

Psychological Bulletin

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Online First Publication, September 6, 2010. doi: 10.1037/a0020970

CITATION

Landau, M. J., Meier, B. P., & Keefer, L. A. (2010, September 6). A Metaphor-Enriched Social Cognition. *Psychological Bulletin*. Advance online publication. doi: 10.1037/a0020970

A Metaphor-Enriched Social Cognition

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Social cognition is the scientific study of the cognitive events underlying social thought and attitudes. Currently, the field's prevailing theoretical perspectives are the traditional schema view and embodied cognition theories. Despite important differences, these perspectives share the seemingly uncontroversial notion that people interpret and evaluate a given social stimulus using knowledge about similar stimuli. However, research in cognitive linguistics (e.g., Lakoff & Johnson, 1980) suggests that people construe the world in large part through *conceptual metaphors*, which enable them to understand abstract concepts using knowledge of superficially dissimilar, typically more concrete concepts. Drawing on these perspectives, we propose that social cognition can and should be enriched by an explicit recognition that conceptual metaphor is a unique cognitive mechanism that shapes social thought and attitudes. To advance this metaphor-enriched perspective, we introduce the *metaphoric transfer strategy* as a means of empirically assessing whether metaphors influence social information processing in ways that are distinct from the operation of schemas alone. We then distinguish conceptual metaphor from embodied simulation—the mechanism posited by embodied cognition theories—and introduce the *alternate source strategy* as a means of empirically teasing apart these mechanisms. Throughout, we buttress our claims with empirical evidence of the influence of metaphors on a wide range of social psychological phenomena. We outline directions for future research on the strength and direction of metaphor use in social information processing. Finally, we mention specific benefits of a metaphor-enriched perspective for integrating and generating social cognitive research and for bridging social cognition with neighboring fields.

Keywords: attitudes, conceptual metaphor, embodied cognition, schemas, social cognition, social perception

Since its inception, social psychology has aimed for a scientific understanding of how people make sense of the people, events, and ideas that they encounter in the social world. Toward this end, in the 1970s social psychologists began to study social thought and attitudes using theories and methods developed by cognitive psychologists, whose efforts during the preceding 20 years to analyze the mind as an information-processing machine yielded novel insights into such cognitive processes as attention, memory, and perception (Thagard, 2002, reviews this work). This merger launched the field of social cognition, which has continually stimulated research on the cognitive devices that people use to process the information available in their social environment.

While research programs in social cognition focus on particular phenomena, the field's prevailing view is that people process social information using *schemas*: mental structures that contain abstract representations of accumulated knowledge about categories of similar stimuli (e.g., S. T. Fiske & Taylor, 1991; Kunda, 1999). In recent years some researchers have critiqued this view's assumption that social knowledge is represented in an abstract form, and they have proposed theories of *embodied cognition*, which posit that social information processing involves representations of bodily states (e.g., tactile sensations) stored in the brain's modal systems for perception and motor control (e.g., Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005).

Although embodied cognition theories offer a novel way of fleshing out the traditional schema view, both theoretical perspectives share the seemingly uncontroversial assumption that people interpret and evaluate a given social stimulus using their knowledge about similar stimuli. However, if we listen to how people ordinarily talk about the social world, we observe them using an impressive array of metaphors that liken social concepts to superficially dissimilar types of things. Solomon Asch (1958) was perhaps the first social psychologist to note metaphors' ubiquity and variety in social discourse:

When we describe the workings of emotion, ideas, or trends of character, we almost invariably use terms that also denote properties

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We thank Daniel Sullivan for providing useful comments on an earlier draft of this manuscript. The first author is grateful to Jeff Greenberg for his encouragement throughout this project.

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and processes observable in the world of nature. Terms such as *warm*, *hard*, *straight* refer to properties of things and of persons. We say that a man thinks straight; that he faces a hard decision; that his feelings have cooled. We call persons deep and shallow, bright and full, colorful and colorless, rigid and elastic. Indeed, for the description of persons we draw upon the entire range of sensory modalities . . . the language of social experience and action reveals the same characteristic. We are joined to people with ties and bonds; classes are high and low; groups exert pressure, maintain distance from other groups, and possess atmosphere. (pp. 86, 87)

Since Asch (1958) penned these words, researchers in cognitive linguistics have identified thousands of conventional expressions that metaphorically relate social concepts to dissimilar concepts (e.g., Lakoff & Johnson, 1980, 1999). To mention just a few examples: “I’m *stuck* in this job” (activities are containers); “Why can’t I *get this across* to you?” (communication is sending); “The President’s speech *threw* the audience *into* a frenzy” (causation is forced movement). Because such metaphoric expressions are uttered about six times per minute (Gibbs, 1994) and are comprehended quickly and without special effort (Glucksberg & Keysar, 1990), they are usually taken to be part of the tacit background of seemingly literal meanings. Yet they are senseless when interpreted literally: Jobs are not containers that can be entered and exited, no physical object is exchanged in a conversation, and speeches don’t physically push people into anything.

What significance does this observation have for understanding the cognitive underpinnings of social thought and attitudes? One possibility is that metaphoric expressions are merely ornamental figures of speech with no particularly important relation to cognition. A more interesting possibility, however, is that these linguistic metaphors provide a window into people’s underlying conceptions of the social world. Perspectives on conceptual metaphor (Gibbs, 1994; Lakoff & Johnson, 1999) posit that whereas metaphor is reflected in language, it is primarily a cognitive tool that people use to understand abstract concepts in terms of superficially dissimilar concepts that are relatively easier to comprehend. Using these perspectives as a theoretical framework, we propose in this article that social cognitive theory and research can and should be enriched by an explicit recognition that metaphor is a unique cognitive mechanism underlying social thought and attitudes.

To advance this metaphor-enriched perspective, we begin with a brief overview of the conceptual metaphor framework. We then discuss the traditional schema view and introduce the metaphoric transfer strategy as a means of empirically assessing whether metaphors influence social information processing in ways that are distinct from the operation of schemas alone. Next, we distinguish conceptual metaphor from embodied simulation—the mechanism posited by embodied cognition theories—and introduce the alternate source strategy as a means of empirically teasing apart these closely related mechanisms. Throughout, we buttress our claims with empirical evidence of metaphors’ influence on a wide range of social psychological phenomena.

Given the emerging interest in metaphor within social and cognitive psychology, surprisingly little empirical attention has considered which factors determine whether metaphors are used, and which metaphors are used, in social information processing. To guide future research on these issues, we apply insights from lay epistemology theory (Kruglanski, 1989) to outline how global and specific motives for certain knowledge might determine the

strength and direction of metaphor use. Finally, we discuss benefits that a metaphor-enriched perspective offers to researchers interested in integrating research findings, generating novel hypotheses, and bridging social cognition with insights from neighboring fields.

Conceptual Metaphor

Aristotle (circa 335 B.C.E./2006) narrowly defined metaphor as a linguistic device comparing dissimilar things, although he noted that metaphors used in spoken rhetoric can prompt listeners to decipher how dissimilar things are alike. Interest in metaphor’s cognitive import quickly waned, however, and for the major part of philosophical history, metaphors either were denounced as obfuscating objective truth (Hobbes, 1651/1962; Locke, 1689/1997) or dismissed as mere stylistic embellishments of language (Davidson, 1978; Rorty, 1989; Searle, 1979). Nietzsche (1873/1974) was the first to break with this tradition and take a broader view of metaphor, arguing that “truth” can never be apprehended directly and is understood indirectly in terms of more concrete experiences. In a somewhat less radical conception, 20th-century philosophers interested in the nature of human symbolism (Arendt, 1977; Cassirer, 1946; Jaynes, 1976; Langer, 1979) converged on the idea that metaphor is a central component of human cognition that is routinely used to understand and communicate abstract or elusive ideas. These theorists also presented observational evidence that metaphors figure prominently in the languages, art forms, and rituals of diverse cultures.

Researchers in cognitive linguistics have been the strongest contemporary proponents of the idea that metaphor is an important part of the conceptual system that people ordinarily use to understand (and not just talk about) abstract concepts (for overviews of this work, see Gibbs, 1994, 2006b). Lakoff and Johnson’s (1980) seminal analysis posited that metaphors operate as conceptual mappings between source concepts and superficially dissimilar target concepts. *Source concepts* represent commonplace, schematic knowledge about the attributes of familiar referents and the relations among those attributes derived from routine interactions with the physical and social world. *Target concepts*, in contrast, represent relatively more abstract referents, which are more difficult to grasp. Conceptual mappings involve systems of *entailments*, or mental associations between corresponding elements of the concepts in metaphoric relation. These elements can be the referents of the concepts or attributes of these referents (e.g., shape, weight, duration) as well as causal relations and other relational knowledge common to the structure of both concepts (e.g., actions known to produce seemingly spontaneous effects at a later point, such as the setting of a time bomb). Through these entailments, people are able to use select pieces of knowledge about the source concept as a structured framework for reasoning about, interpreting, and evaluating information related to the target concept (Gentner, 1983, offers a similar account).

Lakoff and Johnson (1980) contended that systems of entailments are reflected in clusters of metaphoric expressions that are conventionally used to talk about the same target concept. To illustrate, consider some everyday expressions related to *love*:

She guided me through some rough parts.

I want to get to a place where I feel like part of something.

Where do you see us ten years down the road?

Is this going to hold us back, or are we strong enough to get over it?

I think we need to slow down.

These expressions (and dozens like them) relate elements of love (the target concept) to elements of the concept of journey (the source concept). Because these expressions preserve the salient attributes and relations that people commonly associate with travel, they are unlikely to be isolated idioms stored in one's mental lexicon; they are instead the linguistic expression of entailments created by a conceptual metaphor that uses knowledge about travel to structure understanding of love, even though actual travel has little to do with the nature or development of romantic relationships in any literal sense. For example, the metaphor enables people to think of lovers as travelers, their life goals as destinations, the means to achieve those goals as routes, and relationship difficulties as impediments to motion. This supports metaphorical inferences such as: if the relationship is not "going anywhere," or if lovers are "moving apart," it means that the lovers are not making progress toward compatible "destinations," or life goals.

Using this conceptual metaphor framework, cognitive linguists have offered detailed analyses of ordinary language as evidence that metaphors are used to think about a wide range of abstract concepts (e.g., causation, purpose, emotions, military conflict; Kövecses, 1986, 2000, Lakoff, 1996; Reddy, 1979; Sweetser, 1990; Turner, 1987). Some theorists (e.g., Murphy, 1997) have critiqued this work on the grounds that observational analyses of language do not provide definitive evidence that metaphors play a causal role in shaping thought. Although we do not endeavor to enter this controversy here (see Gibbs, 2006c; Gibbs & Colston, 1995), throughout this article, we discuss how these linguistic analyses are corroborated in a growing body of experimental research in social and cognitive psychology showing that metaphors operate online to influence diverse cognitive processes and socially relevant outcomes.

Distinguishing Metaphors From Schemas

The Schema View

The prevailing view in social cognition portrays schemas as the basic cognitive building blocks of social thought and attitudes. This view, which is consistently characterized in popular overviews of the field (e.g., S. T. Fiske & Taylor, 1991; Hamilton, 2005; Kunda, 1999; Moskowitz, 2005; Taylor & Crocker, 1981; Wyer & Srull, 1989), begins with the assumption that people lack the mental capacity to attend to and process every aspect of their environment at a given time. In order to quickly and efficiently process social information, people classify stimuli into categories and subsequently access prior knowledge about those categories (e.g., beliefs, expectations, inference patterns) to interpret and evaluate their present situation. Schemas represent and store this knowledge in memory. For example, one's schema for the category of librarians may contain beliefs about which traits are generally shared by members of that group (e.g., intelligence), theories about how librarians' attributes relate to other aspects of the world (e.g., librarians probably do not enjoy extreme sports),

and examples of librarians one has known. In addition to representing knowledge about social groups (i.e., stereotypes; Hamilton & Sherman, 1994), schemas represent knowledge about personality types (implicit personality theories; Schneider, 1973), events (scripts; Schank & Abelson, 1976), and the self (self-schema; Markus, 1977).

