

Material priming: The influence of mundane physical objects on situational construal and competitive behavioral choice[☆]

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Abstract

Inspired by potential theoretical linkages between nonconscious priming work in psychology and the anthropological emphasis on the impact of material culture, five studies were conducted to investigate the role of implicitly presented material objects and automatic processes in interpersonal and organizational contexts. These studies showed that exposure to objects common to the domain of business (e.g., boardroom tables and briefcases) increased the cognitive accessibility of the construct of competition (Study 1), the likelihood that an ambiguous social interaction would be perceived as less cooperative (Study 2), and the amount of money that participants proposed to retain for themselves in the “Ultimatum Game” (Studies 3 and 4). A fifth study, in which the ambiguity of the governing social situation was manipulated, demonstrated that these types of effects are most likely to occur in contexts that are ambiguous and/or lacking in explicit normative demands. The importance of these situation-specific “material priming” effects (all of which occurred without the participants’ awareness of the relevant influence) to judgment and behavioral choice in specific contexts, as well as to the fostering of less competitive organizational settings, is discussed.

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Introduction

Certain material objects are predictably associated with particular social contexts: Books and journals are often found in an academic’s office; dark lights, candles, and flowers are often found in a romantic French restaurant; and, of particular relevance to the present thesis, briefcases, suits, and board-room tables are often found at business meetings. These objects or “props” can play an important role in creating distinctive situational contexts and communicating associated behavioral norms. Anthropologists have long pointed out that

material objects are signs fraught with meaning as to cultural norms and values (De Saussure, 1915). A few psychologists have similarly emphasized the directive and dynamic role played by objects and other ecological features (notably Barker & Wright, 1955; also see Gibson, 1979). However, whereas most behavioral social scientists and particularly most social psychologists—even in discussing the interplay between the “person and the situation” (Ross & Nisbett, 1991)—have devoted careful empirical attention to the impact that other *individuals* can exert on behavioral choice within a specific social situation, relatively little attention has been paid to the potential impact of the *objects* that characteristically are present in these social contexts.

In the present research, we explore the possibility that the mere presence of everyday, inanimate objects can serve as “material primes” that exert automatic, unconscious, and even unwanted effects on relevant behavioral choices and judgments. In particular, we investigate the potential for objects drawn from the world of business—with their strong associations to

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competitive and self-interested norms (see Kay & Ross, 2003; Liberman, Samuels, & Ross, in press)—to automatically influence social perceptions and judgments in a predictable, unconscious, and often counter-productive manner.

Implicit construct activation, material anthropology, and object meaning

A quarter-century of implicit priming research leaves little doubt that subtle, even subliminal, environmental stimuli can influence social perceptions, decision processes, and, to at least some extent, behavior as well (e.g., see Baldwin, Carrell, & Lopez, 1990; Bargh, Chen, & Burrows, 1996; Bargh, Gollwitzer, Lee-Chai, Barn-dollar, & Trötschel, 2001; Higgins, Rholes, & Jones, 1977). In particular, semantic primes and primes involving names and images of other people have been shown to affect perceptions of others (e.g., Higgins, 1996), construals of the normative demands of social situations (e.g., Baldwin & Holmes, 1987; Kay & Ross, 2003), interpersonal processes (Fitzsimons & Bargh, 2003) and even motivated behaviors (Bargh et al., 2001). However, despite the abundance of research on priming effects and related implicit processes (for a review, see Higgins, 1996), the extent to which potential sources of such priming include physical objects drawn from relevant social situations remains unclear.

Two reasons for this lacuna in the available body of priming research can be noted. First, researchers in this area historically have been more interested in studying the *consequences* of variations in cognitive accessibility accomplished by priming than in studying the range of circumstances that might influence such accessibility in everyday circumstances (for an exception see Higgins & King, 1981). Second, the emphasis in the majority of this work has been on documenting the existence and nature of implicitly generated thoughts and behaviors rather than on understanding the everyday circumstances in which they might actually manifest themselves (but see Bargh, Raymond, Pryor, & Strack, 1995). Accordingly, most research has relied upon either semantic primes that are unambiguously and simply linked to the constructs they were introduced to activate (see Higgins, 1996), and/or animate primes that serve to activate clear prototypes or stereotypes of particular classes of actors (e.g., Baldwin et al., 1990; Payne, 2001).

