their own thoughts, I expected to moderate the effects of the primes. Only when individuals misinterpret primed content as emerging from their own natural reaction to the situation should it be used to inform subsequent behavior. If this information is instead perceived as being accessible due to some external influence then participants should no longer attribute it to their own thoughts. In the same way that individuals no longer use their mood to inform judgment if it is attributed to an external source (e.g. Schwarz & Clore, 1983), this manipulation should prevent accessible information from being used to inform subsequent behavior in the current paradigm.

Study 3.1

In order to provide an initial test of this hypothesis, all participants in Study 3.1 were primed with the construct of cleaning by having them complete a short recall task. I manipulated the perceived source of this information, either encouraging the misattribution process by making participants feel as though the recalled content had been personally generated or discouraging it by making the recalled content seem as though it had been brought to mind by a facet of the experimental procedure. I then measured subsequent cleaning behavior with the prediction that
only participants who attributed the accessible information to their own thoughts would use it to inform their actions.

Method

Participants

Thirty-three participants were randomly assigned to a single factor (source of recalled information: internal vs. external) between-subjects design. One participant was a non-native English speaker and was eliminated from the sample. This left 32 individuals in the final analyses.

Materials and Procedure

Motivated cleaning recall task. Upon beginning the experiment, participants received the following instructions for the motivated cleaning recall task.

We would now like you to recall some of your past life experiences. In particular, we would like you to think of times in which you were especially motivated to clean. Please recall instances in which you felt especially motivated and tried to clean an area or object as well as you possibly could. That is, please recall a special instance of cleaning behavior as opposed to a cleaning event that would have happened in the course of your normal, everyday routine. Because highly motivated behavior is accompanied by strong emotional reactions to success or failure, the instances you remember should be times in which you felt especially good after cleaning or especially bad when your cleaning behavior was disrupted. Once you recall the event, please summarize it in A SINGLE SHORT SENTENCE and then try to think of another time which meets the above criteria.

Source of recall. The perceived source of the information made accessible by the recall task was manipulated via instructions within the task’s description. Inspired by the work of Förster and Liberman (2001, Study 2), participants were told that they would be listening to the sound of prerecorded speech played backwards during the recall task. Of critical importance was the ostensible effect of this speech on participants’ experience of recalling past instances of motivated cleaning. In the internal source condition, participants were told that the speech would interfere with their thought process, making it especially difficult to generate examples. Because
any recalled examples occur despite the hindering influence, this information should be especially likely to feel as though it was personally generated (see the augmenting rule of attribution, Kelley, 1971).

In the external source condition, participants were instead told that the speech would produce thoughts of motivated cleaning. By leading participants to feel that feel their recalled thoughts may be due to this external source, the information should no longer be perceived as self-generated (see Kelley’s discounting rule of attribution). The internal source instructions provided to participants are listed below with the modifications for the external source condition in brackets:

While you are completing this task you will also be hearing some sound over the headphones. Although you won't be able to understand what is being said, the noise contains subliminal messages, which are designed to influence your thoughts. In today's experiment, the message you will be hearing is one that has been found to interfere with [produce] thoughts of cleaning and make it more difficult [much easier] for participants to recall past experiences of motivated cleaning. You do not need to pay special attention to the sound, since it has been shown to work best when it passively plays in the background.

The speech used for this purpose was taken from a Democracy Now! interview featuring Hunter S. Thompson which was broadcast on February 23, 2005. The audio portion utilized was a 10-minute clip in which all questions had been removed using Audacity audio editing software. This clip was then reversed to create a monotonous, single voice recording with no discernable words.

Cleaning task. After completing the recall task, participants were asked to spend three minutes completing a color-by-numbers “filler” task, presented as an opportunity for any influence of the recall task to recede before completing other measures. The color-by-numbers task, a common children’s activity taken from a coloring book, requires one to color a black and white line drawing in which each separate section is labeled with a number. Here, the numbers ranged
from 1-8 with each number corresponding to a different color of crayon. When the sections of the worksheet are colored in with the appropriate crayons, a full-color picture is created. In order to perform this task, participants were provided with a box of eight crayons (four of which were out of the box on the desk), which they used to color a one-page worksheet. Once three minutes were complete, participants were alerted by the computer and told to “stop working and place the worksheet back next to the computer monitor.” The very next screen following these instructions asked them to indicate which of the crayons were currently in the crayon box. My measure of cleaning behavior was the percentage of the crayons that participants had used on the coloring task that were placed into the box during the course of the task. Each time participants used a crayon they were presented with the implicit question of whether to place it in the box or put it on the desk. It was expected that participants who viewed their recalled thoughts as self generated would be more likely to use them to inform their behavior. If this is the case, participants in this condition should be especially likely to infer that they should behave cleanly, causing them to place a greater percentage of used crayons in the box.

**Self-perceptions of past cleaning behavior.** After completing the color-by-number task, participants were asked two questions to measure self-perceptions of cleanliness. These questions required them to rate, “*How much do you like to clean?*” on a seven-point scale anchored by the labels *not at all* (0) and *a lot* (6) and “*How clean do you keep your living space?*” on a seven-point scale anchored by the labels *very dirty* (-3) and *very clean* (+3). These items were assessed to determine if any changes in the degree of cleaning behavior were independent of participants’ self-perceptions of cleanliness. Upon completing these measures, participants were administered a funnel-debriefing to probe for suspicion (see Bargh & Chartrand, 2000) and were debriefed.

**Results and Discussion**

In order to test my hypothesis, I examined the effect of the source of recall manipulation on the percentage of crayons used and then placed in the box. As expected, participants tended to place a higher percentage of used crayons in the box in the internal source condition ($M = .44$,
than in the external source condition ($M = .14, SD = .28$), $t(30) = 1.99, p = .06$. As outlined above, I have proposed that this manipulation is affecting participants’ ability to misattribute the recalled content to their own thoughts and these thoughts are subsequently being used to determine how to behave. Another alternative, however, is that the recalled content is actually changing participants’ self-perceptions, an effect which would produce the same downstream consequences observed on my dependent measure (see Schwarz et al., 1991; Wheeler et al., 2007). In order to explore this possibility, I first examined the effect of my manipulation on participants’ ratings of both how much they liked to clean and the degree to which they kept their living space clean. Both measures were unaffected by the source of recall manipulation, $ts < 1$. I then ran an ANCOVA analysis in which participants’ answers to these two questions were entered as covariates in my primary analysis. Although the degree to which participants kept their living space clean predicted the percentage of crayons placed in the box, $F(1,28) = 4.09, p = .05$, partialling out the variance from these two questions did not reduce the impact of the manipulation on subsequent cleaning, $F(1,28) = 4.24, p = .05$ (see the “Model Implications” section for further discussion of this result).

Together, these findings suggest that manipulating the ability of participants to misattribute accessible information to their own cognitive response enhances the behavioral effects of primed content. When the manipulation caused participants to feel as though the information they recalled was self-generated, this mental content had a stronger effect on subsequent cleaning behavior than when the same information felt as though it had been produced by an external source. Presumably this was because the information did not feel personally generated and could no longer be seen as a valid source of information for deciding how to behave. Although this finding supports my hypotheses, it is possible that the recall of personal memories initiates many processes that are not produced by more traditional behavioral priming manipulations. In order to address this concern, Study 3.2 sought to demonstrate analogous results using a non-recall based manipulation of construct accessibility.
Study 3.2

In this study I manipulated the accessibility of either competition or cooperation by showing participants one of two videos in which two students played a game of racquetball (a manipulation used successfully in past research on behavior priming, Loersch et al., 2008). Crossed with this priming manipulation, half of the participants also completed an attribution manipulation which was expected to enhance the extent to which they believed that the information which was accessible after the video was due to their own cognitive response towards the situation. I then measured competitive behavior in an ultimatum game. I predicted that the priming video would be more likely to influence the behavior of subjects who believed that any accessible information was due to their own thoughts regarding how to behave.

Method

Participants

Sixty-two participants were randomly assigned to a 2 (priming video: competition vs. cooperation) X 2 (thought attribution: internal source vs. control) full factorial, between-subjects design.

Materials and Procedure

Priming stimuli. Upon beginning the experiment, participants were primed with the construct of either competition or cooperation by viewing a video containing footage of two male Ohio State University students playing racquetball. Shot from the rear door of the court, these two videos were 25 seconds in length and included the same two individuals. The competitive version included short clips of the students playing an actual game, running intensely after shots, actively competing throughout the length of the video. In the cooperative version, they instead took turns nicely hitting the ball back and forth to one another, moving slowly and not competing in any way. Past work has demonstrated that these videos reliably prime varying degrees of competitive behavior (Loersch et al., 2008).