Social cognitive research paints a detailed picture of how schemas are mentally activated and used in social information processing. We know, for example, that people are more likely to attend to and recall information that is consistent (vs. inconsistent) with their schemas (e.g., Alba & Hasher, 1983; Cantor & Mischel, 1979; Cohen & Ebbeson, 1979; Ditto & Lopez, 1992; Rothbart, Evans, & Fulero, 1979). For instance, Snyder and Cantor (1979) found that participants assessing an individual's suitability for a stereotypically introverted (vs. extraverted) job recalled more introverted information about that individual. Studies also show that people interpret and evaluate social stimuli in line with accessible schemas, even when those schemas are primed outside of conscious awareness (e.g., Banaji, Hardin, & Rothman, 1993; Devine, 1989; Dunning & Sherman, 1997; Fazio, Jackson, Dunton, & Williams, 1995; Lord, Ross, & Lepper, 1979). In one such study (Bargh & Pietromonaco, 1982), participants exposed to subliminal presentations of words related to the concept of hostility (e.g., *rude*) interpreted another person's behavior as more aggressive and judged that individual more negatively compared with participants not primed with hostility. These and many other findings constitute an enormous body of work documenting schemas' far-reaching influence on people's construal of their social environment.

The metaphor-enriched perspective advanced in this article does not undermine social cognition's traditional emphasis on schemas in its attempt to highlight metaphors' role in shaping social thought and attitudes. People undoubtedly rely on schemas to impose simple structure on their social environment. Rather, this perspective complements the schema view by emphasizing that many social concepts (e.g., justice, spirituality, happiness) are inherently abstract and difficult to grasp and that metaphor is a cognitive tool that people routinely use to interpret and evaluate information related to those abstract concepts. Put simply, a metaphor-enriched perspective suggests that a complete account of the meanings people give to abstract, socially relevant concepts requires an understanding not only of their schematic knowledge about those concepts in isolation but also how they structure those concepts in terms of superficially dissimilar, relatively more concrete concepts.

The Metaphoric Transfer Strategy

In order to empirically demonstrate metaphors' unique role in shaping social thought and attitudes, we need to show that metaphors influence social information processing in ways that would not be expected from the operation of schemas in isolation. The metaphoric transfer strategy is a general empirical strategy that can be used to examine this possibility. This strategy involves assessing whether manipulating psychological states (e.g., perceptions, motivations) related to one concept changes how people process information related to a dissimilar concept in a manner consistent with their metaphoric relation. For example, if the concept of journey is actually used as a vehicle for conceptualizing love, then

manipulating thoughts or feelings about travel should transfer across the metaphor's system of entailments and produce metaphor-consistent changes in the interpretation and evaluation of information about love (e.g., the progress of a romantic relationship). Furthermore, insofar as metaphors operate at a conceptual, and not merely a linguistic, level, metaphoric transfer effects should obtain even in contexts where linguistic expressions of the relevant metaphors are not made salient.

A growing body of experimental research in social and cognitive psychology has utilized the metaphoric transfer strategy to test hypotheses about metaphors' influence on a wide range of social psychological phenomena, including attention and memory, person perception, object perception, and attitudes. Although we aimed to be comprehensive in our review of this work, we note that the review cannot be exhaustive given the rapid rate at which relevant research findings are reported.

Metaphoric transfer effects on attention and memory processes. Table 1 summarizes research on metaphors' role in attention and memory processes. Most of this work examines metaphors involving the source concept of verticality, or high and low vertical position. Linguistic analyses (Lakoff & Johnson, 1980) show that people conventionally talk about many concepts implying positive valence and social power metaphorically in terms of high vertical positions (e.g., "You are in *high* spirits today"; "He reached the *top* of the corporate ladder") and similarly talk about concepts implying negative valence and powerlessness in terms of low vertical positions ("I have never felt so *low*"; "He's starting at the *bottom* of the company"). The conceptual metaphor framework suggests that these expressions reflect a metaphoric understanding of valence and power in terms of verticality. If this is correct, we would expect variations in verticality perceptions to systematically relate to people's attention and memory for valence- and power-relevant information.

Support for this possibility comes from correlational evidence that individual differences in depressive symptoms and self-perceived social power are related to vertical spatial attention in metaphor-consistent ways. Individuals who score high (vs. low) in depressive symptoms preferentially attend to lower areas of vertical space (Meier & Robinson, 2006), and those who perceive themselves as powerful are quicker to attend to higher spatial locations (Moeller, Robinson, & Zabelina, 2008; Robinson, Zabelina, Ode, & Moeller, 2008). Converging experimental evidence shows that situational inductions of positive and negative mood produce metaphor-consistent changes in attention to high

and low spatial locations, respectively (Wapner, Werner, & Krus, 1957). Extending these findings to memory processes, Crawford, Margolies, Drake, and Murphy (2006) presented participants with positive and negative images in different spatial locations and found that participants recalled positive images as appearing in higher locations relative to negative images.

Metaphoric transfer effects on person perception. Classic and contemporary theorists have noted that personality traits and other nonobservable characteristics of an individual are abstract constructs that are often conceptualized metaphorically in terms of relatively more concrete concepts (Asch, 1958; Uleman, 2005). Table 2 summarizes relevant research showing that metaphors directly influence individuals' perceptions of others and themselves.

A series of studies conducted by Schubert (2005) shows that perceptions of vertical position influence perceptions of social power in line with their metaphoric relation (powerful is up/powerless is down). In one study, participants were more accurate in judging a group's social power when powerful groups were presented at the top of a computer screen and powerless groups were shown at the bottom of the screen. Another study showed that participants made quicker and more accurate identifications of powerful groups and powerless groups when making judgments using an upward movement (using an "up" cursor key) and a downward movement, respectively. Extending these findings to perceptions of leaders' power, Giessner and Schubert (2007) found that increasing the vertical, but not the horizontal, distance between pictorial representations of a manager and subordinates led participants to view the leader as more powerful.

Other studies have examined how metaphors of verticality and power influence perceptions of sexual attractiveness. Some evolutionary perspectives (e.g., Buss, 1994) posit that men desire powerless or dependent mates, whereas women desire powerful or high-status mates. On the basis of this notion, Meier and Dionne (2009) hypothesized and found that male participants rated women as more attractive when their images appeared in lower locations, whereas female participants rated men as more attractive when their images appeared in higher locations.

In addition to social power, the concept of divinity is commonly talked about (and visually represented) in terms of vertical position ("God is the most *high*"; "The *lowly* devil"). Research by Meier, Hauser, Robinson, Friesen, and Schjeldahl (2007) has suggested that these are not mere figures of speech: Participants in their studies judged photographed individuals as having a stronger

Table 1
Metaphoric Transfer Effects on Attention and Memory Processes

Report	Central finding	Relevant metaphor
Meier & Robinson (2006)	Higher/lower scores in depressive symptoms correlate with attention to higher/lower areas of vertical space, respectively.	Good is up/bad is down.
Moeller, Robinson, & Zabelina (2008); Robinson, Zabelina, Ode, & Moeller (2008)	Individual differences in perceived social power influence spatial attention in a metaphor-consistent manner.	Powerful is up/powerless is down.
Wapner, Werner, & Krus (1957)	Happy/sad mood shifts attention up/down, respectively.	Good is up/bad is down.
Crawford, Margolies, Drake, & Murphy (2006)	Individuals show better recall for positive items presented in a higher position.	Good is up/bad is down.

Note. Research reports are listed in the order in which they appear in the present article.

Table 2
Metaphoric Transfer Effects on Person Perception

Report	Central finding	Relevant metaphor
Schubert (2005)	Powerful/nonpowerful groups identified faster when presented in high/low vertical position, respectively.	Powerful is up/powerless is down.
Giessner & Schubert (2007)	Extending the vertical, but not the horizontal, distance between manager and subordinates increased manager's perceived power.	Powerful is up/powerless is down.
Meier & Dionne (2009)	Men rated vertically low women as more attractive; women rated vertically high men as more attractive.	Mate value is vertical position.
Meier, Hauser, Robinson, Friesen, & Schjeldahl (2007); Chasteen, Burdzy, & Pratt (2009)	Target individuals portrayed in vertically high (vs. low) spatial positions are judged to have a stronger belief in God.	Divinity is up.
Williams & Bargh (2008a)	Priming spatial distance decreased perceived emotional attachment to family members.	Interpersonal intimacy is spatial distance.
Williams & Bargh (2008b)	Inducing physical sensations of warmth increased a target individual's perceived friendliness.	Friendliness is physical warmth.
IJzerman & Semin (2009)	Inducing physical sensations of warmth increased perceived emotional attachment to friends and family members.	Interpersonal intimacy is physical warmth.
Landau et al. (in press)	Priming the expansion of a physical entity increased perceived self-actualization and decreased concern with external standards of value.	Authentic self-expression is entity expansion.

Note. Research reports are listed in the order in which they appear in the present article.

belief in God if the photographs were presented in a high rather than a low vertical position (see also Chasteen, Burdzy, & Pratt, 2009).

Research has also examined metaphors of physical distance. In their normal interactions with the physical world, people tend to approach desired objects and pull them toward the self, whereas they distance themselves from undesirable objects or push them away from the self (Elliot, 2008). On the basis of analyses of ordinary language, Lakoff and Johnson (1980) argued that people use knowledge of these physical interactions to conceptualize positive valence as toward/close and negative valence as away/distant, even with relation to abstract concepts that do not literally exist in space (e.g., "I am *embracing* my new role"; "They are *moving away* from the Democratic Party"). Indeed, this notion of psychological distance has figured prominently in social psychological theorizing since its conceptual origins in the works of Lewin (1951) and Heider (1958).

Accordingly, Williams and Bargh (2008b) showed that subtly manipulating perceptions of spatial distance/closeness led to metaphor-consistent changes in participants' perceptions of their emotional attachments to significant others. Specifically, participants asked to place two dots far apart on a Cartesian plane subsequently perceived a weaker emotional bond with their family members compared with participants who placed the dots close together.

Researchers have also examined how manipulating sensations related to concrete concepts produce metaphoric transfer effects on social perception. Williams and Bargh (2008a) provided evidence that interpersonal warmth is understood partly in terms of physical warmth (e.g., "I got a *chilly* reception at the meeting") by showing that participants who simply held a warm (vs. cold) beverage subsequently described a target individual as having a "warmer" (i.e., generous and caring) personality. In a related finding, IJzerman and Semin (2009) showed that participants holding a warm (vs. cold) beverage rated themselves as being emotionally closer to their friends and family.

In research focused on perceptions of the self, Landau et al. (in press) examined the metaphors that people use to conceptualize their "true self," or who they think they truly are. People conventionally talk about their true self metaphorically as a corelike entity that resides within the bounds of an external casing or shell (e.g., "This is who I am *inside, deep down*"), whereas the external shell corresponds to the publicly presented self that is not always compatible with the true self ("They only know the *surface* me"; Lakoff & Johnson, 1999). Using this metaphor as a foundation, speakers of diverse languages refer to the enhanced expression of their true self as the physical expansion of a corelike entity (e.g., "I feel like I am *growing inside*"; Lakoff, 1997; Moser, 2007). This is not surprising given that other research (reviewed shortly) shows that people generally make sense of significance or influence metaphorically in terms of an entity's physical expansion and contraction.