Some researchers, to be sure, have used non-social objects as part of their investigations. Most notable in this regard, perhaps, was Berkowitz's (1968) seminal demonstration that aggression, especially among already angry college students, becomes more intense following casual exposure to a gun. Yet very few investigators have focused directly on the nonconscious role that mundane inanimate objects—that is, objects that are both very *common* and relatively *subtle*—can

play in directing everyday interpersonal judgments and perceptions, especially those judgments and perceptions that occur in regular social contexts (such as business settings) in which the objects in question are commonly embedded. As Williams and Costall (2000) reflected,

Psychology appears to have special problems with objects. To the limited extent that psychology even touches upon things, they have been regarded as existing primarily in a physical, asocial realm, as distinct from the socio-cultural domain of people (p. 97).

The lack of interest in material objects and their influence displayed by most social psychologists stands in sharp contrast to the emphases of social anthropologists—especially those who label themselves “material anthropologists.” In fact, these social scientists make material objects their unit of analysis in attempting to understand the beliefs, ideas, and values of a given society at a given time (Dittmar, 1992). Implicit in this method of study is the belief that material objects hold representations and meaning beyond their physical shapes and functions (see Miller, 1998), that “things, both natural and man-made, are appropriated into human culture in such a way that they represent the social relations of culture, standing in for other human beings, carrying values, ideas, and emotions (Dant, 1999, p. 11).” Over time, cultures and societies are thought to imbue inanimate objects with implicit meanings—meanings that can become very salient in the collective consciousness of a given society (e.g., Graves-Brown, 2000; McCracken, 1987; Miller, 1998). Such objects, moreover, are thought to serve as conveyors of ritualized behavior, helping those who share a material culture to know how to behave “appropriately” in a given context. In other words, familiar objects and the meaning systems they activate may help to define and disambiguate potentially ambiguous situations, thereby providing people both with common psychological interpretations and with overlapping behavioral inclinations (see Berger & Luckmann, 1966).

The social cognition tradition in social psychology adds an important notion to this anthropological account—the notion that social beings are generally “cognitive misers” (Fiske & Taylor, 1991). It is asserted that people generally prefer to respond to situations in a cognitively effortless fashion, devoting attentional, and analytic resources to controlled, deliberative, processing of information, and decision-making only reluctantly, and only when it is clearly necessary to do so (Bargh & Chartrand, 1999; Baumeister & Sommer, 1997). It seems likely, then, that it will be in novel or ambiguous social situations—in which people do not already possess a clearly established cognitive script and therefore need to rely upon other means of preserving cognitive resources—that judgments and perceptions are most likely to be affected by environmental material cues.

Considered in conjunction, these anthropological and social psychological traditions suggest a testable prediction. Given that semantic primes and person primes have been shown to exert effects on perceptions and behavioral choice via increasing the accessibility of relevant and applicable cognitive constructs (see Higgins, 1996; Srull & Wyer, 1979), it is reasonable to predict that nonconscious exposure to objects that manipulate construct accessibility should produce similar influences on relevant choices and perceptions. That is, if certain inanimate objects (such as those drawn from business contexts) come to assume implicit psychological meanings (such as competitiveness), then when embedded in ambiguous and/or novel situations, exposure to such objects may (without the individual's conscious awareness) produce the following: (1) increases in the cognitive accessibility of constructs related to those object-generated meaning systems, (2) corresponding changes in the perception or disambiguation of relevant social contexts, and (3) corresponding changes in observed decisions and behavioral choices.

Through the use of objects and images from the business domain in demonstrating the feasibility of such a process, we hope, in broadest terms, to increase our understanding of the manner in which people and their physical environments interact. More specifically, we hope: (1) to demonstrate the ecological validity and potential real-world significance of earlier research on automatic behavior and nonconscious priming (see Bargh et al., 1996; Chen, Lee-Chai, & Bargh, 2001; Dijksterhuis & Bargh, 2001; Fitzsimons & Bargh, 2003; Higgins, 1996), and (2) to contribute to ongoing discussions about the (potentially destructive) consequences of competitive orientations during negotiation (Forgas, 1998; Maxwell, Nye, & Maxwell, 1999; Pruitt & Carnevale, 1993).

Material priming in business contexts

Before proceeding to the details of the research, however, it is worth briefly addressing why the preceding analysis should be applicable to objects drawn from (and behaviors relevant to) organizational and business settings. First, given the relatively strong competitive and capitalistic stereotypes surrounding the business world, we reasoned that objects drawn from this context are likely to possess particularly robust and powerful connotations. Indeed, previous research offers some evidence that such associations exist. For example, Kay and Ross (2003) demonstrated that priming participants with words related to the construct of competition led participants to rate the "Wall Street Game" as a significantly more appropriate name than the "Community Game" for the relevant mixed-motive dilemma (also see Liberman et al., in press).