Thought attribution. After being primed with competition or cooperation, one-half of the participants were given an attribution manipulation to enhance the extent to which accessible
information would be interpreted as emerging from their natural thoughts about how to behave. Specifically, these participants were informed that they would be listening to backwards recorded speech and that this sound would influence their thoughts. The instructions were as follows:

Throughout the rest of this experiment you will be hearing pre-recorded speech over the headphones. Although you won't be able to understand what is being said, the track contains subliminal messages and has been designed to influence your thoughts. In particular, this audio track is able to interfere with the process of generating thoughts. By preventing you from generating thoughts, the speech can greatly interfere with the decision making process. Because the audio track will MAKE IT VERY DIFFICULT TO HAVE THOUGHTS, you should PAY SPECIAL ATTENTION to the thoughts that you have. They are likely to be especially useful for deciding how you want to behave.

Because any accessible content should be viewed as coming to mind despite the sound’s hindering influence, this manipulation should make participants especially likely to misattribute prime-related content to their own thoughts. The speech was identical to that of Study 3.1. Participants in the no attribution control condition did not listen to this backwards speech and received no other special instructions.

*The ultimatum game.* In order to measure competitive behavior, all participants subsequently completed “a few rounds” of an ultimatum game (see Thaler, 1988). This game is typically structured such that participants receive a monetary offer from a partner which represents some portion (e.g., $3) of a monetary stake (e.g., $10). If participants accept this offer, they receive the proposed amount (the $3) and the person making the proposal keeps the remainder ($7). If participants reject the offer, neither party receives any money. In this experiment, the actual game consisted of three repeated proposals (with stakes of $3 out of $10, $2 out of $10, and $5 out of $10) followed by a role-switch in which participants made an offer to their imaginary partner. Participants were not given any advanced warning regarding the number of rounds or the role-switch. In addition, because past work has found no systematic differences between real and imaginary instantiations of this game (Bethwaite & Tompkinson, 1996), the
instructions simply asked participants to mentally simulate the game and imagine that they were playing for real money with a real partner. Thus, there was no actual partner and the computer always accepted the participant’s offer, regardless of amount.

For my purposes, what is critical about the ultimatum game is that it contrasts equity concerns and self-interest. Thus, basic economic theory suggests that individuals who wish to maximize their profit should accept any offered amount when considering proposals and offer as little as possible (while still encouraging an acceptance) when proposing to another person (see Rubinstein, 1982). What is commonly observed, however, is that people offer fair proposals (e.g., $5 out of $10) much more often than expected and will reject unfair offers (e.g., $2 out of $10), sacrificing their personal profit in protest of the proposal’s lack of equity (for reviews see Roth, 1995; Thaler, 1988). Because of this conflict between equity concerns and self-interest, the ultimatum game has been used as a measure of relative competitiveness (Kay, Wheeler, Bargh, & Ross, 2004, Studies 3 & 4). In particular, because winning necessitates inequality, competition inherently involves some suspension of equity concerns (Kasser, Cohn, Kanner, & Ryan, 2007; Thomas, 1973) in order to maximize the likelihood of personal gain. Thus, I hypothesized that individuals who were behaving competitively would act in a more “economically rational” manner, accepting lower proposals and making lower offers in order to maximize their personal profit (Munier & Zaharia, 2002). Individuals who want to behave cooperatively, on the other hand, should be especially sensitive to equity concerns, making them more likely to reject unfair proposals and to offer relatively fair amounts in order to cooperate with their partner. Such behavior should lead these individuals to make less money during the game.

Self-perceptions of competitiveness. After completing the ultimatum game, participants were asked three questions to measure their self-perceived competitiveness. These questions required them to rate, “How important is it for you to be competitive in your daily life?” on a seven-point scale anchored by the labels not at all (0) and very (6); “How competitive are you in general?” using the same scale; and “How competitive are you compared to your friends and peers?” on a seven-point scale anchored by the labels less competitive (-3) and more competitive
(+3). After completing these measures all participants answered funnel-debriefing questions to probe for suspicion and were debriefed.

Results and Discussion

The amount of money participants gained during the course of the ultimatum game was subjected to a 2 (priming video: competition vs. cooperation) X 2 (thought attribution: internal source vs. control) ANOVA. As expected, the only significant effect to emerge was the predicted prime X thought attribution interaction, $F(1,58) = 6.13, p = .02$ (see Figure 2). Simple effects analyses showed that the video primes were more likely to affect the behavior of participants who were led to attribute any accessible content to their own natural thoughts about how to behave. Participants in this condition made significantly more money after being primed with competition ($M = $14.12, $SD = $2.65) than after being primed with cooperation ($M = $11.44, $SD = $1.55), $F(1,58) = 7.52, p = .01$. These priming inductions had no effect, however, on participants in the no attribution control condition, $F < 1$.

In order to examine whether these effects were due to changes in self-perceptions of competitiveness, I submitted participants’ answers to these three items to the same ANOVA analysis. Replicating Study 3.1, none of these items were significantly affected by the manipulations, all $Fs < 1.8, ps > .18$. As before, I also ran an ANCOVA analysis in which participants’ answers to these three questions were entered as covariates in my primary analysis. Although participants’ answers to the questions were significant predictors of behavior in the ultimatum game (all $Fs > 4.5, ps < .04$), the predicted interaction between prime and thought attribution remained significant, $F(1,55) = 7.04, p = .01$. This provides some support for the proposal that the attribution manipulation was affecting the degree to which accessible information was misattributed to participants’ thoughts about how to behave rather than directly changing their self-perceived competitiveness.

Together, these findings provide a conceptual replication of past work by Kay et al. (2004), demonstrating that participants who were primed with competition made more money during an ultimatum game. Presumably this occurred because these individuals were less
Concerned with equity and fairness than participants who had been primed with cooperation. Critically, however, this behavioral priming effect only emerged when participants were led to misattribute information made accessible by the primes to their own thoughts regarding how to behave. The behavior of participants in the no attribution control condition was unaffected by the primes.

Although some may be tempted to criticize these findings because of the null effect in the control condition, it is worthwhile to note that this is fairly common in research investigating the moderators of behavioral priming. For example, in Dijksterhuis and colleagues’ (1998) work on stereotype and exemplar priming, they only found significant priming effects when a stereotype prime was paired with a prominent exemplar. Priming the stereotype alone led to only non-significant trends toward assimilation (see Studies 2a and 2b). Similarly, DeMarree et al, (2005) demonstrated that low self-monitors are especially likely to show behavioral priming effects. Across three studies, high-self monitors showed either no effects or reversed effects, and in two out of three studies there was no overall effect of priming. Although such results can be viewed as failures to replicate past research (e.g., Bargh et al., 1996), they do not call into question the relevance of these moderators. In fact, these findings are particularly noteworthy because they highlight just how important it can be to take such moderators into consideration.

In the case of the current study, it is difficult to know the exact source to which participants in the control condition attributed the information made accessible by priming. Although no participant reported suspecting a biasing influence of the priming video during the funnel debriefing procedure, it may be that the conscious experience of this prime led some individuals in this condition to accurately attribute thoughts of competition or cooperation to the video. If this occurred, then the information made accessible by the prime could not be misattributed to thoughts about how to behave and no effect of the prime would be expected. This potential issue was addressed in Study 3.3 by removing such ambiguity and directly controlling the perceived source of accessible information in all conditions.
Finally, although I have claimed that the results of this study are due to changes in the likelihood that accessible information was misattributed to participants’ natural response to the situation, there are a variety of alternative explanations for these findings. In particular, the manipulation may have actually changed participants’ object of focus, leading individuals to focus their attention on questions of how to behave. Thus, the effects may have emerged not because I altered the likelihood of misattribution, but instead because I affected the target of thought (another critical moderator of priming effects according to the attributional model, see Chapters 4 and 5). Perhaps more importantly, it is also possible that this manipulation so clearly directed participants to use the information made accessible by the priming videos that all the observed effects were due to experimental demand. In order to address these concerns, Study 3.3 utilized a more subtle attribution manipulation which I expected to affect the likelihood of misattribution without affecting participants’ object of focus.

Study 3.3

Although the results of the previous two studies support the attributional model, there are a variety of issues which are of concern. In particular, one may argue that the thought attribution manipulations I’ve used can only affect consciously accessible information because participants in both of the prior studies were asked to explicitly consider the priming stimuli. Also, as outlined above, the results of Study 3.2 may be due to the fact that this particular manipulation actually altered participants’ object of focus after the priming induction or induced a strong demand characteristic on participants’ responses. To address these concerns, Study 3.3 manipulated construct accessibility using a subliminal priming induction and utilized a novel, more subtle, attribution manipulation.

Method

Participants

One hundred and one participants were randomly assigned to a 2 (prime: competition vs. cooperation) X 2 (thought attribution: internal source vs. external source) full factorial, between-
subjects design. Nine non-native English speakers were eliminated from the analyses, leaving a sample of 92 individuals in the final analyses.