These patterns of ordinary language suggest that people understand the enhanced expression of their true self metaphorically as the expansion of a corelike entity. Accordingly, Landau et al. (in press) reported two studies showing that participants exposed to perceptual primes depicting an expanding physical entity (vs. a contracting entity, a static entity, or a visually enlarging array of fragmenting pieces) reported a greater sense of self-actualization and attenuated concern with extrinsically defined (vs. self-determined) standards of value, two outcomes associated with authentic self-expressions (Kasser & Ryan, 1996; Williams, Schimel, Hayes, & Martens, 2010).

Metaphoric transfer effects on perceptions of social symbols and environments. Research conducted with the metaphoric transfer strategy provides evidence that metaphors shape how people perceive aspects of the social environment that are associated with abstract concepts (see Table 3). Returning to the verticality metaphor, we observe that one study in Meier, Hauser, et al.'s (2007) aforementioned research on divinity showed that participants were faster to recognize words related to God and the devil when those words were presented in a high and a low

Table 3
Metaphoric Transfer Effects on Perceptions of Social Symbols and Environments

Report	Central finding	Relevant metaphor
Meier, Hauser, et al. (2007)	God-/devil-related words recognized faster when presented in high/low position, respectively.	Divinity is up.
Meier, Sellbom, & Wygant (2007)	Morality/immorality-related words recognized faster when presented in high/low position, respectively.	Moral is up/immoral is down.
Miles, Nind, & Macrae (2010)	Contemplating the personal past or future led to backward and forward postural sway, respectively.	Past is backward/future is forward.
Bruner & Goodman (1947); Bruner & Postman (1948)	Socially significant (positive or negative) stimuli are perceived as big.	Significance is size.
Jostmann, Lakens, & Schubert (2009)	Physical heaviness increased perceptions of social significance.	Significance is weight.
Zhong & Leonardelli (2008)	Contemplating social exclusion (vs. acceptance) decreased perceived room temperature.	Social exclusion is physical coldness.

Note. Research reports are listed in the order in which they appear in the present article.

position, respectively. Meier, Sellbom, and Wygant (2007) reported similar results involving the abstract target concepts of morality (associated with high vertical position) and immorality (associated with low vertical position).

Social stimulus perception is also influenced by metaphors involving conceptions of backward and forward motion. Building on prior research showing that conceptions of the temporal past and future are understood partly in respective terms of backward and forward motion (Boroditsky & Ramscar, 2002), Miles, Nind, and Macrae (2010) tested whether contemplating the personal past or future would have metaphor-consistent effects on backward and forward bodily posture. Participants were asked to imagine a typical day either four years in the past or four years in the future while experimenters measured their postural sway. As predicted, retrospective thought led to backward movement, and prospective thought led to forward movement.

Classic and contemporary research has examined how metaphors shape perceptions of the significance of social stimuli, such as symbols and political issues. People commonly talk about an increase in significance or importance as physical largeness or expansion (“This is a *big* problem, and it is only going to *grow*”; Lakoff & Johnson, 1999). Supporting the claim that these expressions reflect conceptual metaphors, Bruner and Goodman (1947) found that children perceived coins (a valued stimulus) as larger than size-matched cardboard disks. Follow-up research by Bruner and Postman (1948) showed that adults perceive socially significant symbols as physically larger than neutral symbols regardless of whether the symbol is evaluatively positive (dollar sign) or negative (swastika).

More recent research shows that perceptions of social significance are also shaped by perceptions of physical weight (e.g., “This is a *heavy* topic”). Jostmann, Lakens, and Schubert (2009) gave participants a survey asking them how important it was to have students give input on university issues. Participants completed the survey on either a heavier clipboard or a lighter clipboard (2.29 lb. [1.04 kg] vs. 1.45 lb. [0.66 kg]). As predicted, participants toting a heavier clipboard believed student input was more important.

As mentioned, Williams and Bargh (2008a) provided evidence of a metaphoric relation between perceptions of physical and interpersonal warmth. In a related finding, Zhong and Leonardelli

(2008) showed that participants who recalled a time when they were socially excluded (vs. socially accepted) perceived the temperature of the room to be an average of five degrees colder, even though the room temperature was the same for both groups. These findings show that manipulating experiences with interpersonal warmth has metaphor-consistent effects on sensory perceptions of physical warmth.

Metaphoric transfer effects on attitudes. Complementing the focus on social perception, research has examined metaphors’ role in the formation and expression of attitudes about social stimuli (see Table 4). Recall that people conventionally talk about positively valenced concepts such as happiness as vertically high (e.g., “We *hit a peak* last year!”) and negatively valenced concepts as vertically low (e.g., “Things have been *downhill* ever since Mabel left”). Meier and Robinson (2004) provided evidence that these expressions reflect an automatic metaphoric association between affective valence and vertical spatial position. Participants in their study evaluated positive words quicker when they appeared at the top (vs. the bottom) of the computer screen, whereas they showed the opposite bias in response to negative words (Casasanto, 2009, reported similar findings).

Other research has focused on the role of spatial distance metaphors in people’s judgments about themselves and their past experiences. Wilson and Ross (2001) argued that people maintain favorable self-regard by comparing their current self to past selves and outcomes, and these comparisons are often conceptualized in terms of subjective distance (e.g., “Look how *far I have come*”; “I have *moved way beyond* those types of antics”). To test whether evaluations of the current self are causally influenced by perceptions of subjective distance from past outcomes, Wilson and Ross (2001) asked college students to mark a point on a timeline indicating a past success or failure. For all participants, the timeline was labeled on the right with “Today” (the current self), but in one condition the timeline began with birth, whereas in another it began at 16 years of age. With a timeline that spans many years (beginning with birth), one draws past events spatially closer to the current self compared with a timeline that spans a few years (beginning at age 16). As predicted, participants led to feel subjectively close to a past success evaluated their current self more favorably than did those who were led to feel distant from the same success. Also supporting predictions, participants led to feel closer

Table 4
Metaphoric Transfer Effects on Attitudes

Report	Central finding	Relevant metaphor
Meier & Robinson (2004)	Evaluations of positive/negative words were faster when presented in high/low vertical position, respectively.	Good is up/bad is down.
Casasanto (2009)	Right-handed individuals associated good with a right spatial orientation and bad with a left spatial orientation. Left-handed individuals showed the opposite pattern.	Good is right (or left)/bad is left (or right).
Wilson & Ross (2001)	Perceiving success/failure as spatially close (vs. distant) led to more positive/negative self-evaluations, respectively.	Personal improvement is spatial distance.
Ross & Wilson (2002)	Past experiences with favorable (vs. unfavorable) implications for current self-regard are viewed as subjectively closer.	Personal improvement is spatial distance.
Meier, Robinson, & Clore (2004)	Evaluations of positive/negative words were faster and more accurate when presented in white/black font, respectively.	Good is bright/bad is dark.
Sherman & Clore (2009)	Automatic affective associations between the concepts morality/immorality and the colors white/black, respectively.	Moral is bright/immoral is dark.
Meier, Robinson, Crawford, & Ahlvers (2007)	Positively valenced words perceived as brighter than negatively valenced words.	Good is bright/bad is dark.
Schnall, Benton, & Harvey (2008); Zhong & Liljenquist (2006)	Priming cleanliness concepts (vs. neutral concepts) and physical cleansing led to less severe moral judgments of other people and the self.	Morality is cleanliness.
Schnall, Haidt, Clore, & Jordan (2008)	Inducing physical disgust led to more severe moral judgments.	Morality is cleanliness.
Zhong & Liljenquist (2006)	Reminders of moral transgressions increase cleaning intentions.	Morality is cleanliness.
Landau et al. (in press)	Priming entity expansion facilitated expression of authentic attitudes (vs. conformity to majority opinion).	Authentic self-expression is entity expansion.

Note. Research reports are listed in the order in which they appear in the present article.

(vs. distant) to a past failure evaluated their current self less favorably.

In a related set of studies, Ross and Wilson (2002) looked at subjective distance as a dependent variable. They found that participants reported feeling subjectively closer to past experiences with favorable compared with unfavorable implications for their current self-regard, even though the actual passage of time was the same in the two conditions. These findings suggest that evaluations of the current self are understood, at least in part, in terms of spatial movement away from past selves and experiences.

Other lines of research have focused on how attitudes are metaphorically shaped by variations in perceptual brightness or luminosity. We know from anthropological evidence that, across times and cultures, people commonly represent (in their language, myths, etc.) insight, health, optimism, and virtue in terms of brightness or light, whereas they represent evil, danger, depression, and death in terms of darkness (e.g., “*Bright* ideal!”; “It was a *dark* epoch in history”; Adams & Osgood, 1973; Becker, 1975; Eliade, 1996). To test whether metaphoric associations between affect and brightness operate automatically, Meier, Robinson, and Clore (2004) asked participants to evaluate positive (e.g., *hero*) and negative (e.g., *criminal*) words presented on a computer screen in either black or white font. Supporting predictions, participants’ evaluations were facilitated when the font color was consistent with prevalent metaphors (good is bright/bad is dark) rather than inconsistent ones (good is dark/bad is white). Sherman and Clore (2009) reported similar effects with the concepts of morality/immorality.

In related work, Meier, Robinson, Crawford, and Ahlvers (2007) found that variations in affective valence led to metaphor-consistent biases in brightness judgments. Participants were presented with positive and negative words in varying shades of grayscale and were asked to estimate the brightness of the words.

Although there was no systematic correlation between word valence and brightness, participants nevertheless judged positive words as brighter than negative words.

Conceptions of physical cleanliness have also been shown to metaphorically influence attitudes, particularly in the context of moral judgment. According to Rozin, Haidt, and McCauley (2000), people’s conceptions of physical cleanliness and their disgust reactions to filth form the cognitive basis for conceptions—and not merely linguistic expressions—of the otherwise abstract concept of moral purity. Supporting this broad hypothesis is observational evidence that, across diverse cultures and historical periods, cleanliness metaphors for moral purity figure prominently in language (e.g., “This is a *disgusting* act that will *soil* their reputation”; Kövecses, 2000), mores and taboos (Douglas, 1966), and artistic expressions (Gombrich, 1965).

In line with these findings, Schnall, Benton, and Harvey (2008) showed that participants primed with concepts related to cleanliness (e.g., washed, pure) judged moral transgressions as more acceptable than did participants primed with neutral concepts. A follow-up study showed that the simple act of washing one’s hands led participants to judge a moral dilemma as less severe. In a similar finding related to self-relevant moral judgments, Zhong and Liljenquist (2006) showed that physical cleansing alleviated the threat to one’s moral self-image otherwise elicited by recalling one’s own unethical behaviors.

Related research by Schnall, Haidt, Clore, and Jordan (2008) showed that inducing physical disgust by making a work area dirty led to more severe moral judgments of individuals who committed various moral violations (e.g., not returning a found wallet to its owner). Focusing on cleanliness as a dependent variable, Zhong and Liljenquist (2006) found that participants who were asked to recall their own past transgressions (e.g., adultery, cheating on a

test) were more likely to subsequently request an antiseptic cloth than were participants who were asked to recall their good deeds.

In addition to attitude formation, research has examined attitude expression. Landau et al.'s (in press) aforementioned research on entity-metaphoric conceptions of the true self included a study examining people's willingness to express their genuine attitudes rather than conform to the opinions endorsed by the social majority. This study used a conformity paradigm developed by Arndt, Schimel, Greenberg, and Pyszczynski (2002) and showed that participants primed with images of an expanding physical entity (vs. a static entity or a contracting entity) were more likely to express their genuine attitudes about artwork, even when doing so contradicted the majority opinion. These results suggest that people understand the enhanced influence of their true self in terms of entity expansion, at least in part.