Second, automatic and implicit psychological processes are likely to be of considerable relevance to the

routinized and fast-paced atmosphere in which business interactions take place. Indeed, several researchers are beginning to pay increasing attention to automatic cognitive processes and implicit primes that exert influence in the context of bargaining and/or negotiation (for a review, see Bazerman, Curhan, Moore, & Valley, 2000; Neale, 1984). Increases in the salience and cognitive accessibility of gender stereotypes, for example, have been shown to have dramatic effects on the extent to which women conform to, versus react against, their "stereotypical" negotiation styles (Kray, Thompson, & Galinsky, 2001). Similarly, semantically priming the construct of *fairness* has been shown to produce significant changes in price negotiations, leading participants to engage in more cooperative bargaining strategies (Maxwell et al., 1999).

The present research

The empirical goals of the studies to be reported can be summarized as follows: By employing as stimuli common material objects from the business world—i.e., objects such as briefcases, boardroom tables, and fountain pens (or images of such objects)—we sought to accomplish four goals. First, we sought, in Study 1, to demonstrate that seemingly chance exposure to inanimate objects, or even the pictorial representation of those objects, can in fact increase the cognitive accessibility of the particular knowledge structures that are associated with those objects. We then sought, in studies 2, 3, and 4, to demonstrate that exposure to such images, or to the objects themselves, can also produce relevant changes in social and business-relevant perceptions and behavioral choices. Finally, in Study 5, through manipulating the explicitness of the normative demands surrounding the context in which these behavioral judgments are made, we sought to provide initial evidence that material primes are most likely to affect behavioral choices when normative demands are least explicit (or, conversely, most ambiguous).

Study 1

Our first study was designed to demonstrate that pictorial representations of everyday material objects, such as those linked to business situations, can automatically increase the cognitive accessibility of the norms and other concepts associated with those situations—in this case the norm and concept of competition in particular and other aspects of self-interested behavioral choices in general. To do this, we first exposed participants to pictures and descriptions of either business-related or neutral stimuli in the context of a simple "matching" task. Then, in an ostensibly unrelated word-completion task, participants were asked to complete a

series of word fragments, several of which afforded opportunities for competition-relevant completions. Our prediction was simply that the relevant material priming would result in more competition-relevant word completions than that observed in the (neutral image) control condition.

Method

Participants

A total of 67 university students, recruited across the Stanford University campus, participated in the study in exchange for a one-dollar lottery ticket.

Materials and procedure

Participants were told they would be taking part in two unrelated experiments; the first involving measurement of “common associations” and the second involving a test of a particular type of “verbal ability.” The first task, which allowed us to manipulate exposure to business-related objects, simply required the participants to match each of the pictures on the right side of a page to descriptors on the left side of the page by drawing a line from each picture to the relevant descriptor. (To add to the credibility of our claims regarding the purpose of this task, participants were also asked to place a star beside any association that took longer than 30 s to complete.)

In the case of participants in the *business materials* condition, the set of descriptors and corresponding pictures included a “fountain pen,” a “man’s suit,” a “circular table” (actually a boardroom table), a “women’s suit,” a “dress shoe,” an “empty oak table” (actually a boardroom table), and an “empty long table” (actually a board room table). In the case of participants in the *neutral control* condition the descriptors and corresponding pictures included a “kite,” a “stapler,” “sheet music,” a “whale,” a “plug,” a “toothbrush,” and a “phone.”

To assess the impact of the relevant experimental manipulation on the activation and subsequent cognitive accessibility of the construct of competition, the second task employed a standard word-completion task in which participants were presented with a list of word fragments and simply asked to complete each fragment in a manner that created an actual word. We presented each participant with a list of 24 word fragments, in which were embedded a subset of nine fragments that provided an opportunity for completions that clearly connoted competition (or “zero-sum” or “us versus them” thinking). The relevant fragments (and potential competition relevant completions) were as follows: *_in* (*win*), *_ower* (*power*), *wa_(war)*, *_ake* (*take*), *_ight* (*fight*), *c__p__tive* (*competitive*), *en___* (*enemy*), *ar___* (*argue*), *bea_(beat)*.

The total number of competition-relevant word completions provided by each participant was our pri-

mary dependent variable measure. The 6th fragment above, i.e., *c__p__tive*, which offered two obvious, contrasting, choices—i.e., *competitive* and *cooperative*—provided a separate dichotomous measure of concept accessibility.