Materials and Procedure

Thought suppression task. Upon beginning the experiment, participants completed a thought suppression task that lasted approximately three minutes. Based on a modified version of the paradigm implemented by Wegner, Schneider, Carter, and White (1987), participants were asked to stare at a fixation point on a computer screen while being flashed with random strings of letters and numbers. However instead of focusing participants on suppressing any particular thought, they were instructed to avoid all thoughts during this task. The presentation of the random number and letter strings served as the basis for the thought attribution manipulation (see below).

Priming stimuli. During the thought suppression task, participants were subliminally primed with the construct of either competition or cooperation. Primes were presented foveally in the center of the screen for 10 ms and were immediately followed by a non-word letter string (e.g., qpwnzmnvcz) to mask the stimuli. This mask remained on screen for between 30 and 60 ms. The competition-related primes included the stimuli beat, collect, compete, gain, guard, hoard, keep, profit, stockpile, and win. The cooperation-related primes were cooperate, divide, equality, fair, generous, give, help, kind, share, and split. Each individual prime was shown nine times during the course of the thought suppression task, resulting in 90 separate priming trials.

Thought attribution. In addition to these priming stimuli, participants were presented with random letter (e.g., zoes, tacroe, etc.) and number strings (e.g., 6552, 37, etc.) of varying color, size, and duration (15 – 2000 ms) throughout the thought suppression task. In the internal source condition, participants were informed that these stimuli were being presented in order to distract them and interrupt any thoughts that were beginning to form. Thus, any information accessible after the task should be especially likely to be misattributed to participants’ own thoughts because these thoughts were in mind despite the interference of the experimental procedure. In the external source condition, participants were instead told that subliminal information embedded
within the stimuli would actually cause them to have certain thoughts, making the suppression task much more difficult. I expected that this manipulation would cause participants to distrust any information accessible after the task, making it seem especially unlikely to be self-generated and preventing the misattribution process. At the conclusion of the thought suppression task all participants completed the same ultimatum game described in Study 3.2. All other aspects of the procedure were also identical to this study.

Results and Discussion

The amount of money made during the course of the ultimatum game was subjected to a 2 (prime: competition vs. cooperation) X 2 (thought attribution: internal source vs. external source) ANOVA. In line with my predictions, there was a significant interaction between prime and thought attribution, \( F(1,88) = 5.44, p = .02 \) (see Figure 3). As expected, simple effects analyses showed that the primes only had an effect on behavior when participants were led to misattribute prime-related content to their own thoughts, \( F(1,88) = 6.62, p = .01 \). When this was the case, participants primed with competition-related stimuli made more money during the ultimatum game (\( M = $13.91, SD = $2.02 \)) than those primed with cooperation-related stimuli (\( M = $11.87, SD = $2.53 \)). When participants felt that their thoughts may have been created by an external influence, there was no effect of prime, \( F < 1 \). As in Study 3.2, I also examined the effect of the manipulation on participants’ answers to the three questions assessing self-perceptions of competitiveness. None of the three measures were significantly affected by the manipulations, all \( Fs < 1.3, ps > .26 \). I then ran an ANCOVA analysis in which participants’ answers to these three questions were entered as covariates in my primary analysis. Although the critical interaction between prime and thought attribution remained significant, \( F(1,85) = 4.91, p = .03 \), I failed to replicate Study 3.2 in that none of these questions were significant predictors of behavior in the ultimatum game.

In line with the earlier findings, participants only used accessible information to inform their behavior when they were led to misattribute it to their own response towards the situation. When participants instead felt that this information could have been introduced by an external
factor, this misattribution process was prevented and the primes were no longer used to inform subsequent behavior. Importantly, this occurred even though construct accessibility was manipulated through a subliminal priming induction, providing evidence that participants do not need to consciously consider the priming stimuli for these effects to emerge.

Model Implications

As outlined above, the attributional model proposes that primes often do not have automatic or default effects. Instead, I argue that a prime simply causes related information to increase in accessibility and this highly accessible mental content is subsequently used as information for making later decisions. When the situation encountered after priming affords an implicit question for which prime-related content is relevant and applicable (Higgins et al., 1977), then this accessible information becomes capable of producing an observable priming effect. As long as one mistakenly attributes the accessibility resulting from priming to their own reaction towards the focal target of attention, then a change in subsequent judgment, behavior, or motivation will occur. Behavioral priming effects like those I observed often emerge when participants become focused on their current behavioral options, and the implicit question “What will I do?” is made salient. When this occurs, any relevant and applicable mental content which is attributed to one’s natural response to the situation will be used as to infer the proper answer.

In the set of studies presented in this chapter, I demonstrated that manipulations which increased the likelihood that accessible information becomes misattributed to participants’ natural response to the situation also increases the impact of a priming induction. Presumably, enhancing perceptions that this information was due to participants’ own thoughts made it appear especially relevant for inferring how to behave on subsequent tasks. Across the three studies, this moderation occurred regardless of how information was made accessible. Thus, the same results were obtained when information was made accessible by having participants recall their own past behaviors (Study 3.1), view the overt behavior of others (Study 3.2), or view subliminally presented words which were semantically related to the construct of interest (Study 3.3). This demonstrates the potential generality of the proposed process. Furthermore, with Study 3.2, I
demonstrated that the misattribution of primed content to one’s thoughts about how to behave is at least sometimes necessary to produce a behavioral priming effect. To my knowledge, this set of studies is the first to demonstrate that such attributional manipulations can affect the likelihood of observing behavior priming.

Furthermore, these findings seem difficult to account for from other models of behavior priming. For instance, because the ideomotor model (Dijksterhuis & Bargh, 2001) suggests that primes should automatically and inevitably produce behavioral effects, it would not predict the moderation observed in the current studies. The results of Study 3.2, in which the priming manipulation had no effect on participants unless they misattributed prime-related content to their own thoughts regarding how to behave are particularly problematic for this perspective. In addition, although the active-self account of Wheeler and colleagues (2007) might predict similar effects to those I observed on my primary behavioral measures, questions assessing behavior related self-perceptions were unaffected by the studies’ manipulations. Although one should not make strong arguments based on null effects, ANCOVA analyses in each study showed that even accounting for these aspects of participants’ self-concepts did not alter the influence of my manipulations. Indeed, these analyses provided evidence that the measures of participants’ self-perceptions were often quite valid in that they also predicted behavior on the primary dependent measures (see Studies 3.1 and 3.2). Together, these findings suggest that the effects I observed were not due to overall changes in participants’ active self-concept. Although some subset of the participants may chronically focus on their self and therefore have experienced self-concept driven behavior change (e.g., low self-monitors and those high in self-reflectiveness, see DeMarree et al., 2005; Wheeler et al., 2008, respectively) this did not occur for all individuals in these studies. Instead, it appears that the attributional manipulations I used generally enhanced the extent to which participants’ could misattribute accessible information to their own thoughts and this increased the likelihood that the information was later used to inform behavior.

Related to these issues, one might wonder why the accessible content was used to directly inform decisions regarding how to behave instead of indirectly influencing behavior by first
altering participants' self-perceptions. Although speculative, one potential reason is the order of my dependent measures in these studies. In particular, participants always completed the behavioral measure before judging their own personality. Because of this, the initial misattribution of prime-related content to participants’ thoughts about how to behave may have prevented the information’s use in later trait judgments. If the order of these measures had been reversed, the information made accessible by priming may have been used to inform self-perceptions and this change in the self-concept would have then affected behavior (see Wheeler et al., 2007). This possibility is explicitly addressed by the research presented in Chapter 5.
In Chapter 3 I showed that manipulations which increased participants’ ability to view accessible information as being personally generated also led this prime-related content to produce larger behavioral priming effects. According to the attributional model, the reason these effects emerged was because the information made accessible by the prime was only used to answer the implicit question “What will I do?” if it was first misattributed to participants natural thoughts about how to behave. Presumably by affecting the likelihood of this misattribution process, these manipulations also affected the ability of the prime-related information to be used to answer this implicit question. Critically, although these studies demonstrate the importance of misattribution in priming effects, they do not provide any evidence that participants really were using the primes to answer some implicit question. This is the purpose of the two studies presented in the current chapter.

As highlighted in the introduction, one of the most critical predictions of the attributional model is the idea that the exact same accessible information can produce very different priming effects depending upon the precise implicit question for which it is used as information. The two studies presented here attempt to highlight this potential interaction between the information made accessible by a prime and the implicit questions afforded by a given target of judgment. With these studies I seek to demonstrate that accessible information is flexibly used to inform subsequent decision making as proposed by the attributional model.