Summary and Discussion

A large and growing body of research has assessed whether social concepts are understood metaphorically by using the metaphoric transfer strategy to test whether manipulated psychological states related to one concept influence how people process information related to a superficially dissimilar concept in a manner consistent with the concepts' metaphoric relation. Multiple studies show that manipulating perceptions, sensations, and other psychological states produces metaphor-consistent changes in how social information is attended to, recalled, interpreted, and used to make judgments. Furthermore, in none of these studies were participants exposed to linguistic expression reflecting the metaphors of interest, suggesting that the observed metaphoric transfer effects are not simply the result of making linguistic metaphors salient.

Taken as a whole, these empirical findings, which demonstrate diverse manifestations of metaphors' influence in a wide range of social psychological phenomena, support the claim that metaphors shape how people conceptualize—and not merely talk about—multiple aspects of the social world. Our claim that metaphors play a significant and unique role in social information processing does not imply that schemas are thereby unimportant; as mentioned, schemas demonstrably influence social information processing in many ways. Rather, we are claiming that the metaphor-enriched perspective adds an important and heretofore neglected dimension to the discourse on the cognitive underpinnings of social thought and attitudes.¹

Metaphoric transfer effects and spreading activation. Explaining the metaphoric transfer effects just reviewed as the operation of schemas in isolation poses particular challenges for the traditional schema view. Insofar as schemas represent knowledge about categories of similar stimuli, the schema view has difficulty explaining why interpretations and evaluations of information related to one concept are consistently influenced by perceptions and evaluations of information related to a superficially dissimilar concept. Consider, for example, the aforementioned research on metaphors of morality and physical cleanliness. These are different types of things: One is an abstract concept that refers to right and wrong, whereas the other is a concrete concept that refers to, for instance, food stains inside a refrigerator. The schema view does not offer any account of why or how these two concepts would be systematically linked in such a way as to offer a parsimonious explanation of the consistent pattern of metaphoric transfer effects

reported by Schnall and colleagues (Schnall, Benton, & Harvey, 2008; Schnall, Haidt, et al., 2008).

However, proponents of the schema view who subscribe to associative network models of concept representation (Collins & Loftus, 1975; Smith, 1998) might claim that metaphoric transfer effects are the result of activation spreading from one construct to an associated construct, making the latter more likely to be applied to process incoming information. From this perspective, Schnall and colleagues' (Schnall, Benton, & Harvey, 2008; Schnall, Haidt, et al., 2008) findings, for example, reflect spreading activation between morality relevant and contamination-relevant bits of knowledge.

We are not claiming that metaphors operate independent from spreading activation. Indeed, conceptual metaphor is defined as a mapping of associative links between corresponding elements of dissimilar concepts (i.e., entailments). However, the conceptual metaphor framework, with its emphasis on the epistemic function served by metaphors, offers a more theoretically specified and empirically generative account of the structure and organization of those links than could be provided by associative network models. In their most general forms, associative network models are content free: They place no constraints on the spread of activation and can thus posit that any concept can include associative links to unspecified elements of any other concept, regardless of how superficially dissimilar those concepts are. Thus, such models can almost always provide post hoc explanations of metaphoric transfer effects and, when considered in this context, are virtually immune to falsification.

¹ Much of the research we reviewed enhances metaphor research in cognitive linguistics by providing experimental evidence that metaphors play a role in diverse cognitive processes and social psychological phenomena. It is worth noting, however, that some demonstrations of metaphoric transfer challenge accepted views of metaphor. Cognitive linguists stress that a hallmark of metaphor is its cognitive asymmetry or directionality (Lakoff & Turner, 1989; Ortony, 1979; for exceptions, see Katz, 1992; Shen, 1989). This means that metaphorical mappings between dissimilar concepts tend to go in the direction of a concrete source concept to a relatively more abstract target concept, but not the other way around. For example, multiple expressions linking depressed affect to vertical position (e.g., "I do not know how much *lower I can sink*") suggest that the metaphor "depression is down" structures people's understanding of depression, but this metaphor does not conventionally support an understanding of vertical position in terms of depression (e.g., we do not provide consoling advice to people going down an escalator). Supporting this proposed asymmetry, metaphorical expressions take on different meanings, or become nonsensical, when the source and the target are switched (e.g., "Jobs are jails" is different from "Jails are jobs"; Glucksberg et al., 1997).

Yet many of the findings we reviewed show that manipulating abstract social concepts produces metaphor-consistent changes in perceptions related to more concrete concepts: significant things are bigger; happy/sad moods shift attention up/down; spatial memory for positively valenced and divinity-related images is biased upward; social exclusion influences temperature sensations; and positive words are perceived as brighter. These findings raise questions about whether, when, and how metaphors operate bidirectionally. These questions cannot be adequately addressed in this article given the available evidence. We raise this point only to suggest one way in which emerging lines of experimental research stand to inform the pioneering work on metaphor within cognitive linguistics.

By contrast, a conceptual metaphor framework explains why abstract concepts share associative links with superficially dissimilar, typically more concrete concepts. Just as importantly, this framework places explicit constraints on the spread of activation and can therefore be used to generate a priori hypotheses about metaphoric transfer. Lakoff and Johnson (1980), Gentner (1983), and others posited that the associative links shared by dissimilar concepts in metaphoric relation preserve the schematic structure of the source concept but do not conventionally map more superficial or isolated bits of knowledge between concepts. For example, the conceptual metaphor of love as a journey maps a schema for goal-directed movement onto corresponding elements of love but does not typically map isolated features of particular travel experiences (e.g., the entertaining waiter encountered during last week's visit to Graceland).

The conceptual metaphor framework also explains why the associative links between elements of dissimilar concepts typically (although not always; see Footnote 1) operate asymmetrically from a concrete concept to a more abstract or complex concept (Glucksberg, McGlone, & Manfredi, 1997; Ortony, 1979). That is, it explains why, for instance, people conventionally talk about morality in terms of cleanliness (“wash away my sins”) but do not talk about cleanliness in terms of morality (“make this refrigerator holy”). Associative network models cannot account for this asymmetry.

Finally, only one class of associative network models—called parallel constraint satisfaction models—allows for activated nodes of knowledge to not only stimulate other nodes but also to actively inhibit other nodes (e.g., Thagard & Kunda, 1998). The conceptual metaphor framework also posits that elements of knowledge may share inhibitory links, but it affords more specific predictions about which elements of knowledge will be inhibited. In particular, it posits that metaphors should actively inhibit those elements of the metaphorically related concepts that are not isomorphic and are therefore irrelevant for understanding the target concept. Supporting this claim, research by Glucksberg, Newsome, and Goldvarg (2001) shows that participants who comprehended metaphoric expressions (e.g., “My lawyer is a shark”) subsequently showed marked delays in processing sentences that referred to attributes of the source concept that were irrelevant to the metaphor, even when those attributes were prototypical of the source concept (e.g., sharks' skilled swimming; for related findings see Gernsbacher, Keysar, & Robertson, 1995). A parallel constraint satisfaction model could explain post hoc that the concept of lawyers shares an inhibitory link with a prototypical attribute of the concept of sharks; a metaphor framework predicts this link a priori because it emphasizes that sharks' prototypic viciousness, and not their swimming ability, is used to interpret information about lawyers.

Distinguishing Metaphors From Embodied Simulations

Embodied Cognition Theories

Beginning in the 1950s, many cognitive psychologists, inspired by developments in the then-nascent fields of artificial intelligence and cognitive science, began analyzing human cognition as analogous to the information processing performed by digital computers. This effort was guided by the assumption that an intelligent system can be functionally described as the manipulation of sym-

bolic tokens, independent of the physical medium in which it is implemented. Because social cognition has its roots in this empirical approach, social cognitive theory traditionally relies on the assumption that concepts are mentally represented in terms of propositional content (implemented as a semantic network or features list) that is abstracted from the person's direct sensory, motor, and affective interactions with specific entities and situations. In recent years, however, a number of theorists and researchers have challenged this computational view of concept representation on the grounds that it gives little consideration to how knowledge is connected to the brain's modal systems for perceiving and interacting with the physical environment. To correct for this previous neglect, researchers have proposed theories of embodied cognition (for comprehensive discussions of these developments, see Gibbs, 2006a; M. Johnson, 1987).

Within social cognition, the most influential of these theories is Barsalou's (1999, 2008) perceptual symbols systems model, which posits that, rather than being represented exclusively by a set of amodal symbols, concepts also contain modality-specific representations of sensations, motor activity, and other bodily states that occur during interactions with stimuli corresponding to those concepts. As a result, conceptual processing involves the simulation, or neural reactivation, of associated bodily states, even when the individual is not currently interacting with relevant stimuli. For example, retrieving a memory of a faux pas may involve simulations of somatic responses that were active during the original embarrassing experience (e.g., blood rushing to the face).

Using the perceptual symbols systems model as an organizing framework, Niedenthal et al. (2005) reviewed research providing evidence that processing abstract social concepts can involve embodied simulations which manifest themselves through overt behavior. In a representative study by Bargh, Chen, and Burrows (1996), participants completed a sentence-unscrambling task designed to subtly prime words referring to either characteristics of the elderly (e.g., *wrinkled, gray, retired*) or a control concept. The experimenters then surreptitiously recorded participants' walking speed as they left the laboratory. As predicted, participants primed with the elderly characteristics walked more slowly, presumably because the concept of elderly contains motoric representations of slow walking (perhaps because of prior experiences walking with the elderly, running past them, and the like).

The conceptual metaphor framework and embodied cognition theories share the broad notion that the meanings people give to abstract social concepts are intimately connected with their bodily states and recurring interactions with the physical world. However, if it were the case that conceptual metaphor is nothing but embodied simulation—that is, if the two mechanisms influenced social information processing in essentially the same manner—then a metaphor-enriched perspective would offer few novel insights over embodied cognition theories into the cognitive underpinnings of social thought and attitudes. We maintain that the importance of the metaphor-enriched perspective can stand apart from appeals to embodied cognition because the former provides a more compelling account of many empirical findings and, just as importantly, offers a framework that can be used to generate novel hypotheses that would not follow from embodied cognition theories.

Distinguishing Conceptual Metaphor and Embodied Simulation

As mentioned, embodied cognition theories posit that concepts contain representations of bodily states that customarily occur during interactions with concept-relevant stimuli. For example, a person's bowling ball concept might include tactile representations of a bowling ball's smooth surface and proprioceptive representations of adjusting one's balance to pick up a bowling ball. Embodied simulation is, therefore, an *intra*conceptual mechanism in that it involves modality-specific representations about a given concept derived from prior experiences with category members corresponding to that concept.

In contrast, the conceptual metaphor framework posits that some concepts are systematically structured in terms of dissimilar concepts—that is, conceptual metaphor is a uniquely *inter*conceptual mechanism. The source concepts of conceptual metaphors are concepts in their own right that can be, but need not be, metaphorically linked to target concepts. For example, the physical warmth experienced while being safely cradled in a caregiver's arms might form the basis for a metaphoric understanding of friendliness in terms of warmth. However, people can think about the concept of physical warmth in its own terms, and they frequently process information about that concept in ways that are irrelevant to friendliness (e.g., allowing tea to cool before consuming).