After the participants completed their two tasks, they were debriefed with regard to their awareness or suspicion of the manipulation and/or purposes of the study according to a standardized funneled debriefing procedure (see Bargh & Chartrand, 2000), thanked for their participation, and excused. No participants reported any awareness of the true purposes of the task providing our independent variable manipulation, the intent of our dependent variable, or the possible linkage between the two tasks and the purpose of the experiment as a whole.

Results and discussion

Two separate analyses were performed to assess the effects of the two types of pictures on the cognitive accessibility of the construct of competition. First, a one-way ANOVA was performed to examine the effects of experimental condition (two levels: business pictures and neutral pictures) on the total number of word fragments completed using the competition-relevant words. This analysis yielded a significant effect of condition, $F(1, 65) = 9.92$, $p < .01$ ($\eta_p^2 = .13$), indicating that participants exposed to the pictures of the business-relevant materials completed significantly more word fragments using competition-relevant words ($M = 3.09$, $SD = 1.00$), than participants in the neutral condition ($M = 2.21$, $SD = 1.27$).

The predicted impact of the independent variable manipulation was also confirmed by a simple 2×2 χ^2 test comparing the proportion of participants in the business-relevant priming condition who completed the word fragment ‘c__p__tive’ by forming the word *competitive* rather than any other word (24 of 34, or 70.6%) with the proportion of participants in the neutral condition who did so (14 of 33 or 42%), $X(1) = 5.41$, $p < .05$.

These findings lend support to the argument that material objects with a particular social and normative relevance within a given culture—and indeed pictorial representations of such objects—can influence the cognitive accessibility of the broader knowledge structures linked to those representations. Theoretically, then, these same material primes should also lead to predictable effects on social perceptions and behavioral choice—that is, perceptions of social contexts and the demands and constraints presented by the relevant context itself, and behavioral choices made in that context. Study 2 begins by investigating the effect that our priming task could exert on perceptions of an ambiguous social situation itself.

Study 2

Our earlier conceptual analysis suggests that objects in one's environment may serve to implicitly communicate meanings and norms when a situation is novel or ambiguous, thereby providing a guide to one's behavior in absence of any conscious deliberation or other expenditure of cognitive resources. Study 2 pursued this conjecture by first priming participants through use of the same matching task used in Study 1. In this study, however, the second, ostensibly unrelated task participants undertook required them to read and interpret the events described in a ambiguous vignette describing a social interchange between two actors.

Method

Participants

A total of 42 undergraduate students recruited from an introductory psychology class participated in the study, for which they received credit toward a course requirement.

Materials and procedure

As in Study 1, participants were told they would be taking part in two unrelated experiments—the first involving measurement of “common associations” and the second involving a test of verbal ability. The first task was identical to that of Study 1.

To assess the effect of the two conditions on perceived situational norms, the second task presented the participants with the following vignette, which had been written in a manner that left ambiguous several details about the specific nature of, and context for, the two actors' responses, and aimed to make the situation as ambiguous as possible with reference to the precise nature of the meeting:

Geoff walks into the room at around 3:15. He has short, dark brown hair and is wearing his usual outfit. David, who arrived about ten minutes earlier than Geoff and has been passing the time by reading today's newspaper, is already sitting at the table with his stuff spread out in front of him. The two of them shake hands, briefly exchange pleasantries, and then immediately begin discussing the issue at hand. David's suggestion is fairly extreme, and a bit surprising to Geoff. Geoff, on the other hand, suggests a more moderate idea, which, as usual, amuses David. After sharing these initial opinions with each other, the two then spend around ten minutes discussing the Atlanta Braves World Series chances. Afterwards, they return to their discussion of the issue at hand, and remind each other of each of their respective plans. Geoff, as usual, thinks David is being unrealistic, and David, as usual, thinks Geoff is being stubborn. Then, after a few sharp words and a bit of kidding around, the two agree and head their separate ways.

After reading this account of the interaction between Geoff and David, participants were asked to answer a series of four questions designed to measure the extent

to which they interpreted this situation to be one that involved “competitive, self-interested” motives as opposed to “cooperative, pro-social” motives, in each case accompanied by a relevant 9-point rating scale. These four questions were, (1) “Do you feel the interaction between Geoff and David is better described as ‘adversarial’ or ‘friendly?’” (1 = ‘very friendly,’ 9 = ‘very adversarial’), (2) “To what extent did the situation above seem to be competitive versus cooperative?” (1 = ‘very cooperative,’ 9 = ‘very competitive’), (3) “To what extent do you feel both Geoff and David were involved in a discussion versus an argument?” (1 = ‘definitely a discussion,’ 9 = ‘definitely an argument’), and (4) “Do you think it is more likely that Geoff and David were ‘on the same side’ (i.e., looking out for each others' mutual interest), or were coming from sides with opposite interests?” (1 = ‘definitely on the same side,’ 9 = ‘definitely on opposing sides’). The responses to these four questions were then averaged to form a composite measure of “competitive versus cooperative” construal of the relevant interaction.