Study 4.1

In this study, participants were subliminally primed with words related to either clean or dirty prior to judging the desirability of four food products or four cleaning products. Based on my proposal that primes affect subsequent judgments by changing the information one considers
when making decisions, I expected the primes to have very different effects for these two product types. In particular, although the desirability of any single item can be determined by a variety of factors, I expected that the most common question people ask themselves when judging food items is very different from that used when judging cleaning products. Imagine, for instance, going to the grocery store and attempting to decide whether or not to buy a particular produce item. When engaged in this task, one is likely to consider the physical characteristics of the item, attempting to determine whether it is clean or fresh enough to be consumed. Because the desirability of such items is often determined by this consideration of physical state, I expected judgments of food products to afford the implicit question “How clean is this item?” to most participants. To the extent that individuals use the information made accessible by priming to infer the answer to this question, they should judge these products as more desirable if primed with clean than if primed with dirty.

In contrast, I expect the default implicit question involved in the selection of cleaning products to be quite different. Now, if one is attempting to determine whether or not to buy a particular cleaning item, the primary consideration is not the objects’ physical state (i.e., how clean or dirty it is), but instead the physical state of one’s environment. This is because dirty environments (such as dirty teeth or a filthy kitchen floor) create a personal need for cleaning products. When the environment is clean, the products are no longer needed. Based on this likely concern, I expected judgments of these products to afford the implicit question “How clean is my environment?” to most participants. Importantly, if participants use the information made accessible by priming to infer the answer to this question, then the primes should have the exact opposite effects for cleaning products than for the food items. Because cleaning products are only needed in dirty environments, these products should be judged as more desirable if primed with dirty than if primed with clean. Critically, such a reversal should only occur if accessible content is
used to infer the answer to the implicit questions afforded by the current object of focus, but not if primes affect judgments in the ways proposed by prior models of construal priming.\(^3\)

**Method**

**Participants**

Ninety-nine students were randomly assigned to a 2 (subliminal prime: clean vs. dirty) X 2 (product type: food vs. cleaning), between subjects design. Twelve individuals who had spoken English for less than ten years were excluded from the analyses, leaving 87 participants in the final design.

**Materials and Procedure**

*Subliminal primes.* Participants first completed a 30-trial lexical decision task (LDT) in which they judged various letters strings as words or non-words. During the course of this LDT participants were subliminally primed with words related to either clean (i.e., *clean, fresh, and pure*) or dirty (i.e., *dirty, filthy, and foul*). On each trial of the LDT they first viewed a fixation point (\(\ast\)) for 1000 ms which was immediately followed by a 13 ms prime presentation. The prime was then cleared and post-masked with the string “XXXXXXXXXXXXXXX” for 225 ms, after which either a word (e.g., *tree, class, hammer, etc.*) or non-word (e.g., *glkws, armtolp, posa, etc.*) was displayed. This letter string stayed on the screen until participants made their decision. A prime 3

In order to examine whether people differentially consider these implicit questions, 60 participants completed a pilot test in which they judged the desirability of the same food and cleaning products used in Study 4.1 and were then asked to list the primary basis of these judgments. Two individuals blind to the hypotheses of Study 4.1 coded these free responses for their relevance to product appearance and personal need for the product (inter-rater reliability was moderate, *Kappa* = 0.69, *p* < .01). Disagreements were resolved by a third coder who was also blind to the research hypotheses. In line with the predictions of Study 4.1, participants were more likely to consider the physical appearance of food products than the physical appearance of cleaning products, *t*(59) = 2.84, *p* = .01. In contrast, participants were more likely to consider their personal need for cleaning products than food products, *t*(59) = 5.03, *p* < .01.
was presented on every trial of the LDT, resulting in 30 priming trials (15 word and 15 non-word decisions). Each individual prime was presented 10 times.

*Product desirability.* After completing the LDT, participants were asked to rate the desirability of four food products or four cleaning products. For each item they were asked to answer the question, "*How desirable is this product?*" on a 9-point scale ranging from 0 (*not at all*) to 8 (*extremely*). The four food items were photographs of lettuce, pasta, eggs, and an onion. The four cleaning products were photographs of Stanley Steamer spot remover, Windex glass cleaner, Head and Shoulders shampoo, and Resolve carpet cleaner. After judging the desirability of these items, participants completed a funnel debriefing procedure to probe for knowledge of the priming stimuli and suspicion of the experimental hypotheses. They were then debriefed and released from the experiment.

Results and Discussion

Because participants judged different products depending upon experimental condition, I first examined the effects of the primes on the desirability judgments of cleaning and food products independently. Participants’ ratings of the four food or cleaning products were averaged and submitted to separate t-tests. As predicted, among participants who judged food products, those who had been primed with clean-related words rated the products as more desirable ($M = 3.86, SD = 1.67$) than those who had been primed with dirty-related words ($M = 2.88, SD = 1.53$), $t(41) = 2.01, p = .05$. The primes, however, had the opposite effects among participants who judged cleaning products. Those who had been primed with clean-related words rated these products as less desirable ($M = 3.86, SD = 1.40$) than those who had been primed with dirty-related words ($M = 4.70, SD = 1.36$), $t(42) = 2.00, p = .05$.

In order to examine the interaction between prime and product type, I Z-transformed participants’ average product ratings and then created a single-item index which represented the average desirability of whatever four products were rated. Scores on this index were then submitted to a $2$ (subliminal prime: clean vs. dirty) X $2$ (product type: food vs. cleaning) ANOVA. As predicted, the interaction between these two factors was significant, $F(1,83) = 8.03, p < .01$.
(see Figure 4). No other effects were reliable, all $F$s < 1. Simple effects analyses showed that the primes had significantly different effects across the two product types. Thus, being primed with clean-related words made food products more desirable than cleaning products, $F(1,83) = 4.15$, $p = .04$, while being primed with dirty-related words made cleaning products more desirable than food products, $F(1,83) = 3.88$, $p = .05$.

In support of my predictions, the effects of the primes differed across product type. When asking themselves if various food products were desirable, participants appeared to use the information made accessible by priming to judge the physical state of these products. Because they were focused on this implicit question, participants inferred that the products were more desirable if primed with clean than if primed with dirty. For individuals who judged the desirability of various cleaning products, the primes had very different effects. Now it appeared that participants used the information made accessible by priming to judge the physical state of their environment and their personal need for these items. Because they were focused on this aspect of the situation, participants now inferred that the products were more desirable if primed with dirty than if primed with clean.

Although these results confirm my predictions and are consistent with my pilot testing, there is no real evidence that participants were using the prime-related content to answer the specific implicit questions I described. Thus, it is not clear that all participants judging food products were assessing these items’ physical state or that all participants judging cleaning products were assessing the physical state of their environment. As mentioned above, the desirability of any particular product can be informed by a number of considerations and the concerns I proposed are only two possible routes to reach a decision. If this is true, then I should be able to replicate the results outlined above by manipulating the exact concern on which participants focus when judging a single type of product. If, for instance, participants judging cleaning products were led to consider each product’s physical state when deciding on its desirability, then the clean and dirty primes should actually have the same effect on judgments as they did for food products in the current study. In order to provide evidence for this possibility,
Study 4.2 had all individuals judge cleaning products and manipulated the exact aspect of desirability on which participants focused.

Study 4.2

In Study 4.2 all participants judged their desire for various cleaning products and I manipulated the type of concern on which they focused while making this judgment. In particular, half of participants were led to focus directly on the products when making this decision while the other half were led to focus on their environment. In order to create these differential concerns, those participants in the product focus condition were asked to attend to the product’s physical appearance when judging each item’s desirability. Participants in the environment focus condition, on the other hand, were asked to attend to their personal need for the products. Because one needs cleaning products more when their environment is relatively dirty, I expected the dirty primes to make the products seem more desirable than clean primes for participants in this condition (as when judging the desirability of cleaning products in Study 4.1). However, because most products are more desirable when relatively clean, I expected the clean primes to make the products seem more desirable than dirty primes when participants were instead focused on the physical state of the product itself (as when judging the desirability of food products in Study 4.1).

Method

Participants

One-hundred and one students were randomly assigned to a 2 (subliminal prime: clean vs. dirty) X 2 (judgment focus: environment vs. product), between subjects design. Six individuals who had spoken English for less than ten years were excluded from the analyses, leaving 95 participants in the final design.

Materials and Procedure

In order to demonstrate the generality of the prior study’s findings, I selected four new cleaning products for Study 4.2. Thus, participants rated the desirability of Dial soap, Ajax bleach, Clorox cleaner, and Scotch-Brite sponges. Participants in the environment focus condition were
asked to answer the question, “Considering your potential need for this product, how desirable is it?” Participants in the product focus condition were asked, “Considering this product’s physical state, how desirable is it?” All answers were provided on the same 9-point scale with the anchors 0 (not at all) and 8 (extremely). All other aspects of the experiment were identical to Study 4.1.