To clarify, conceptual metaphor and embodied simulation are related in the sense that both mechanisms involve representations of bodily states in processing abstract concepts. However, metaphors can draw on concepts representing commonplace knowledge about bodily states (e.g., heavy things are difficult to move), whereas embodied simulations exclusively involve particular bodily states that occur during experience with the abstract concepts (e.g., the representation of the motor activity required to lift a heavy object). To illustrate this distinction, consider Williams and Bargh's (2008a) findings. For most people, the concept of friendliness is rich with representations of bodily states, including temperature-related sensations (e.g., warm embraces), that regularly occur during friendly interpersonal encounters. However, gripping a warm paper cup is not likely to be among them, suggesting that the observed link between warm-cup sensations and judgments of interpersonal friendliness reflects, beyond experiential correlations, a metaphoric mapping between the embodied concept of physical warmth and the abstract concept of friendliness.

Our theoretical distinction between conceptual metaphor as an interconceptual mechanism and embodied simulation as an intraconceptual mechanism is intended only to highlight how conceptual metaphor can use representations of bodily states in a way that is qualitatively distinct from the way embodied simulations are currently characterized to use such representations; the distinction is not meant to imply that the two mechanisms are incompatible or mutually exclusive. There is good reason to believe that processing an abstract concept can involve both the simulation of bodily states related to that concept and metaphoric mappings between that concept and concepts derived from embodied experience. Indeed, later we discuss the possibility, suggested by perspectives on scaffolding, that bodily states accompanying target-relevant experiences can, in the course of cognitive development, form the basis for conceptual metaphors.

With the intra- versus interconceptual distinction in mind, identifying empirical evidence of embodied simulation that does not implicate metaphor is a fairly straightforward matter. Put simply, we can point to evidence that processing a concept activates bodily states associated with that concept. For example, Niedenthal, Winkelman, Mondillon, and Vermeulen (2009) provided evidence of embodiment in the processing of emotion concepts (e.g., joy, disgust) by showing that when participants made judgments about words related to those concepts, they exhibited facial muscle activity specifically associated with those emotions (e.g., corrugator supercilii muscles used in disgust expressions). This evidence suggests that facial muscles that are customarily activated in response to emotion-eliciting stimuli constitute a portion of the content of respective emotion concepts. This evidence does not show, however, that these patterns of facial muscular activity are separate concepts that are used to think and talk metaphorically about emotion concepts.

Identifying what counts as evidence for conceptual metaphor as distinct from embodied simulation can be more difficult, and until now no formal attempts have been made to articulate this distinction. This task would be simplified if we could point to evidence of metaphoric transfer involving source concepts representing knowledge that is not primarily embodied in nature. Researchers could test, for example, whether manipulating conceptions of sporting game rules or the hierarchies that exist in a business organization influence interpretations of target-relevant information in metaphor-consistent ways (Lakoff, 1991, 2002, shows that these particular source concepts indeed shape how people talk about a range of politically charged topics). As it were, however, extant demonstrations of metaphoric transfer typically involve source concepts referring to bodily states (e.g., verticality, weight). With this in mind, we next articulate three empirical distinctions that are meant to clarify which research findings provide evidence of metaphoric transfer involving bodily source concepts as distinct from the operation of embodied simulations in isolation. We then articulate a fourth empirical distinction that sets the stage for a review of research that utilizes what we term the *alternate source strategy* to study the influence of metaphors on social information processing.

Metaphors transfer experientially remote manipulations of bodily source concepts. The intra- versus interconceptual distinction suggests, for one, that metaphoric transfer effects should occur when psychological states associated with a bodily source concept are experimentally manipulated in a manner that is remote from the bodily states that customarily accompany experiences with the target concept. To illustrate, consider Williams and Bargh's (2008b) finding that participants primed with spatial distance (vs. closeness) subsequently viewed themselves as less emotionally attached to their family members. We assume that participants in this study had prior experiences physically distancing themselves from family members, and we can further assume that some of these experiences were accompanied by attenuated feelings of emotional attachment. It seems plausible, therefore, that the spatial distance prime simulated the perceptual and motor representations associated with these bodily states and thus triggered feelings of emotional detachment.

Recall, however, that Williams and Bargh's (2008b) subtle distance prime required participants to plot points on a Cartesian plane that were relatively far apart or close together—an action

that essentially amounts to drawing a line on a patch of graph paper. We believe it is unlikely that the bodily states involved in this priming manipulation resemble the particular bodily states that customarily occurred during participants' past experiences with familial attachment; that is, it seems unlikely that the priming manipulation simulated those bodily states that form part of the embodied representation of the concept of familial attachment (cf. the straightforward connection between facial muscle activity and the concepts of disgust or joy examined by Niedenthal et al., 2009). It seems more likely, rather, that the priming manipulation activated the spatial concept of distance, which, in turn, engendered metaphor-consistent changes in perceptions of familial attachment. In short, this finding (and similar others) makes sense when we think of abstract concepts such as familial attachment as understood partly in terms of concrete bodily concepts, given that perceptions and other psychological states related to those bodily concepts can be experimentally manipulated in ways that share little to no superficial resemblance with the specific bodily states that are involved in direct encounters with those abstract concepts (and thus are likely to be simulated during conceptual processing as per embodied cognition theories).

Metaphors transfer bodily source manipulations to multiple, experientially dissimilar target concepts. Extending our theoretical characterization of metaphor as an interconceptual mechanism, we expect that manipulating psychological states related to a given bodily concept would engender metaphor-consistent changes in the processing of information related to multiple target concepts, even though the bodily states that attend experience with those target concepts are superficially different from each other. Returning to Williams and Bargh (2008b) as a case study, we highlight their finding that priming spatial distance (vs. closeness) led to metaphor-consistent changes in participants' perceptions of familial attachment, emotional reactions to disturbing media, and estimates of the caloric content of unhealthy food. In order to explain this full pattern of results as the operation of embodied simulations, one would need to postulate that, for most of the participants, recurring past experiences interacting with family members, watching offensive media, and making judgments about junk food all involved the same (or very similar) bodily states. This seems unlikely. Just as importantly, it is not apparent how embodied cognition theories could predict these effects a priori: Why would manipulating distance perceptions influence those particular domains of perception and judgment and not others? In contrast, this pattern of results makes sense when interpreted within a conceptual metaphor framework, which views metaphors as capable of structuring different abstract concepts using knowledge of a single bodily concept.

Metaphors transfer bodily source manipulations to experientially nonembodied target concepts. We can carry out the implications of the intra- vs. interconceptual distinction even further by positing that, through the mechanism of conceptual metaphor, manipulating psychological states related to bodily source concepts should engender metaphor-consistent changes in information processing related to target concepts that are inherently abstract and for which people lack embodied experience. Supporting this hypothesis, Landau et al. (in press) provided evidence that people conceptualize their true self metaphorically as an integral entity by showing that priming perceptions of entity expansion increased authentic self-expressions in self-perceptions and atti-

tudes. Note that the true self is an abstract concept—it has no spatial coordinates and cannot be physically manipulated in any literal sense. We suspect that people use this metaphor because commonplace knowledge of physical entities is useful for conceptualizing analogous properties of the self. People generally experience physical entities as singular and integral (as opposed to manifold and fragmentary) and as retaining their essential characteristics across different situations and time periods. Analogously, the personal characteristics that define the true self are perceived as unified and resistant to the shifting standards of socially prescribed value (in contrast to the various masks or façades that constitute the extrinsic self-concept). This explains why people talk about the true self as a corelike entity and why simply exposing participants to depictions of an expanding square facilitates authentic self-expressions. This account can also be used to generate novel hypotheses about other ways in which conceptions of physical entities might shape the representation and expression of the self-concept. In contrast, it is difficult to explain these findings as the operation of embodied simulations given that people do not use their bodies to engage directly with their true self.

Metaphors map alternate source concepts to differentially structure target concept processing. Moving beyond a discussion of metaphoric transfer, our guiding analysis suggests an additional empirical distinction between conceptual metaphor and embodied simulation: Metaphor, but not embodied simulation, can structure a given target concept in terms of multiple source concepts and, in this way, systematically influence how target-relevant information is interpreted and evaluated. To elaborate, linguistic analyses (e.g., Kövecses, 1986) show that people often use different source concepts to talk about a given target concept. For example, the target concept of arguments is commonly talked about in terms of such diverse source concepts as war (“I cannot *penetrate her defenses*”), journeys (“We *covered a lot of ground*”), buildings (“His claims lacked *foundation* and quickly *collapsed*”), and containers (“His argument *contained* two new ideas”).

The critical idea, put forward by a number of theorists (Fauconnier, 1997; Gentner & Wolff, 1997; Lakoff & Johnson, 1980), is that using different source concepts to structure a given target concept, or using a source concept compared with a literal conception, will project distinct patterns of entailments that actively highlight, downplay, and conceal certain elements of the target concept. Thus, if metaphoric expressions relating arguments to war and those relating arguments to journeys reflect different metaphoric understandings of the same concept, then conceptualizing arguments in terms of war should uniquely guide the processing of argument-relevant information in line with commonplace knowledge of military combat (e.g., supporting the inference that arguments are characteristically aggressive and end decisively with a sole victor), whereas thinking about arguments in terms of journeys should guide information processing in ways that are consistent with knowledge of travel (e.g., supporting the conviction that arguing parties “stay on track” and eventually “get somewhere” together). On the basis of this theorizing, we would expect that experimentally manipulating which source concepts are used to understand a given target concept will have predictable consequences for people's interpretation and evaluation of target-relevant information.

The Alternate Source Strategy

Researchers have examined this possibility using an empirical approach that we label the *alternate source strategy*. This strategy involves assessing whether thinking about a given target concept using one source concept will produce interpretations and evaluations of target-relevant information that are consistent with that source concept and that are different from the interpretations and evaluations suggested by thinking about the same target using an alternate source concept or in a literal manner.

Psycholinguistic research using this strategy has shown that linguistically framing a target concept using metaphoric expressions related to one source concept facilitates comprehension and memory for expressions consistent with that metaphor and interferes with the processing of expressions reflecting alternate metaphors (Allbritton, McKoon, & Gerrig, 1995; Galinsky & Glucksberg, 2000; Gentner, Imai, & Boroditsky, 2002; Gibbs & O'Brien, 1990; Hoffman & Kemper, 1987). For example, Gentner and Boronat (1992; reported in Gentner, Bowdle, Wolff, & Boronat, 2001) instructed participants to read a passage that described a debate either literally or metaphorically using one of two source concepts—either a race (e.g., “He had to steer his course carefully in the competition”) or war (e.g., “He had to use every weapon at his command in the competition”). In all conditions, the passage’s last sentence included a race-metaphoric expression (“His skill left his opponent far behind him at the finish line”). For those reading the race passage, this sentence represents a continuation of an ongoing metaphor, whereas for those reading the war passage, it requires a new metaphoric mapping and should therefore take longer to process. This is exactly what was found.

Complementing these findings, research in social and cognitive psychology has used the alternate source strategy to show that experimentally manipulating the metaphoric framing of target concepts influences how people perceive and make inferences and judgments about target-relevant information (see Table 5 for a

summary).

Research on metaphors of time and space provides one demonstration of how alternative source manipulations can influence perceptions of a given target concept. Time can be described with the use of different spatial concepts: One refers to the self’s forward movement (e.g., “We are quickly *coming up on* spring break”); another refers to the approach and passing of objects with reference to the (stationary) self (e.g., “Spring break is *getting closer*”). The alternate source strategy can be used to test the hypothesis that conceptualizing time using either the ego-moving source concept or the object-moving source concept will differentially influence temporal perception. Boroditsky and Ramscar (2002) tested this possibility by priming participants either with the self’s forward movement (by having them move across a room in a rolling chair) or approaching objects (by having them pull a rolling chair toward the self with a rope). In an ostensibly unrelated task, participants were asked an ambiguous question “Next Wednesday’s meeting has been moved forward two days. What day is the meeting now that it has been rescheduled?” As predicted, participants perceived the meeting as “moving forward” in the recently primed spatial direction—that is, those primed with ego movement were more likely to perceive Wednesday’s meeting as being moved to Friday, whereas those primed with approaching objects perceived the meeting as moved to Monday. These findings show that priming different source concepts results in distinct, source-consistent changes in perceptions related to a target concept, suggesting the active operation of metaphorical mappings in target processing.