After the participants completed both tasks, they were once again thoroughly debriefed for any awareness or suspicion of the manipulation and/or purposes of the study using the funneled debriefing procedure, thanked for their participation, and excused. As in Study 1, no participants reported any awareness of the true purposes of the task providing our independent variable manipulation, the intent of our dependent variable, or the possible linkage between the two tasks and the purpose of the experiment as a whole.

Results and discussion

To assess the effects of prior exposure to the two types of pictures on perceptions of the competitive versus cooperative nature of the situation, a one-way ANOVA was performed on the overall situational construal ratings. This test yielded a significant effect of condition, $F(1, 40) = 16.22$, $p < .001$ ($\eta_p^2 = .29$), confirming that participants exposed to pictures drawn from the world of business perceived the social situation to be significantly less about cooperation ($M = 4.78$, $SD = 0.86$) than did those participants exposed to the neutral pictures ($M = 3.60$, $SD = 1.02$).

Thus, as well as increasing the cognitive accessibility of the constructs with which they are associated (Study 1), material primes can also influence the manner in which people interpret ambiguous accounts of social interactions—even when the material primes are not logically “relevant” to the interactions in question. This finding—i.e., that material primes can implicitly influence social perceptions—lends support to our contention that object meanings may alert people to the normative demands and expectations of social situations without their conscious awareness of the relevant influence, or

the need for any expenditure of conscious resources. Moreover, given research indicating the role of primed social perceptions in producing primed behavioral intentions (Kay & Ross, 2003), these findings also suggest that material primes may also produce meaningful changes in behavioral choice.

To this end, the task of the third study was to determine if similar influences can be seen in terms of the priming of actual behavioral choice—in particular, behavioral choices relevant to the associations and norms addressed in our two prior studies. After a similar priming manipulation, participants were confronted with a bargaining problem that obliged them to decide between a cooperative strategy that essentially guaranteed them and their counterparts a modest positive outcome, and a riskier, more competitive strategy that had the potential to maximize their own personal outcome by exploiting the constraints upon their counterpart.

One other change in procedure from our two earlier studies is worth noting. The task used in those studies to expose participants to the relevant pictures included a verbal descriptor to which the pictures were to be linked by the participants. To show that the pictures alone can accomplish the relevant priming effects even in the absence of the one-word labels, the priming task employed in our third study was altered so that no such labels were ever provided.

Study 3

Our third study was designed to assess the impact of business-relevant material primes on response choices made by participants in the “Ultimatum Game”—an interaction context that obliges one participant to propose a division of money that a second participant can either accept or reject (see Guth, Scmittberger, & Schwarz, 1982; Messick, Moore, & Bazerman, 1997; Robert & Carnevale, 1997; Thaler, 1988). The dilemma facing the ultimatum giver is normally analyzed in strategic terms—that is, determining how small an amount can be offered (realizing that one’s counterpart faces a take-it-or-leave-it proposition in which the acceptance of any offer is “better-than-nothing”) without so offending the other participant’s sense of fairness that he or she opts to “punish” the ultimatum giver, at some personal cost, by rejecting the ultimatum. But the dilemma is also a normative one, since both participants realize that an equal division would be welcomed, accepted, and deemed perfectly “fair” by the recipient.

The focus of Study 3 was the impact of the business-relevant vs. control condition images on the ultimatum-givers’ decision to opt for a maximum personal outcome (by offering his or her counterpart less than half of the available money) rather than proposing an equal divi-

sion. Participants first completed a “visual perception” task in which they were asked simply to rank order a row of pictures with respect to their height. For one half of the participants, these pictures were of objects found in, and associated with, the world of business (e.g., a briefcase or a boardroom table). For the other half of the participants, the objects portrayed were neutral or irrelevant with respect to that domain (e.g., an electrical socket, or a telephone). Then, in a second (and ostensibly separate and unrelated) task, they were assigned the role of ultimatum giver in the relevant game and asked to propose a division of the available purse to their counterpart (who was in fact an experimental confederate). Although it is possible, and certainly more efficient, to have participants partake in the ultimatum game with a fictional or make-believe other that they never encounter, given the interpersonal and social nature of our theoretical argument, we reasoned that using a confederate—which the participant actually sees and briefly interacts with—would offer us a more relevant experimental context.