Results and discussion

Participants’ ratings of the four cleaning products were averaged and submitted to a 2 (subliminal prime: clean vs. dirty) X 2 (judgment focus: environment vs. product) ANOVA. As predicted, the interaction between these two factors was significant, $F(1,91) = 14.88, p < .01$ (see Figure 5). No other effects were reliable, all $Fs < 1$. Simple effects analyses showed that participants in the environment focus condition judged the cleaning products as more desirable if primed with dirty ($M = 4.47, SD = 1.57$) than if primed with clean ($M = 3.11, SD = 1.46$), $F(1,91) = 10.02, p < .01$. The primes, however, had the exact opposite effects for participants in the product focus condition. For these individuals, clean primes made the products significantly more desirable ($M = 4.18, SD = 1.52$) than dirty primes ($M = 3.21, SD = 1.31$), $F(1,91) = 5.22, p = .02$.

As predicted, the primes also had significantly different effects across the two judgment conditions. Thus, being primed with dirty-related words made the cleaning products more desirable in the environment focus condition than in the product focus condition, $F(1,91) = 9.40, p < .01$. In contrast, being primed with clean-related words made the cleaning products more desirable in the product focus condition than in the environment focus condition, $F(1,91) = 5.84, p = .02$.

As predicted, Study 4.2 provided evidence that desirability judgments for a single product type could be differentially affected by primes depending upon the exact facet of the object on which participants focused. When participants were led to consider the physical state of their environment, the results replicated the judgments of cleaning products from Study 4.1. When participants instead considered the physical state of the products, the effects of the primes reversed and mimicked the judgments of food products from Study 4.1. Presumably, these effects mirror the results of this previous study because the differential concerns on which participants
were focused were highly similar to those naturally elicited when judging the general desirability of either food or cleaning products.

Model Implications

Across these two studies, I have provided evidence that prime-related mental content can be flexibly used for decision making as proposed by the attributional model. In line with the model’s predictions, the primes did not have automatic or default effects. Instead, the accessible content had very different effects depending upon the implicit question afforded by the current judgmental target. For some questions, information related to cleanliness made the target seem more desirable while for other questions this information actually made the target seem less desirable. Although Study 4.1 shows that these differential effects can be produced because certain objects naturally present different implicit questions to a perceiver, Study 4.2 demonstrates that the type of question is not fixed or invariable. Instead, people can consider very different questions for any single product and accessible information will be flexibly used to inform decisions anytime it is relevant to this judgment.

Importantly, these results are not easily predicted from alternative models of construal priming. In particular, those accounts that propose more automatic effects of construct accessibility would likely predict that the clean and dirty primes would produce the same effects across these two judgmental targets (e.g., Higgins, 1996). Because clean is a more positive trait than dirty (Harris & Sachau, 2005), one might expect clean primes to make both product types appear more desirable. This would be the likely outcome, for instance, if all of the products were ambiguously clean and the primed construct was used to categorize the objects as either clean or dirty. Furthermore, it seems unlikely that the theories of construal priming created to account for both assimilation and contrast would predict such effects either. In particular, many of these models rely on changes in participants’ information processing goals or style to account for situations in which a prime differentially affects subsequent judgment (e.g., see Ford & Thompson, 2000; Mussweiler, 2003; Stapel, 2007). The results of Study 4.1 are particularly unlikely to be predicted by these models. Because both of the subliminally primed constructs
were general categories and all participants made the exact same judgment, it does not seem likely that general processing goals would be different when viewing cleaning products vs. food items.

Finally, although these results are not easily accounted for by other models of construal priming, they very nicely mimic past findings within the literature examining the influence of mood on judgment. In particular, they provide a conceptual replication of research on mood-as-information which has shown that a person’s mood can differentially impact judgments depending upon the exact question that individuals seek to answer (e.g., Martin et al., 1993; Martin, Abend, Sedikides, & Green, 1997). In addition, they coincide nicely with the work of Jefferis and Fazio (2008) in which the authors demonstrate that the behavioral effects of a prime can differ depending upon the exact question on which participants ask themselves after a priming induction. That these same types of effects have been observed across both construal and behavior priming further supports the attributional model’s proposal that common processes underlie the two priming effects.
According to the attributional model, primes often do not have automatic or default effects. Instead, I argue that a prime simply causes related information to increase in accessibility and this highly accessible mental content is subsequently used to inform later decisions by providing answers to implicit questions presented by the environment. When the situation encountered after priming affords an implicit question for which prime-related content is relevant and applicable (Higgins et al., 1977), then this accessible information becomes capable of producing an observable priming effect. As long as one mistakenly attributes the accessibility resulting from priming to their own reaction towards the focal target of attention, then a change in subsequent judgment, behavior, or motivation will occur. It is the exact focal target and the implicit questions it affords that determine the final effect of the prime.

With the studies presented in the last two chapters, I’ve provided evidence for three of these basic predictions. In particular, I’ve shown that a) increasing the likelihood that participants misattribute accessible information to their own cognitive response also increases the impact of primes on behavior, b) that primes affect subsequent judgments by serving as a source of information for answering the implicit questions afforded by the environment, and c) that different targets of focus can cause a single prime to produce different effects by altering the implicit questions for which prime-related content is used as information. In the current chapter I seek to provide some initial evidence for another aspect of the attributional model. In particular, if this account is correct, then the influence of accessible information should be limited by the specific inference for which it is used as evidence. That is, once the prime-related information is perceived as arising from one’s reaction towards a specific target of focus (such as inferring that any thoughts of aggression are do to the behavior of Donald), then this object should be seen as the
true source of the accessible information. By tagging this mental content as emerging from one’s thoughts about this particular stimulus, the accessibility from priming should no longer be available for misattribution to another source (as in Studies 3.1 and 3.3). In essence, a prime’s biasing potential is consumed by whatever target it becomes attached to.

Critically, although the initial effect of the prime should be limited in this way, this does not mean that additional downstream effects are impossible. If, for example, a perceiver uses the information made accessible by a prime to infer that another individual is hostile, this inference can itself serve as information for answering any relevant implicit questions subsequently presented by the environment. Thus, if the perceiver was asked to interact with the individual they had just judged as hostile, they might naturally use the information made accessible by this recent inference to decide that they should behave in a relatively defensive manner.

Study 5.1

To investigate these hypotheses, I utilized a paradigm in which participants were subliminally primed with either the African American or Buddhist monk stereotype and were then led to focus their thought on either their self or their best friend. As they focused on one of these targets, they were directed to consider the various personality traits possessed by this individual. By controlling participants’ attention in this manner, I expected the prime-related content to be used to answer the particular implicit question presented by the focal target (in this case, the questions “Who am I?” vs. “Who are they?”). If this occurs, then the information made accessible by priming should no longer be available for misattribution to alternative targets after this point in time.

Following this target of thought manipulation, all participants completed a task in which they had to decide how aggressively to behave towards an interaction partner. Critically, although this behavioral measure provides a second implicit question for which the primes could be used as information (i.e., “How will I behave?”; see Lieberman, Solomon, Greenberg, & McGregor, 1999), the accessible information should not influence this judgment. Because participants have already associated the prime-related content with another source (i.e., either their self or their
best friend), this information will no longer be available for answering this implicit question and should have no additional effects.

Although the information made accessible by priming should not be directly used to answer this implicit question, behavior on this task is potentially relevant to the prime-related inference made during the earlier thought induction. In particular, because changes in participants’ self-concept naturally affect subsequent behavior (see Wheeler et al., 2007), individuals in the self focus condition (for whom the primes were presumably used to answer the implicit question, “Who am I?”) should behave in line with the primed constructs on this second task. Thus, these individuals should behave more aggressively if primed with the African American stereotype than if primed with the Buddhist monk stereotype. In contrast, if participants in the best friend focus condition use the primes to answer the implicit question “Who is he/she?”, then there should be no priming effect on subsequent behavior. Because impressions of a best friend are irrelevant to one’s own actions on this second task, the potential behavioral influence of these primes will be eliminated.

**Method**

**Participants**

One hundred and six undergraduates were randomly assigned to the conditions of a 2 (subliminal prime: African American vs. Buddhist monk) x 2 (target of thought: self vs. best friend) between-subjects design. Because the effects of primes differ as a function of whether a person is a member of the targeted group (Shih, Ambady, Richeson, Fujita, & Gray, 2002), ten African American participants were removed from the analyses as were two non-native English speakers. In addition, funneled suspicion probes indicated that 17 participants did not believe the cover story regarding the dependent measure (i.e., that some participants might be required to drink hot sauce), leaving 77 participants in the final sample.

**Materials and Procedure**

**Subliminal primes.** Upon beginning the experiment, participants completed a lexical decision task consisting of neutral words (e.g., walnut, book) and non-words (e.g., nuwalt, koob)
as a priming manipulation. Preceding each judgmental target, a prime word appeared for 12 ms followed by a mask (XXXXXXXX) for 225 ms. Prime words were either related to African Americans (Black and African American) or Buddhist monks (Buddhist and Monk).