Alternative source manipulations have also been shown to influence how people make inferences. In a study by Morris, Sheldon, Ames, and Young (2007), participants read stock market commentaries that linguistically framed price movements in terms of the deliberate action of a living agent (e.g., “The NASDAQ *climbed higher*”) or in terms of the nonagentive activity of an inert

Table 5
Effects of Alternative Source Manipulations on Perception, Inference, and Attitudes

Report	Central finding	Relevant metaphor
Boroditsky & Ramscar (2002)	Priming ego-moving versus object-moving concepts resulted in consistent perceptions of events as either something one is moving to or as something moving toward the self.	Time is the self moving/ time is something moving toward the self.
Morris, Sheldon, Ames, & Young (2007)	Conceptualizing price trends as agents (vs. nonagentive objects) led to inferences that a given price trend would continue.	A market is an agent.
Read, Cesa, Jones, & Collins (1990)	Likening compulsory seat belt legislation (an abstract policy issue) to a concrete and repulsive experience changed attitudes toward the policy.	Freedom is privacy.
Johnson & Taylor (1981)	Politically informed individuals are more influenced than uninformed individuals by persuasive metaphors in political debates.	
Sopory & Dillard (2002)	Metaphoric persuasive messages result in increased attitude change relative to nonmetaphoric messages.	
Ottati, Rhoads, & Graesser (1999)	Among sports fans, sport-metaphoric vs. literal framing of a persuasive message heightened likelihood of elaboration.	Academic success is a sport.
Landau, Sullivan, & Greenberg (2009)	Heightened motivation to protect one’s body from contamination leads to harsher attitudes toward immigrants entering the United States among those primed with a body-metaphoric, but not a literal, framing of the United States.	Nations are bodies.

Note. Research reports are listed in the order in which they appear in the present article. There was no single relevant metaphor for the J. T. Johnson and Taylor (1981) or Sopory and Dillard (2002) studies.

object (e.g., “The Dow *fell*”) and were then asked to predict the next day’s price trend. Morris et al. reasoned that because agent metaphors imply the deliberate action of a living thing pursuing a goal (e.g., things that climb presumably want to continue climbing), participants led to conceptualize price trends using this source concept (vs. nonagentive objects) should be more likely to infer that a given price trend will continue the following day. This is exactly what was found.

Researchers have discovered a number of ways in which using alternative source concepts influences attitudes. Read, Cesa, Jones, and Collins (1990) showed that linguistically framing a persuasive message in metaphoric terms led people to assimilate the affective connotations of a source concept into their evaluations of a literally unrelated public policy issue (see also J. T. Johnson & Taylor, 1981). Specifically, participants expressed more negative attitudes toward compulsory seat belt legislation if they were exposed (vs. not exposed) to a statement that metaphorically related that policy to a violation of physical privacy: “The compulsory seat belt legislation introduced by the state legislature is like having Governor Deukmejian sitting in your bathtub telling you to wash behind your ears.” In a meta-analysis of empirical investigations of metaphor and persuasion, Sopory and Dillard (2002) found that use of metaphoric language in persuasive messages created a small but significant increase in attitude change over equivalent literal messages.

Research by Ottati, Rhoads, and Graesser (1999) showed that framing a persuasive message in metaphoric (vs. literal) terms can influence individuals’ motivation to think carefully about the message. Participants who either liked or disliked sports were given strong or weak literal arguments advocating that college seniors be required to complete a thesis requirement before graduation (cf. Petty & Cacioppo, 1986). In one condition, the message was interspersed with sports-metaphoric statements (e.g., “If you want to play ball with the best . . .”); in a literal control condition, these statements were replaced with literal paraphrases (e.g., “If you want to work with the best . . .”). Among individuals who enjoy sports, sport-metaphoric statements led to more positive attitudes toward the senior thesis requirement when the arguments were strong but not when they were weak. This finding suggests that metaphors influence persuasion not only by assimilating evaluative connotations from a source concept to a target concept (e.g., Read et al., 1990) but also by heightening motivation to attend to a persuasive message’s quality when it is metaphorically framed in terms of a source concept of personal interest.

A study by Landau, Sullivan, and Greenberg (2009) combines the metaphoric transfer and alternative source strategies to test whether metaphor-consistent effects of source manipulations on target attitudes can be moderated by the situational salience of a metaphorical link between the relevant source and target concepts. The researchers reasoned that prior demonstrations of metaphoric transfer, in which changes to one concept directly produce changes in a dissimilar concept, depend on the relevant metaphors being chronically accessible. It is possible, however, that not all metaphors are accessible in this way (a point we develop further in a later section); therefore, they may need to be temporarily activated for metaphoric transfer to occur.

Landau et al. (2009) tested these hypotheses in the context of studying how metaphors influence Americans’ attitudes toward immigration into the United States. They built on Lakoff and

Johnson’s (1980) observation that people commonly talk about nations metaphorically as physical bodies (e.g., “America *reaches out*”). Because bodies are known to be vulnerable to contaminating foreign agents, it is possible that people’s motivation to protect their own bodies from contamination shapes how they make judgments about immigrants entering their nation (accordingly, immigration discourse is pervaded with bodily contamination metaphors; O’Brien, 2003). On the basis of this analysis and using the metaphoric transfer strategy, Landau et al. hypothesized that increasing people’s motivation to protect their own bodies from contamination would result in more negative immigration attitudes.

However, people do not seem to chronically conceive of the nation as a body; they also use alternative metaphoric interpretations (e.g., conceiving of a nation as a house; “We have enemies in our *backyard*”) as well as literal interpretations. Thus, bodily contamination concerns may only engender metaphor-consistent changes in attitudes toward U.S. immigration if the United States is framed metaphorically as a body. To test these hypotheses, Landau et al. (2009) manipulated contamination concern by priming participants to view airborne bacteria in their environment as either harmful to their physical health or innocuous. Participants then read an ostensibly unrelated essay describing U.S. domestic issues (other than immigration) that either contained statements metaphorically relating the United States to a body (e.g., “After the Civil War, the United States experienced an unprecedented growth spurt”) or used literal paraphrases of those metaphoric statements (“After the Civil War, the United States experienced an unprecedented period of innovation”). As expected, heightening participants’ bodily contamination concerns led them to express more negative immigration attitudes when the metaphoric relation between the United States and a body was made salient; however, contamination threat did not influence immigration attitudes when the country was framed in literal terms.

These findings support our distinction between conceptual metaphor and embodied simulation: Although the contamination threat may have triggered a disgust or contamination-avoidance response stored in a particular modality, this induction did not, by itself, affect immigration attitudes; only when the nation was metaphorically linked to the body (vs. a literal conception) did contamination concerns transfer over and influence evaluations of target-relevant information.

Summary and Discussion

Conceptual metaphor and embodied simulation both involve interesting interactions between people’s understanding of abstract concepts and their experiences with the physical world. However, embodied simulation is an intraconceptual mechanism that involves representations of bodily states associated with a given concept, whereas metaphor is interconceptual in that it maps content and structure between superficially dissimilar concepts. On the basis of this distinction, we articulated three ways to identify evidence of metaphoric transfer involving bodily source concepts as distinct from the activation of embodied simulations. We then introduced a fourth empirical distinction between these mechanisms: Through conceptual metaphor, but not embodied simulation, a given target concept can be differentially structured by multiple source concepts, resulting in theoretically specified pat-

terns of target interpretation and evaluation. This empirical distinction set the stage for our review of research that used the alternate source strategy.

Our claim that conceptual metaphor shapes social information processing in ways that are distinct from the operation of embodied simulation in no way implies that metaphor-enriched and embodied perspectives on social cognition are incompatible or even at odds; rather, we believe that they are two equally useful approaches to understanding the cognitive underpinnings of social thought and attitudes (for an attempt to synthesize these perspectives, see M. Johnson, 2007).

Directions for Future Research

The empirical findings reviewed in this article show that metaphor is not merely a decorative linguistic device; instead, it is a cognitive tool that people use to grasp the abstract concepts that lie at the center of their social life. A few points about this body of work: Many of the studies demonstrate that metaphors influence social information processing automatically and without the individual's conscious intent or awareness. Moreover, in most of these studies, the influence of metaphors on social information processing did not depend on the salience of metaphoric language. For example, participants in Boroditsky and Ramscar's (2002) study did not need to be primed with linguistic expressions reflecting spatial metaphors for time—or to make explicit connections between the spatial prime and the time judgment components of the experimental procedure—in order to spontaneously conceive of time metaphorically in terms of a salient spatial concept. Therefore, it would be very difficult to account for this body of work as simply reflecting how people talk about the social world. Moreover, as we discussed above, these findings cannot be parsimoniously explained as the operation of schemas or embodied simulations in isolation, suggesting that metaphor is a unique cognitive mechanism used in social information processing.

There are, however, a number of important questions about the role of metaphor in shaping social thought and attitudes that have not received adequate attention in the research literature. In this section, we raise these questions and offer suggestions for addressing them in future research.

Complementing a Metaphor-Focused Approach With a Phenomenon-Focused Approach

Most of the research reviewed thus far takes a metaphor-focused approach in that it identifies a metaphor reflected in ordinary language (e.g., power is up) and assesses whether that metaphor operates at a conceptual level to influence information processing. Although this approach has yielded many interesting findings, it is limited in important ways. The most obvious limitation is that cognitive linguists have identified hundreds of metaphors that pervade ordinary discourse about dozens of socially relevant concepts, from free will to military conflict, and separately investigating each metaphor would result in a proliferation of disparate findings.

A more severe limitation of this approach is that it has difficulty modeling the conditions under which people are more and less likely to rely on metaphors compared with literal interpretations in making sense of abstract social concepts. Whereas thinkers such as

Nietzsche (1873/1974) and Jaynes (1976) argued that metaphors inevitably shape people's comprehension of abstract concepts, the empirical evidence points to significant variability in metaphor use across situations and individuals. For example, Landau et al. (2009) found that if participants were not primed to view the United States metaphorically as a physical body, then a bodily contamination threat did not influence immigration attitudes, suggesting that the metaphoric idea of the country as a body was not chronically accessible for participants and had to be activated by means of a situational prime for metaphoric transfer to occur.

Moreover, a metaphor-focused approach typically entails examining a single source concept and its influence on a target concept. Demonstrations of metaphoric transfer indeed show that those concepts are metaphorically related, but such findings should not be interpreted as showing that certain target concepts are exclusively structured by certain source concepts. We saw earlier, for example, that conceptions of morality are influenced in metaphor-consistent ways by manipulated perceptions of darkness/brightness (Sherman & Clore, 2009), physical cleanliness (Schnall, Benton, & Harvey, 2008; Schnall, Haidt, et al., 2008), and vertical space (Meier, Sellbom, & Wygant, 2007). We also saw that priming different source concepts results in source-consistent patterns of inference (Morris et al., 2007). Indeed, research involving the alternate source strategy is predicated on the notion that target concepts can be metaphorically structured in terms of multiple, sometimes very different, source concepts.

In short, a metaphor-focused approach has difficulty modeling the factors influencing the strength and the direction of metaphor use in social information processing. To remedy this situation, we recommend that researchers complement a metaphor-focused approach with a phenomenon-focused approach, which entails starting with a phenomenon of social psychological interest, identifying the multiple metaphors observed in discourse surrounding that phenomenon, and then examining the factors of the situation and the individual that determine whether metaphors (vs. literal conceptualizations) are used to process information related to that phenomenon, which metaphors are used, and the downstream consequences of using different metaphors for thought, feeling, and behavior.