Methods

Participants

A total of 25 participants were recruited from an introductory psychology class. Each participant received credit in partial fulfillment of a course requirement. The responses of two of our participants, however, were omitted from our ultimate data analyses—one because his English language comprehension was very limited and it was clear that he did not understand our explanation of the “rules” of the game, and one because she had recently taken part in another experiment that had employed a confederate and she stated that she had never believed that her counterpart was another naïve participant.

Materials and procedure

Participants were scheduled on the half hour and instructed to report to a specific room. A couple of minutes after the participant’s arrival, the confederate (a male sophomore who was ostensibly “a little late”) arrived as well. The experimenter then asked the confederate to sit down in a chair directly across the table from the naïve participant and to sign a consent form so that “we can get started.”

The experimenter proceeded to explain that the participants would be taking part in two separate studies, one that would require them each to provide “individual data,” and one that would require them to provide data from the two of them acting “as a pair.” The first task, described as a visual perception task, required them to rank-order the five pictures in each of 12 rows from shortest to tallest by placing numbers from 1 to 5 in the space under each picture. (All of the pictures had been

made very similar in height, so that the participants would have to pay close attention to each, although not to the nature of the object portrayed, in order to rank order them properly.) Participants saw one of two versions of this task. Those in the business objects condition were exposed to pictures of objects from the world of business (briefcases, boardroom tables, fountain pens, dress shoes, business suits, etc.), while those in the neutral condition were exposed to neutral pictures (kites, electrical sockets, turkeys, whales, sheet music, etc.).

Participants were seated in separate rooms and told that the second task would be explained to each of them individually as soon as they completed the first task. (The confederate always finished the first task before the actual participant, and, thus, ostensibly also had the second task explained to him first.) When the participant reported to the experimenter that he or she had also completed the first task, the experimenter immediately explained the rules of the Ultimatum Game. The participant was told that s/he, along with the “other participant,” would have a chance to earn and keep real money, “anywhere from 0 to 10 dollars,” depending on “how the situation plays itself out.”

The participant, still isolated from the confederate, was then told that one of two slips of paper in a cup read “offer” and one read “decision,” and that whoever received the slip marked “offer” would receive 10 dollars and then have an opportunity to propose a division of that sum between himself/herself and the other participant which that other participant could either accept or could reject (in which case neither participant would receive any money). The experimenter added the clarification that “whoever chooses the offer slip has to decide both how s/he wants to divide the money, and what proposal the other participant is likely to accept or reject.”

Next, the participant was told that, “because you arrived first, it is up to you to decide if you want to pick the slip out of the cup yourself, or to have the other participant do it.” Both slips actually contained the word “offer.” Thus, when the participant chose to pick the slip (which was the case for all but two participants) he or she invariably picked one reading “offer”; and in the (two) other cases, in which the participant opted to have the other individual make the choice, the confederate declared (very loudly from the other room) that he had picked the slip bearing the word “decision.” Accordingly, the naïve participant inevitably was obliged to decide what division of the 10-dollar purse to propose as an ultimatum to his or her counterpart. Once that proposal had been communicated to the experimenter, he wrote it down and took it to the “other participant.” The amount of money in the “ultimatum” offer made by the participant served as our key dependent variable measure.

Afterwards, the participants were thoroughly debriefed as to whether or not they suspected that the other individual had been a confederate or had suspected there to be any connection between the first and second tasks they had been asked to undertake. Except for a single case in which the participant had suspected our use of a confederate (which, as noted earlier, led us to exclude her data in our subsequent analyses) no such suspicion was voiced. All participants were then given the entire 10-dollar amount, asked not to discuss the experiment with any of their classmates, and thanked for their efforts.

Results and discussion

All participants either proposed a 50–50 split of the 10 dollars or proposed to keep more than 5 dollars for themselves. Our first analyses therefore simply examined the proportion of participants in each experimental condition who proposed a 50–50 division of the money by offering their counterpart \$5 (i.e., a non-strategic, pro-social, and cooperative response) and the proportion who opted to offer their counterpart less than \$5 (i.e., a strategic, self-serving, and competitive response). A $2 \times 2 \chi^2$ (cooperative behavior versus not cooperative behavior \times business pictures versus neutral pictures) analysis yielded a significant effect of the experimental manipulation, $X(1) = 7.99$, $p < .01$. More specifically, whereas fully 10 of 11 participants (i.e., 91%) in the control condition proposed an even split of the money, only 4 of 12 participants (i.e., 33%) in the business-related pictures condition proposed an even split.