Target of thought. Following the priming task, participants completed the target of thought manipulation, described as a study on how fixing visual attention affects one’s thought processes. Participants were instructed to stare at a cross in the center of the computer screen for two minutes while thinking about an assigned topic. The cross changed its pattern and flickered from time-to-time to maintain participants’ visual attention. The topic of thought during this task was either participants’ self or their best friend. Participants were told to think about as many aspects of their [or their best friend’s] lifestyle as they could, considering the typical features, behaviors, characteristics, and traits that they possessed.

Aggression measure. After the thought induction, participants began a separate experiment about online impression formation. They were informed that they would complete a fishing game with a partner in order to examine how impressions were formed with minimal interactions. During the instructions for this game, they were told that they would be fishing from a lake and that the lake’s population of fish could not decrease below a critical level during the game. They were then asked to select a punishment for their partner in case this person overfished the lake and caused the population to drop below this level. The instructions were as follows.

The total stock of the lake must stay above a certain number of fish. In this version of the experiment, you have the chance to punish your partner if they force the lake’s population below this critical point. In order to standardize punishment across sessions, those participants who are to be punished will drink a 3oz. cup of water containing approximately ½ of a teaspoon of hot sauce. Research has shown that while this is unpleasant, the discomfort can be easily alleviated by drinking a full cup of regular water. Participants were then given a choice between four pictured hot sauces arranged in order of increasing intensity. These sauces ranged from a mild green sauce ("African Rhino Peri-Peri
Mild Sauce; Heat factor – X; Scoville Units ~ 5.6k”) to an intense red sauce (“Blair’s Mega Death Sauce; Heat factor – XXXX; Scoville Units ~ 352.2k”). Although no participants were required to drink hot sauce, 3-ounce cups were placed at each computer station and the actual hot sauce bottles (along with a pitcher of water) were arranged on a nearby table to increase the realism of the experimental situation. The intensity of the hot sauce selected served as the behavioral index of aggression. Higher numbers represent selection of a more intense hot sauce and are indicative of greater levels of aggression towards one’s partner. Past work has demonstrated that the administration of hot sauce to another person is both a valid and reliable measure of behavioral aggression (Klinesmith, Kasser, & McAndrew, 2006; Lieberman et al., 1999; McGregor et al., 1998). After completing this task, all participants completed a funnel-debriefing procedure to probe for suspicion and were debriefed.

Results and Discussion

Scores on this behavioral measure of aggression were submitted to a 2 (subliminal prime: African American vs. Buddhist monk) x 2 (target of thought: self vs. best friend) ANOVA. The only significant effect to emerge was the predicted prime x target of thought interaction, $F(1,73) = 3.84, p = .05$ (see Figure 6). Simple effects tests revealed that among participants who thought about themselves, those primed with the African American stereotype selected a significantly more aggressive hot sauce ($M = 3.12, SD = 1.03$) than those primed with the Buddhist monk stereotype ($M = 2.22, SD = 1.26$), $F(1,73) = 5.21, p = .03$. The primes, however, had no effect on the behavior of participants who thought about their best friend after priming, $F < 1$.

Although past research has suggested that presenting primes related to the African American stereotype will automatically induce reflexive behavioral aggression (e.g., see Bargh et al., 1996; Chen & Bargh, 1997), this did not occur in the current study. As outlined above, one potential explanation for the observed moderation is that participants actually used prime-related accessibility to answer the implicit questions afforded by their initial target of thought (i.e., “Who am I?” vs. “Who is he/she?”). Because this accessible content was seen as arising from thoughts
about the specific target of thought, it was no longer available to be misattributed to participants’ thoughts about how to behave during the resource dilemma task. Based on this analysis, the behavioral priming effects I observed were actually obtained because of the initial prime-induced changes in participants’ target of focus. Thus, participants in the self focus condition used the primes as information for judging their own personality and it was this effect on the self-concept that led to downstream changes in behavior (e.g., see Wheeler et al., 2007). Participants in the best friend focus condition, on the other hand, presumably used the primes to inform judgments of their best friend’s personality and this prevented the primes from exerting any subsequent behavioral effects. Because the best friend’s personality was irrelevant for informing participants’ actions during the resource dilemma task, the primes had no observable effect on behavior.

Importantly, although this proposal is consistent with the results of Study 5.1, I have not provided any evidence that the primes were actually used to answer the initial implicit questions presented by participants’ particular targets of focus. In Study 5.2 I utilized the same procedure outlined above, but changed the dependent measure in order to provide stronger evidence that focusing on either the self or best friend truly limited the potential biasing effect of the primes. Thus, after the priming and target of thought inductions, participants were asked to judge the aggressiveness of both themselves and their best friend (two measures which quite explicitly present the questions, “Who are you?” and “Who is your best friend?”). Critically, although the accessibility from priming could be used to answer either of these questions, I predict that it will only affect judgments of participants’ earlier target of focus. If the thought induction leads participants to misattribute any prime-related content to their thoughts about the focal target’s personality, then this accessibility should no longer be available for answering implicit questions about other targets. Based on these hypotheses, I predicted that participants in the self focus condition would have judgments of their self affected by the primes but not judgments of their best friend. Similarly, participants in the best friend focus should have judgments of this person affected by the primes but not judgments of their self.
Study 5.2

In order to investigate these hypotheses, this experiment utilized the same priming and target of thought manipulations as Study 5.1, but followed these inductions with new dependent measures. In particular, participants completed a trait-rating task in which they judged both their own and their best friend’s trait aggression in order to assess the effects of the primes on each target. I predicted that prime-congruent changes in aggression ratings would occur only for the target that was focal in participants’ attention (i.e., self or best friend) but not for the non-focal target.

Method

Participants

Fifty-seven undergraduates were randomly assigned to the conditions of a 2 (subliminal prime: African American vs. Buddhist monk) x 2 (target of thought: self vs. best friend) x 2 (target of judgment: self vs. best friend) mixed design, with repeated measures on the target of judgment. As in the previous study, African American participants were removed from the analyses ($n = 6$), leaving 51 individuals in the final sample.

Materials and Procedure

After completing the same priming and target of thought manipulations from Study 5.1, participants rated themselves and their best friend on a number of traits, including the target trait of aggression. For the measure, participants were asked “On a scale from 00 (not at all) to 99 (completely), please indicate how AGGRESSIVE you are [your best friend is].” The order of these trait ratings was randomized. All other aspects of the procedure were identical to Study 5.1.

Results and Discussion

Ratings of aggressiveness were submitted to a 2 (subliminal prime: African American vs. Buddhist monk) x 2 (target of thought: self vs. best friend) x 2 (target of judgment: self vs. best friend) mixed ANOVA with repeated measures on the target of judgment. The only significant effect to emerge was the predicted prime x target of thought x target of judgment interaction, $F(1,47) = 6.73, p = .01$ (see Figure 7). Simple effects tests revealed that among participants who
thought about themselves after priming, those primed with the African American stereotype judged themselves as more aggressive ($M = 45.25, SD = 29.75$) than those primed with the Buddhist monk stereotype ($M = 25.50, SD = 23.98$), $F(1,47) = 3.91, p = .05$. The primes did not, however, affect these individuals' judgments of their best friend, $F < 1$. Mirroring these findings, among participants who thought about their best friend after priming, those primed with the African American stereotype tended to judge the best friend as more aggressive ($M = 52.00, SD = 31.49$) than those primed with the Buddhist monk stereotype ($M = 29.08, SD = 32.56$), $F(1,47) = 3.24, p = .08$. The primes did not, however, affect these individuals' judgments of themselves, $F < 1$.

As predicted, I found evidence that the primes only affected judgments of participants' particular target of focus. Although both the self and best friend are clearly targets for which information related to aggressiveness is relevant and applicable, the primes did not affect judgments of both targets. This suggests that the primes were in fact misattributed to participants' thoughts about their particular target of judgment. Once this misattribution process occurred, the accessible information became associated with a concrete source and the prime-related content was no longer available for informing judgments of other targets.

Model Implications

Across two experiments, I demonstrated that primes were selectively used to answer the implicit questions presented by participants' current target of focus. Once the information made accessible by the prime was misattributed to participants' reactions towards this object, it no longer affected judgments of other objects for which it was quite applicable and relevant. When participants focused on their self (but not their best friend), prime-related content was used to inform only self-perceptions (Study 5.2) and also affected participants' personal behavior (Study 5.1). When participants instead focused on their best friend (but not the self), the same exact primes had very different effects. Instead, the prime-related content was used to inform only perceptions of the best-friend (Study 5.2) and was no longer relevant for later decisions regarding how to behave (Study 5.1). These findings provide further support for the attributional model by
demonstrating that associating accessible information with one source makes this mental content unavailable for answering the implicit (or explicit) questions presented by other, unrelated targets. As illustrated by Study 5.1, this limitation does not imply that a prime can not have any further downstream consequences after being misattributed to one’s response towards a particular target. Any subsequent judgments which are relevant to the initial prime-biased inference will continue to reflect this priming effect.