As just discussed, extant research involving the alternate source strategy has begun to take this approach and has demonstrated the important role of situational priming in influencing both the strength (e.g., Landau et al., 2009) and the direction (e.g., Morris et al., 2007) of metaphor use. Next, we combine insights from the conceptual metaphor framework and lay epistemology theory (Kruglanski, 1989) to suggest two motivational factors that can be explored in future research on the strength and direction of metaphor use.

The need for nonspecific closure and the strength of metaphor use. Lay epistemology theory posits that situations in which thinking becomes taxing or overly complex can trigger the need for nonspecific closure: a preference for any definite knowledge over informational complexity. The conceptual metaphor framework adds the complementary insight that people have a general epistemic tendency to avoid not only complexity (large quantities of information) but also abstractness (vague or elusive information). The person may struggle, for example, to fully grasp what abstract concepts such as happiness and progress really mean. This framework also posits that metaphors function precisely to

lend concrete structure to otherwise abstract concepts. Combining these insights yields a testable hypothesis: The more individuals perceive available information as abstract, the more they will prefer metaphoric (vs. literal) interpretations of that information, regardless of the specific conclusions supported by those metaphors.

Part of what makes this an interesting possibility is that metaphors are commonly viewed as more abstract than literal interpretations. For example, Miller (1976) argued that metaphors are figurative embellishments that obscure the precise literal meaning of a message. If this is correct, we would expect that an increase in perceived informational abstraction would decrease metaphor use and increase preference for literal facts. Although this may be true in some situations, emerging lines of research support our hypothesis that high levels of abstraction increase metaphor use. One relevant set of studies examined the factors that determine *personification*, which essentially represents the use of metaphor to apply familiar folk-psychological concepts to interpret the actions of nonhuman entities and forces that do not literally possess mind (e.g., “Life has *cheated* me”; “Cancer finally *caught up* with him”; Lakoff & Johnson, 1980). Epley, Waytz, and Cacioppo (2007) showed that people are especially likely to personify something when they are motivated to explain and understand its behavior. Thus, people seem to rely on metaphors when they are motivated to make sense of otherwise abstract or elusive phenomena.

This analysis also invites us to examine how the strength of metaphor use is influenced by individual differences in the motive for clear and structured knowledge. Personality research shows that individuals with a high (vs. low) dispositional preference for structured knowledge—as measured with scales such as need for closure (Kruglanski, Webster, & Klem, 1993) and personal need for structure (Neuberg & Newsom, 1993; Thompson, Naccarato, Parker, & Moskowitz, 2001)—prefer concrete interpretations of social information over abstractness. Insofar as conceptual metaphors provide people with a means of comprehending otherwise abstract concepts in terms of concrete concepts, individual differences in structure seeking may be useful for predicting the types of people who are especially likely to prefer metaphoric over literal interpretations of information, regardless of the specific conclusions implied by those interpretations.

In addition to considering individual differences in epistemic motivation, future research could consider how metaphor use is influenced by individual differences in expertise related to target concepts. The conceptual metaphor framework suggests that people will rely on metaphors to comprehend information that appears unfamiliar, whereas they may prefer literal interpretations with increasing expertise. We can imagine, for example, a person relying on personification metaphors to initially make sense of a computer’s elusive behavior (“I think the computer is feeling overwhelmed”) yet relaxing reliance on these metaphors as a literal understanding of how computers operate is acquired. Indirectly supporting this possibility, research in education shows that experts routinely rely on metaphors to communicate abstract ideas to nonexperts (Graham, 2008). Additional research is clearly needed to more fully assess this possibility.

The need for specific closure and the direction of metaphor use. The need for nonspecific closure just discussed refers to a general preference for clear knowledge—any knowledge—as op-

posed to confusion or ambiguity. Of course, in many cases, people are motivated to arrive at specific conclusions—what Kruglanski (1989) referred to as the need for specific closure. Research has shown that this motive causes people to selectively process information in ways that support those conclusions (e.g., Kunda, 1990; Pyszczynski & Greenberg, 1987). For example, when people receive negative feedback on their personality from another person, they interpret that person through the lens of disparaging stereotypes, presumably to dismiss the threat to their self-esteem posed by the negative feedback (Sinclair & Kunda, 2000).

On the basis of this work, we propose that people will prefer specific metaphors that highlight information supporting their desired conclusions and that downplay information that contradicts those conclusions. Accordingly, linguistic analyses of political discourse show, perhaps not surprisingly, that political pundits prefer to frame target issues using metaphors that highlight and downplay aspects of those issues in ways that comport with their ideological commitments (Lakoff, 2002, 2004, 2008). For example, government officials often attempt to legitimize military aggression by framing war as a point-based game, a quantification metaphor that highlights the simple notion that the side with the most points (i.e., inflicted casualties on the opponent) is the clear victor and that moreover obscures war’s qualitative costs in suffering and death (Lakoff, 1991).

Landau et al. (2009) provided experimental evidence that situationally salient motives increase preference for specific metaphoric interpretations of social issues. The researchers began with the observation that people commonly describe binge alcohol use metaphorically as an act of physically destroying the self (e.g., “I am going to get *smashed* tonight”). Levine (1981) suggested that these expressions reflect the motive, met by excessive consumption of alcohol and other intoxicating substances, to avoid awareness of one’s personal shortcomings. On the basis of this idea, Landau et al. (2009) hypothesized that focusing participants on their personal shortcomings (vs. successes) would increase their attraction to binge drinking behavior when it was metaphorically framed as physical self-destruction compared with when the same behavior was framed using an alternative source concept (competitive destruction of others through drinking; e.g., “I *destroyed* them at drinking games”) or in literal terms. This is exactly what was found, suggesting that activating a specific motive (in this case, to avoid negative self-views) increases the appeal of particular metaphoric interpretations of social activities that satisfy that motive.

Moreover, by taking a phenomenon-focused approach to metaphor use in attitudes toward binge alcohol consumption, Landau et al. (2009) were able to draw on evidence that binge-drinking behavior is more likely to be seen as an attractive means of avoiding negative self-views among frequent (vs. infrequent) drinkers (Hull & Young, 1983). On the basis of this work, the researchers hypothesized that insofar as self-destructive metaphors for drinking reflect that motive, then heavier, but not lighter, drinkers should respond to the salience of personal shortcomings with increased attraction to binge drinking when it is metaphorically framed as self-destruction. This hypothesis was also supported.

The findings reviewed in this section are more suggestive than conclusive, and additional research is needed to more fully evaluate whether people prefer metaphors that support their desired conclusions. One final possibility worth mentioning is that meta-

phors may in some cases be preferred over nonmetaphoric interpretations as a way of supporting desired conclusions. Recall that metaphors structure target concepts using knowledge derived from familiar, concrete domains of experience. Therefore, metaphoric interpretations may be more useful than literal interpretations for convincing others and oneself of the truth and value of certain conclusions. To illustrate, we note that it is evident from our routine physical functioning that being restrained against our will is an aversive state and that one is justified in struggling to regain free movement. Therefore, individuals committed to an ideological cause (e.g., a political rebellion) may prefer to think about the purpose of their cause in terms of physical motion rather than in literal terms, because that metaphor portrays the value of “getting ahead,” “moving forward,” and even “destroying any obstacles in our path” as equally self-evident as the value of maintaining unencumbered physical motion. When understood metaphorically as a concrete concept, an abstract concept may take on meanings that seem equally obvious and irrefutable.

Summing up this section, we note that metaphors may vary in their chronic accessibility and that they may operate fluidly by mapping a given target concept onto different source concepts. Adapting insights from lay epistemology theory, we suggested that future research on the strength and direction of metaphor use should consider people’s global or nonspecific motive to avoid abstractness as well as their specific motive to seize on and justify particular interpretations of social information. By taking a phenomenon-focused approach, future research can model the interplay of these (and other) factors in determining metaphor use in social information processing and its consequences for socially relevant outcomes.

Benefits of a Metaphor-Enriched Social Cognition

We believe that the most significant benefit of a metaphor-enriched social cognition is that it acknowledges metaphor’s significant and unique role in shaping how people create meaning in the social world. It alerts us to the possibility that, as people attempt to make sense of many aspects of their everyday life, such as their emotions, nebulous political issues, birth and death, justice, virtue, and the overall trajectory of their lives, they routinely use metaphors to reason, make inferences, and form judgments.

A metaphor-enriched perspective also provides an integrative framework for organizing multiple emerging lines of research in social psychology, cognitive psychology, and psycholinguistics. This framework can further be used to identify unanswered questions and generate novel hypotheses about the causes and consequences of metaphor use in social information processing. Below we outline some more specific ways in which social cognitive theory and research can be enriched by taking more explicit account of metaphor’s psychological significance.

Highlights Affinities Between Superficially Unrelated Phenomena

A metaphor-enriched perspective provides a useful basis for formulating hypotheses about the relations between seemingly disparate social psychological phenomena. Consider, for example, that for many years psychologists have studied moral attitudes in conceptual isolation from research on disgust as an emotional

reaction to potential bodily contaminants. A metaphor-enriched perspective invites us to observe that people in diverse cultures use the same words and facial expressions to reject physically disgusting stimuli as they do to reject socially inappropriate behaviors such as hypocrisy and betrayal (Haidt, Rozin, McCauley, & Imada, 1997). This observation informed the aforementioned research by Schnall and colleagues (Schnall, Benton, & Harvey, 2008; Schnall, Haidt, et al., 2008) showing that disgust-eliciting stimuli engender metaphor-consistent changes in moral judgments. Moreover, we now know that the same areas of the brain respond to both physically and morally disgusting stimuli (Moll et al., 2005; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). The insight that moral attitudes and disgust reactions share a common conceptual structure would not seem to follow from either the schema view or embodied cognition theories, which focus on the representation and use of knowledge within each domain.

As an illustration of how this type of analysis might guide future research, consider the concept of balance. In social cognition, Heider’s (1958) influential balance theory posits that people prefer to think about elements of interpersonal relationships as fitting together in an evaluatively consistent manner. Stepping back, we observe that the concept of balance figures prominently in ordinary discourse about social concepts in domains other than interpersonal relationships (Gibbs, 2006a; M. Johnson, 1991). For example, people commonly talk about balanced personalities, balanced views, the balance of political power, and the balance of justice. In explaining these linguistic patterns, Gibbs (2006a) noted:

It is not the case that a large number of unrelated concepts (psychological, moral, political) all just happen to make use of the same word “balance” and related terms . . . rather, we use the same word for all these domains because they are structurally related by the same sort of underlying image schemas, and are metaphorically elaborated from them. (p. 93)

The image schema to which Gibbs referred is essentially our conception of physical balance as a symmetrical arrangement of forces around a point or axis. In other words, people’s bodily and perceptual experience with physical balance has a conceptual structure that can be used as a common vehicle for making sense of a range of social concepts. Thus, rather than separately investigating perceptions of balance within different domains, we can use a metaphor-enriched perspective to generate a priori hypotheses about how metaphors of balance shape thought and attitudes in similar ways across these domains.

Provides a Window Into Cultural Differences in Social Thought and Attitudes

Cultural differences in social thought and attitudes have received increasing empirical attention in recent years. For example, a large body of research documents the different construal of self and relationships prevalent in Western countries, which emphasize individualism and individual self-expression, and East Asian countries, which portray the self as interdependent with others (e.g., Markus & Kitayama, 1991; Triandis, 1989). We believe that a metaphor-enriched perspective can substantially enhance these efforts. By attending to the metaphors that people in different cultural contexts use to collectively represent abstract social concepts in their language, art forms, and cultural practices, research-

ers can make specific predictions about which social meanings are likely to be culturally widespread or universal and which are culturally specific.