Next, given that this dichotomous measure of cooperation versus competition is in some sense a subjective dichotomy, we also conducted an analysis in which we treated the exact amount of money offered to the confederate as a continuous dependent variable measure in a one-way ANOVA that included experimental condition (business-related versus neutral pictures) as the controlled factor. This analysis, as expected, yielded a significant effect of condition, $F(1, 21) = 10.01$, $p < .01$ ($\eta_p^2 = .32$). More specifically, participants who had previously been exposed to the business-related pictures subsequently acted more competitively, offering less money to the confederate ($M = \$4.25$, $SD = .72$) than did participants who had previously been exposed to the neutral pictures ($M = \$4.96$, $SD = .15$).

Thus, it appears that prior exposure to images of business-related objects can produce changes not only in cognitive accessibility of concepts and in situational construals, but also in the explicit behavioral choices (that involve real financial stakes) that should logically follow from these changes in perception and cognitive accessibility. Furthermore, these behavioral effects again occurred without participants discerning any connection between their prior exposure to a particular class of

culturally meaningful stimuli and their subsequent behavioral choices.

To fully support our theoretical argument, however, and the real-world consequences we have suggested result from this argument, a more ecologically valid test is still needed. That is, it is important to ensure that the material priming effects of the sort shown in our first three studies are not only limited to instances in which the material objects are represented pictorially, but also occur when these objects are physically present in relevant physical environments.

Although it seems likely that pictured and actual objects should generate the same effects, it is nonetheless possible that the effects of objects in the actual environment will not mirror those of pictorial representations of those objects. One possibility, for example, is that people may possess (both intentional and/or unintentional) cognitive gating mechanisms that would restrict the automatic influence of material objects on subsequent perception and behavioral choice, and instead maximize personal control. By embedding our priming manipulations in Studies 1–3 in an unrelated task, we may have been able to avoid these types of gating mechanisms. To rule out this possibility (and other related ones), Study 4 once again focused on monetary allocations during an ultimatum game-like situation; in this study, however, participants were primed with actual objects embedded in the experimental environment.

Study 4

Methods

Participants

A total of 24 participants participated in exchange for \$10 payment. (In order to preserve the ecological-validity of the bargaining exercise, all the participants signed-up believing they were to be paid “up to \$10,” but all were actually paid the full \$10.)

Procedure

Participants were scheduled on the half hour and instructed to report to a specific room. Once seated, they were told they would be partaking in several different experiments, the first set of which they would perform in the room they were currently seated, and the second half of which they would perform on a computer in the computer lab down the hall. They were also told that another participant was to arrive at the same time as them, and would do the computer half of the session while they were performing the paper and pencil half, and vice-versa.

Several steps were taken to ensure that participants believed this account. First, on the sign-up software, two

different experimental room locations were posted. Second, one day before the experiment, the experimenter emailed the participants to tell them there would be two groups of participants, and that group A was to report to one room and group B to the other room. Third, signs were posted in the hallway that reminded participants to go to one of two rooms. Finally, during the experiment, the experimenter frequently left the room to “check on the other participants.” (In debriefing, only two participants indicated disbelief regarding this deception, which was critical because the participants’ primary task involved the proposal of an ultimatum to this “other participant.” The data they provided were therefore omitted from the subsequent analyses).

The participants were then given a written explanation of the ultimatum game (see Study 3), and asked to complete the questions that followed. They were specifically told that they were to propose a division of their \$10 with a participant currently performing the “computer task” in the other room, and that when they moved to the computer task in the session to follow, that other participant would decide whether to accept or reject their offer. The relevant questionnaire item instructed the participants to “Please indicate here how much of the \$10 you would like to offer to the other player ____.” Once the participants had filled in their proposed division of funds, they placed the sheet with their responses in a receptacle in the center of the table.

Object manipulation

For half the participants, this task was performed in the presence of objects related to business contexts. Thus, when these participants walked in the room, they found a briefcase and an executive black-leather portfolio sitting on the table at which they were seated (the table was very large—large enough to seat 12 people—and the items were placed at the far end of the table, away from the participant’s seat). They also found an executive-style pen (i.e., silver, wide barrel) on the table right in front of them. The experimenter removed the experimental materials from the briefcase, and participants were instructed to place their completed questionnaires into the executive portfolio sitting on the table (so that “the responses would remain anonymous”). For the other half of the participants, a black backpack replaced the briefcase, a cardboard box replaced the executive portfolio, and the participants were given a standard, wooden pencil rather than an executive pen.