Importantly, the findings presented in this chapter are difficult to fully explain from many other perspectives on priming. In particular, it seems unlikely that the ideomotor model of behavior priming would predict the moderation by target of focus observed in Study 5.1. In addition, although the results in the self-focus conditions of these studies provide very good evidence for the predictions of the active-self account (Wheeler et al., 2007), this model is silent on the effect of primes on non-self related targets of thought. Because of this, only the attributional model would predict the full range of effects seen across these two studies. Interestingly, the alternative perspective which is most fully compatible with these results is that of Aaron Kay and colleagues (see Kay et al., 2008; Smeesters et al., 2009). This work has also shown that behavioral priming effects can be moderated by the object of focus encountered after a priming induction. Furthermore, these authors consistently demonstrate mediation of behavior through changes in the construal of this focal target (a finding implied but not demonstrated by Study 5.1). How they would account for the present finding that a prime’s biasing influence is limited to a single judgmental target, however, is not clear.

Finally, it is worthwhile to address one final issue in relating the findings of the current studies to those reported in Chapter 4. In particular, one might wonder why the primes only affected judgments of a single focal target here, but were able to affect multiple product ratings in these other studies. Although clearly speculative, I believe there are a number of factors at play. First, because participants in the current studies spent a great deal of time actively thinking about the assigned target of thought, this conscious elaboration likely highlighted the (false) source of the prime-related content. By making this inference especially salient, the prime’s ability to
influence other judgments was eliminated. Critically, other judgmental situations do not highlight this inferential process as clearly. For instance, because Studies 4.1 and 4.2 required participants to make a number of relatively quick desirability judgments instead of effortfully elaborating on any single product, the implicit questions which participants considered and the information they used to answer these questions were likely to be less salient. Furthermore, because participants were asked to make desirability judgments rather than directly assessing the cleanliness of the product (or environment), the influence of the prime-related mental content was less likely to be identified. Perhaps because of these issues the primes were able to have more general and longer lasting judgmental effects.
According to the attributional model, many priming effects emerge when the information made accessible by a prime becomes confused with one’s own internally generated thoughts about the current situation. When this occurs, this accessible information becomes capable of exerting a priming effect by being used to answer the implicit questions afforded by the environment. The precise priming effect which occurs then depends upon the type of implicit question which one is led to consider. If the situation focuses a perceiver on another person or object, any prime-relevant information that is confused with his or her own cognitions about the target will tend to affect judgments of this object, resulting in construal priming. If, however, the situation causes a person to focus on determining what behavior to engage in, the prime-related content will instead be used to infer the proper course of action, producing behavior priming. And finally, when one is led to consider what they want or desire, the same accessible information will tend to lead to changes in inferred motivation and produce goal priming.

According to this analysis, assimilative effects on judgments and behavior occur when information made accessible by a prime is misattributed to one’s own natural response about the target of judgment. This is most likely when the information is applicable to the target, is rather diffuse and indistinct, and is easily confused with one’s natural thoughts about this aspect of the situation. If this information is especially distinctive, it is more likely to stand apart from other thoughts about the target, preventing the misattribution process. In general, this will occur because the primed construct is especially extreme (Herr et al., 1983) or is associated with a unique exemplar (Dijksterhuis et al., 1998) or some other easily noted category (Aarts & Dijksterjus, 2002). Even when such variables prevent the misattribution process, the information made accessible by priming can still produce effects via one of two possible routes (Moskowitz &
In particular, very extreme primes and exemplars are likely to induce contrast by serving as a standard of comparison, affecting judgments or behavior by providing information about where the target stands on the particular scale of judgment (Dijksterhuis et al., 1998; Herr, 1986; Herr et al., 1983; Schuber & Häfner, 2003). Information which is more diffuse, but still stands out from one’s natural reaction to a target can also produce contrast by motivating participants to engage in effortful correction because of a suspicion that they may be influenced by the accessible content. This motivation may be aroused for a variety of reasons, such as when primes have been blatantly presented (Martin, 1986; Newman & Uleman, 1990; Petty et al., 2008) or when participants consciously remember subtly primed stimuli (Lombardi et al., 1987). Because people are often unable to accurately correct for this type of bias, these efforts will tend to lead to contrast through overcorrection (Martin et al., 1991; Wegener & Petty, 1995). Importantly, if one is not motivated to correct for the influence of the primed information, such as when the bias is welcomed as a legitimate source of information, assimilative effects should follow (Loersch et al., 2009; Petty et al., 2008). Finally, when a prime is not easily confused with one’s own thoughts about the target, but is also diffuse enough that it is unlikely to provide any comparison information for the judgments, a null effect is expected (Shih et al., 2002).

Across all of these effects, people simply use information made accessible by a prime to answer the implicit question presented by a given target of judgment. Although subtle variations in the prime, target, and perceiver combine to produce the drastically different effects seen across the construal, behavior, and goal priming literatures, I propose that all are due to this basic process. Because of this, all are also susceptible to basic attributional cues which signal that one’s thoughts are especially valid and useful or invalid and untrustworthy. When one experiences cues of validity such as the sense of ease (Schwarz et al., 1991), positive affect (Briñol et al., 2007; Custers & Aarts, 2005b; Fishbach & Labroo, 2007; Schwarz & Clore, 1988), or head nodding (Briñol & Petty, 2003) he or she is likely to trust whatever thoughts are held in mind and will become more likely to use them for answering whatever implicit questions are afforded by the current situation. Because of this, these cues should naturally enhance all priming
effects. When a person instead experiences cues of invalidity such as the sense of difficulty, negative affect, or head shaking, he or she is likely to associate any thoughts with low confidence or invalidity and view them as non-diagnostic for answering these implicit questions (Petty, Briñol, & Tormala, 2002). Because of this, such cues eliminate the normal effect of primes, making both assimilation and contrast less likely.

Although past theory has suggested that such priming effects often occur through relatively automatic and thoughtless mechanisms, I believe the attributional model illustrates how these effects may in fact result from a very adaptive and quite logical process. If this account is accurate, these influences (although they may often occur unconsciously) are not reflexive, automatic effects which invariantly affect judgment, behavior, or motivation. Instead, they simply occur because primes bias the information which one considers when making the various judgments and decisions which are necessary to effectively move about the environment. By introducing novel information into this inference process, the accessibility resulting from the perception of environmental stimuli constantly push about our judgments and behavior. Importantly, although such an influence may appear objectively illogical when demonstrated in the laboratory, the changes in accessibility which occur in the natural world actually “bias” this process in very adaptive ways. Imagine, for instance, being presented with a knife. Possession of such an object presents one with an implicit question regarding how to behave. Should the knife be used to attack another person, put in a pocket, thrown across the room, balanced on one’s nose, stuck into the tabletop, used to open a bottle of champagne, or simply discarded? Although perception of the knife by itself might make all possible behavioral affordances come to mind, the information made accessible by other objects in the environment will bias the decision of how to behave. Thus, the presence of a beautifully grilled steak might make information related to eating accessible (at least for non-vegetarians), and one would infer that they should use the knife as a tool to help them consume this object. In another situation, however, such as when one has recently seen a horror movie, the behavioral inference might be quite different. In this case, the information made accessible by the movie experience might instead cause a person to store the
knife so that it can be used to defend against potential predators. By changing the inference one makes across situations, the accessible information produced by the various objects in our environment helps bias judgment and decision making in an adaptive way that is sensitive to subtle contextual variation.

Finally, despite the fact that the attributional model is too broad for all of its predictions to be tested in the current work, the research presented in Chapters 3, 4, and 5, provides empirical evidence for a number of the model’s basic predictions. In particular, I’ve shown that primes influence behavior only when misattributed to one’s natural reaction to the situation (Studies 3.1, 3.2, and 3.3) and that this misattributed content then biases judgments by serving as information for the implicit questions considered by individuals after priming (Studies 4.1, 4.2, 5.1, and 5.2). These findings are especially important because they target the core processes which underlie the attributional model. In addition, I’ve also shown that the power of a prime to bias subsequent judgment and behavior is limited because of this underlying misattribution mechanism (Studies 5.1 and 5.2). In line with the model’s predictions, once a prime is misattributed to one’s reaction towards one source, it is no longer available to answer the implicit questions associated with other, unrelated targets. Together, these findings provide supporting evidence for some of the most basic ideas contained within the attributional model. Although they clearly do not test all of the model’s predictions, I believe this set of studies presents a coherent research package that is difficult to explain from alternative theoretical perspectives.

The Many Effects of One Prime Problem: A Solution?