Linguistic analyses on distinct, and in some cases historically, unrelated languages show that some metaphors manifest themselves across cultures (Asch, 1958; Kövecses, 2005; Sweetser, 1990). Sweetser (1990; see also Yu, 2003) has shown, for instance, that individuals in different cultural contexts and historical periods commonly talk about the experience of understanding or knowing in terms of vision (e.g., “I had *blindness* on but now I *see* the *big picture*”). In a similar vein, anthropological evidence shows that metaphors linking social power/status and vertical position are reflected in collective systems of verbal and imagistic meaning across cultures (A. P. Fiske, 2004; Schwartz, Tesser, & Powell, 1982).

At the same time, linguistic and anthropological analyses point to interesting cultural differences in metaphor use (Kövecses, 2005; Núñez & Sweetser, 2006). These findings can be used to formulate hypotheses about how individuals in different cultures construe a social concept. As an illustration of this approach, Boroditsky (2001) observed that English speakers use predominantly horizontal terms to talk about time, whereas Mandarin speakers use both horizontal and vertical terms. Boroditsky predicted that Mandarin speakers would be more likely than English speakers to rely on vertical spatial concepts when making temporal judgments. Accordingly, Mandarin speakers were faster to answer true/false questions about time (e.g., “March comes earlier than April”) after vertical spatial primes, whereas English speakers’ performance on the same questions was facilitated by horizontal spatial primes. This study illustrates how the metaphoric transfer strategy can be used to assess whether members of different cultures actually construe aspects of the social world in different ways, rather than merely talking about them in different ways.

Alerts Researchers to the Significance of Metaphors in Social Psychological Theorizing

This article focuses on people’s ordinary use of metaphor to think and talk about the concepts that are important in their everyday lives. However, we cannot ignore social psychologists’ pervasive use of metaphor in characterizing mental structures and processes. To mention only a few examples: States of conscious awareness are described in terms of being spatially above/below a threshold (e.g., Bargh, 1996) or inside/outside conscious awareness (Arndt, Cook, & Routledge, 2004); love and intimacy are described in terms of the inclusion of the other in the self and a consequent expansion of the self-concept (Aron & Aron, 1997); people can evince an open or a closed mind (Kruglanski, 2004; Rokeach, 1960), and they seize and freeze on certain interpretations of social information (Kruglanski & Webster, 1996). Of course, the most pervasive metaphor in social cognitive theory likens human cognition to the information processing performed by a digital computer.

Indeed, across psychology various metaphors have been used to characterize attention (a stream, a spotlight, a switchboard, a conveyer belt, a newsreel), memory (a wax tablet, a dictionary, a muscle, a computer’s hard drive, a hologram), short-term memory (working spaces, blackboards, scratchpads), and visual perception (demons), to name just a few (more complete discussions of

metaphors’ significance in psychology can be found in Bruner & Feldman, 1990; Gentner & Grudin, 1985; Leary, 1990; Sternberg, 1990).

Should theorists be relying so heavily on metaphor? Early empiricist philosophers such as Thomas Hobbes and John Locke, as well as positivist philosophers in the 20th century, argued that literal language is the only proper medium for making truth claims, and that metaphors are linguistic trifles that scientists should abstain from. However, it is now largely accepted that metaphors play an integral role in the creation and communication of scientific knowledge (Bicchieri, 1988). We suggest that metaphors make possible the social psychological theories that both researchers and the general public use to meaningfully explain human experience.

With that said, it is important to be alert to the precise meanings of the metaphors used in social psychological theorizing. Researchers should clarify whether their metaphors are intended to characterize the phenomenon of interest as it occurs in individuals’ minds or whether they serve more appropriately as explanatory constructs (or both). For instance, do we as researchers really mean that people process information about authentic self-expression using knowledge of physical expansion, or should we reserve the term self-expansion as a useful theoretical tool? We should also critically evaluate the metaphors that make up our theories. In one such evaluation, Tetlock (2002) pointed out that theory and research in judgment and decision making had been dominated by metaphors portraying people as intuitive scientists or economists, and he suggested that research could benefit from focusing on other metaphors, such as a principled theologian who tries to preserve the integrity of sacred values. We believe that more critical evaluations of this kind can only help refine our theories and facilitate research.

Bridges Social Cognition With Other Areas of Research in Psychology

The past few years have seen an explosion of scholarly interest in metaphor in disciplines ranging from aesthetics to legal studies (see Gibbs, 2006b, for representative coverage). A metaphor-enriched perspective can serve as a framework for integrating insights across these disciplines to acquire a richer understanding of how social meaning making arises from complex interactions between brains, body, language, environment, and culture. First and most obviously, this perspective highlights two fruitful connections between social cognition and cognitive linguistics: Cognitive linguistics provides detailed analyses of the metaphors commonly used in discourse, whereas social cognitive research complements these analyses with experimental assessments of metaphors’ role in shaping social thought and attitudes.

A metaphor-enriched perspective also connects social cognition with neuroscience and evolutionary psychology—two research areas of significant contemporary interest. Feldman (2006) has developed a theory of how metaphoric language and thought are realized in the brain. As to evolutionary psychology, archeologist Steven Mithen (1996) has argued that humans’ unique symbolic intelligence enables them to transfer knowledge between superficially unrelated domains of experience and that this capacity conferred a significant adaptive advantage over the course of evolution. Below we elaborate on a few other bridges.

Environmental psychologists, anthropologists, and cultural geographers have held a long-standing interest in individuals' relation to their physical surroundings, although this topic has not received much attention within mainstream social cognition. A metaphor-enriched perspective highlights the possibility that aspects of a person's or a group's physical environment influence the availability of specific source concepts that are used to understand target concepts. Thus, in addition to analyzing language, researchers can look at how groups of people interact with their physical surroundings to generate hypotheses about which metaphors they characteristically use to create meaning. Among the Fang culture of western Africa, for instance, the skill with which a member of the council house hears debates and settles disputes is described with the same language used to describe the ability to carefully slice fibrous plants (a clumsy judge leaves disruptive, "jagged" edges; a wise and eloquent judge ensures "clean" edges; Fernandez, 1986). It is unlikely that members of another culture would conceptualize juridical technique using the same metaphor if their everyday livelihood did not depend as critically on particular types of plants and agriculture.

Moreover, researchers have begun applying the conceptual metaphor framework to examine how people's abstract concepts are grounded in knowledge of the physical world derived early in cognitive development. Most prominently, theories of scaffolding posit that developmentally early, nonmetaphoric associations between social experiences and interactions with the physical world form the basis for metaphoric conceptions of those experiences later in development (Bargh, 2006; Mandler, 2004; Piaget & Inhelder, 1969; Williams, Huang, & Bargh, 2009). For example, Williams and Bargh (2008a) proposed that correlations between the individual's early experiences of physical warmth while interacting with security-providing caregivers (e.g., sitting in mother's warm lap) provide the cognitive scaffolding for the adult's metaphoric understanding of the abstract concept of friendliness in terms of temperature, a metaphor that shapes how one thinks and talks about social experiences that are not literally related to physical warmth (e.g., "Congress is *warming up* to the idea").

Theories of scaffolding stand to offer novel insights into the developmental origins of the schemas and metaphors that people use in social information processing. These insights could augment mainstream social cognitive perspectives, which broadly characterize schemas as the cumulative product of personal experiences and socialization influences without due consideration of the specific details of this process. A metaphor-enriched perspective is highly compatible with a scaffolding view in offering a window into how people's internal bodily states and routine interactions with the physical world constrain their creation of social meaning. Future research should combine these perspectives to conduct a focused study of the developmental origins of certain patterns in social thought and attitudes.

Finally, it is worth mentioning that a metaphor-enriched perspective can bridge social cognition with the study of creativity, a topic that receives regrettably little attention within mainstream social cognition. M. Johnson (2007) offers a detailed analysis of metaphors' significance in artistic response and creation (Lakoff & Turner, 1989, offered a similar analysis focused on poetry). M. Johnson noted that our discourse about art uses a number of concrete and embodied concepts (e.g., colors are bright, melodies flow, a song builds up, musical phrases rise and fall). Indeed,

master composers such as Bach, Hayden, and Mozart selected from a range of sounds, harmonies, and rhythms that metaphorically expressed sacred and mysterious events and forces, such as the sorrow of Christ's passion, the silence of the entombment, and the jubilation of resurrection (e.g., by using an ascending scale to depict Christ's ascension). M. Johnson also noted that the uses of these concrete concepts for explaining art are nonarbitrary; we systematically find meaning in art by relying on more concrete source concepts to convey that meaning in a unique way. For example, if we find the melody of a song "uplifting" but the lyrics are about some sad event, we might interpret the song as an expression of a bittersweet or ambivalent sentiment.

In addition to addressing how people consume creative products, a metaphor-enriched perspective stands to elucidate the creative leaps of imagination that form the mainspring of artistic and scientific discovery. Bronowski (1977) argued that underlying art and science alike is the search for "hidden likenesses":

A man becomes creative, whether he is an artist or a scientist, when he finds a new unity in the variety of nature. He does so by finding a likeness between things which were not thought alike before, and this gives him a sense at the same time of richness and of understanding. The creative mind is a mind that looks for unexpected likeness. This is not a mechanical procedure, and I believe that it engages the whole personality in science as in the arts. (p. 12)

The artist and scientist are essentially searching for an underlying order or structure to nature and experience, and this structure often entails linking phenomena that were thought to be different in kind. For example, the theory of general relativity links light with gravitation, whereas the poet uses an inventive, unusual, or arresting metaphor to yield fresh insight into some experience or situation. These creative leaps are not unusual, and they do not require a separate positive psychology to understand; rather, they are continuous with routine metaphorical processes inherent in our ordinary conceptual systems. In short, a metaphor-enriched perspective on social cognition may be better positioned than mainstream perspectives to highlight the continuity between everyday social thought and creative cultural endeavors such as art and science.

Conclusion

The field of social cognition attempts to scientifically understand the cognitive events underlying people's efforts to meaningfully construe themselves and the social world. According to the traditional schema view, people rely on schematic knowledge of social stimuli to selectively interpret and elaborate on the complex array of social information. More recent embodied cognition theories posit that social concepts are given meaning partly by the recurring patterns of bodily experience that are associated with those concepts. In this article, we proposed a complementary, metaphor-enriched perspective according to which people construe many aspects of the social world using conceptual metaphors that apply the structure of concrete concepts to process information related to dissimilar, typically more abstract concepts. We defined two broad empirical strategies for investigating whether metaphors influence social information processing in ways that are distinct from schematic and embodied processes in isolation, and we reviewed classic and contemporary lines of research demonstrating

metaphors' far-reaching influence on people's interpretation and evaluation of a wide range of social stimuli, including other people, political topics, and their own value as individuals.

A metaphor-enriched perspective does not replace mainstream theoretical perspectives in social cognition. When people think about social concepts, they are certainly using schematic information about those concepts, and they are likely accessing representations of associated bodily states. However, a metaphor-enriched perspective is capable of explaining a large number of empirical findings that are difficult to account for with either the schema view or embodied cognition theories alone. These latter approaches also have difficulty accounting for the ubiquity of metaphor in language, art, myth, and other practices by which people construct and communicate systems of cultural meaning. Although further research and theoretical refinement are necessary, we hope that our presentation of a metaphor-enriched social cognition sets the stage for developing a richer, more complete understanding of everyday social meaning making and its implications for social life.

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Received August 19, 2009

Revision received June 23, 2010

Accepted June 25, 2010 ■