As noted in the introduction, research has found that primes are capable not only of producing quite different effects within a single area of priming (e.g., both assimilation and contrast in judgments, Stapel & Koomen, 2001; or behavior, Jefferis & Fazio, 2008), but also across areas. For instance, in research on the link between sex and aggression, Mussweiler and Förster (2000) have documented both construal and behavioral priming effects from the exact same set of sex-related primes (i.e., skin, wet, feel, sweat, bed, and stiff). For female participants, judgments of an ambiguously aggressive male target were biased by the primes while for male
participants, aggressive behavior assimilated towards the primes. Similarly, in research by Bargh et al. (2001, Study 3) participants were primed with words related to achievement (e.g., *succeed, win, achieve*, etc.) before completing either an impression formation task (measuring construal priming) or a word search puzzle (measuring goal priming). As expected, both participants’ motivation to achieve and judgments of another person were affected by these primes. Similarly, the research on post-priming attentional focus presented both here (see Chapters 4 and 5) and by Kay and colleagues (Kay et al., 2008; Smeesters et al., 2009) has found similar effects. This work consistently demonstrates that the exact same primes produce very different effects depending upon participants’ object of focus following a priming induction. Together, this research makes it clear that priming stimuli can have multiple effects that range from the simple recognition of a related objects (i.e., semantic priming) to the initiation of automatic motivated behavior (i.e., goal priming). Although this fact has been known for some time, to date no researchers have been able to solve the “many effects of one prime” problem (Bargh, 2006). That is, when exactly will a prime cause one type of effect as opposed to another?

As discussed earlier, the attributional model of priming provides one possible answer. Specifically, this account suggests that construal, behavior, and goal priming are all produced through the same basic process. In all three cases, the prime makes information accessible that is later used as information for coming to some judgment about the current situation. As I have repeatedly stressed, if the situation calls for one to judge another object or person, then construal priming effects are likely. If the situation instead calls for a judgment about how to behave, behavior priming effects are more likely. And finally, if the situation calls for one to determine what they want or desire, goal priming will emerge. These differential effects simply emerge because different situations present different implicit questions which accessible information can be used to answer. In this way, the attributional model suggests that these many priming effects are simply different manifestations of the exact same accessible information. That is, there are not separate processes or knowledge structures that are being tapped in each type of effect or for
each type of person, just a unique target of judgment that affords different implicit questions and brings with it very different downstream consequences.

Importantly, although the research of Chapters 4 and 5 provides evidence for this proposal, situational factors are not the only type of variable that can alter the type of implicit question which is presented to a perceiver. In particular, certain individual differences will affect the aspect of the situation to which people chronically attend and the type of priming effect which is likely to emerge. For instance, individuals who constantly reflect on their need to belong are especially likely to focus on the implicit question “Am I behaving as others want?” and will therefore be highly susceptible to goal priming effects in this domain (see Morrison et al., 2007). Other personality traits will similarly influence the observed priming effect by naturally directing individuals’ attention to different implicit questions. Separate research lines examining self-reflectiveness (Wheeler et al., 2008), self-monitoring (DeMarree et al., 2005), and other-focus (Smeesters et al., 2009) have all provided evidence for this proposal.

Finally, the attributional model not only offers a solution to the many effects of one prime problem, but also suggests a number of unique effects that past theories have perhaps obscured. In particular, any effect documented in one priming domain should be applicable to the others as well. For instance, although no research has examined variables such as the influence of prime extremity in goal priming research, motivational inferences should be affected by this variable just as are judgments of external objects. Because of this, researchers should also be able to document contrast in goal priming (i.e., participants automatically adopting a goal diametrically opposed to the primed construct; for some initial evidence in this direction see Chartrand, Dalton, & Fitzsimons, 2007). Although such results would be at odds with past theories which posit that perception of goal-relevant stimuli automatically activate an associated goal, they make perfect sense within the current theoretical perspective. Perhaps for of this reason, results like this may have been relegated to researchers’ file drawers as simple failures to replicate past research.
Potential Limitations

In presenting this attributional account, I have touched on various other models which have been used to describe construal, behavior, and goal priming effects. Although some of these perspectives are quite integrative in their specific domain of application (e.g., Mussweiler, 2003; Stapel, 2007; Wheeler et al., 2007) and have occasionally been applied to multiple areas of research, none offer the breadth of the attributional model. That is, to date, no other model has attempted to incorporate the literatures on construal, behavior, and goal priming. Although no formal models have taken on this challenge, an alternative has been outlined in a recent thought piece on this topic (see Bargh, 2006). In this article, Bargh suggests that one prime may create multiple effects through the initiation of several separate processes which all run in parallel. Thus, being primed with a single concept initiates separate cognitive processes which individually produce construal, behavior, and goal priming. According to this account, it is at the output stage (i.e., when one is completing a dependent measure) that a single process is selected and applied to one’s current task to produce the observed effect. In essence, a single prime creates a number of concurrently running processes which are then tapped by the administration of a proper dependent measure (Bargh, p. 152). Although this treatment is certainly a viable alternative to the attributional model, it does beg the question of what exactly happens to the processes which are not used on one’s current task. At what point do they quit vying for expression? Is there only one instantiation of each prime-related process? Does the perception of a second stimulus immediately halt those initiated by the earlier prime and begin the processes anew? Or does every single stimulus we see add another set of new processes to those currently running as a result of the previous primes? This possibility is especially vexing when one considers the theory that activated goals increase in strength until achieved (Bargh et al., 2001; Zeigarnik, 1935). If this is the case, and every perceived stimulus which is related to some form of past goal pursuit

For a discussion of applying the selective accessibility model (Mussweiler, 2003) and interpretation comparison model (Stapel, 2007) to both construal and behavior priming, see Dijksterhuis et al. (2007).
directly primes a new goal, one can see a system which is in many ways running out of control. Additional research (and perhaps a more formally elaborated parallel processes theory) is needed to determine which of these broad models provides a more accurate depiction of the empirical reality. Importantly, as illustrated by the studies of Chapter 5, the attributional model actually suggests that the influence of accessible information should be limited by the specific inference for which it is used as evidence. That is, once the prime-relevant information is used to inform judgments related to one object (such as forming an impression of Donald as a very hostile person) then it should not be possible to misattribute this information to one’s reaction towards a second target. For this reason, a person who had just judged Donald after being primed with hostility should not be able to show behavioral effects of this prime (unless mediated by social comparisons to Donald).

Finally, it is possible that the attributional model applies under some conditions whereas alternative models apply under others. Particularly in the domains of behavior and goal priming, it may be that my perspective is more likely to apply when stimuli are only weakly associated with certain behavioral tendencies or motivational states. Thus, it may be the case that when these associative links are sufficiently strong, behavior and motivation are automatically activated by the perception of certain environmental cues (as proposed by more reflexive accounts such as the auto-motive and ideomotor models; Bargh, 1990; Dijksterhuis & Bargh, 2001). If these associative links are weak, however, the prime-induced accessibility may instead alter one’s actions through the process described by the attributional model. In this way, the current account may represent another piece of the puzzle which, when combined with the other relevant theories, helps to more fully describe how human judgment, behavior, and motivation operate.
CONCLUSION

In the current work I have presented an attributional model of priming which was created in order to integrate the literatures on construal, behavior, and goal priming. Across three sets of studies, I produced findings consistent with this perspective, demonstrating that a) increasing the likelihood that participants misattribute accessible information to their own cognitive response also increases the impact of primes on behavior, b) that primes affect subsequent judgments by serving as a source of information in later decision making, c) that different targets of focus can cause a single prime to produce different effects by altering the implicit questions for which prime-related content is used as information, and d) that the effect of a prime is limited by the particular target to which one misattributes any prime-related accessibility. Although these findings do not provide evidence for all aspects of the attributional model, they do support some of its most basic predictions. Although future research is needed to fully test the model, the set of research findings I have presented are difficult to account for from other theoretical perspectives. Based on the theoretical and empirical contributions outlined in this work, I believe that the attributional model offers a valuable new perspective on priming phenomena. That this account is capable of generating many novel predictions and has the potential to explain the large and diverse literatures surrounding construal, behavior, and goal priming effects speaks to the power of the model.


Loersch, C., & Payne, B. K. (2009). *The attributional model of priming: A single mechanism account of construal, behavior, and goal priming.* Unpublished manuscript, Ohio State University, Columbus, OH.


Smeesters, D., Warlop, L., Van Avermaet, E., Corneille, O., & Yzerbyt, V. (2003). Do not prime hawks with doves: The interplay of construct activation and consistency of social value


Figure 1: The attributional model of priming
Figure 2: Mean amount of money earned during the ultimatum game in Study 3.2 as a function of thought attribution and prime.

Figure 3: Mean amount of money earned during the ultimatum game in Study 3.3 as a function of thought attribution and prime.
Figure 4: Mean desirability of products (standardized) in Study 4.1 as a function of prime and product type.

Figure 5: Mean desirability of cleaning products in Study 4.2 as a function of prime and judgment focus.
Figure 6: Study 5.1 aggressiveness of hot sauce selection as a function of prime and target of thought.
Figure 7: Study 5.2 aggression ratings of self (top panel) and best friend (bottom panel) as a function of prime and target of thought.