Follow-up questionnaire

After the participants had placed their offers in the designated receptacle (either the cardboard box or the executive portfolio), they were asked to complete a free-response question designed to assess awareness of the manipulation. The question asked them to write out

what factors they thought contributed to their decision. Specifically, the instructions read as follows:

We are interested in the factors that contribute to the offers people choose to make in this situation. In the space provided, please briefly tell us what factors, if any, contributed to your decision to offer the amount of money you did.

They were then given eight lines to write out whatever they chose. Analyses of this debriefing measure indicated no clear awareness of a possible influence of the objects. Not a single participant mentioned any influence remotely related to the physical environment. Instead, participants generally cited either: (1) their general beliefs about fairness and/or (2) their expectations of what would be accepted by their counterparts.

After answering this question, each of the participants was debriefed, told about the purpose of the experiment, probed again for awareness (still no one reported any), and given all of the \$10 regardless of the division of funds they had proposed.

Results and discussion

The main analysis involved examining the effects of the business and non-business item conditions on the monetary offers. To this end, as in Study 3, we first conducted a chi-square analysis, in which we treated competitive offers (offers of less than \$5) and cooperative offers (offers of \$5 or more) as separate dichotomous responses. The $2 \times 2 \chi^2$ (cooperative behavior versus not cooperative behavior \times business objects versus control analysis) analysis yielded a significant effect of the experimental manipulation, $X(1) = 6.88$, $p < .02$, indicating that whereas all 10 of the participants (i.e., 100%) in the control condition proposed at least an even split of the money, only 6 of 12 participants (i.e., 50%) in the business-objects condition proposed an even split.

Next, treating the dependent measure as a continuous variable, a one-way ANOVA was performed on the monetary offers across both the object conditions. This analysis revealed the predicted significant effect of condition, $F(1, 20) = 5.8$, $p < .03$ ($\eta_p^2 = .23$), indicating that participants opted to offer their counterpart less money (or, likewise, opted to retain more money for themselves) when in the presence of the business objects ($M = \$3.89$, $SD = 1.83$), than in the presence of the non-business objects ($M = \$5.70$, $SD = 1.63$).

These results again support our general contention regarding the role played by material objects in producing situationally relevant behavioral choices. Indeed, the findings in Study 4 mirror those of Study 3; participants acted in a more self-interested and competitive manner following exposure to the business environment primes, even though these primes were now embedded in the actual physical environment. This result, as we had hoped, attests to the ecological validity and/or potential

“real-world” significance of implicit priming effects, and further suggests the role that such priming can play in promoting counter-productive behavioral choices in organizational settings. Our fifth and final study was designed to further refine our analysis and shed light on the nature and type of situations in which material priming effects will be most (versus least) likely to occur.

Study 5

A central function of material primes, we have reasoned, is to aid in the disambiguation of social situations, and to help minimize the cognitive resources that must be expended in discerning operative norms that facilitate social coordination. Implicit in this argument, is that material primes will be most relied upon, even if non-consciously, in situations where such norms and expectations are relatively ambiguous. This contention, we note, is consistent with findings from the priming and person-perception literature, which suggest that semantic priming is generally only effective at manipulating person-perception to the extent that the perceptual targets are described somewhat ambiguously (see Higgins, 1996).

We predicted, accordingly, that material primes, and material priming manipulations, may exert a non-trivial impact on subsequent cognition and judgment in those situations in which situational norms remain relatively ambiguous, but fail to exert such impact in those situations wherein those norms are clearly defined. In other words, material priming effects may be moderated by levels of situational ambiguity. We tested this prediction in Study 5 by employing a 2×2 design that crossed both the priming condition (business primes versus neutral primes) with the level of situational ambiguity (defined versus undefined). In this study, we once again assessed the effects of the primes on behavioral choice (this time using the Prisoner’s Dilemma), and also once again employed pictorial representations of the relevant materials. However, to ensure the neutrality of the stimuli presented in our control condition, in Study 5 we replaced the pictures used as stimuli for the control conditions in Studies 1–3 (e.g., a kite, a stapler, sheet music, a whale, a plug, a toothbrush, and a phone) with pictures only of stacked and solitary, black and white, plastic cups.

Methods

Participants

Seventy-three Stanford University undergraduates participated in exchange for course credit.

Procedure and materials

The experiment was presented under the guise of two separate studies. The first involved the same priming

manipulation that was used in Study 3, although this time it was only one page long, rather than three. Half of the participants were asked to judge the relative sizes of pictures of items drawn from business contexts (e.g., briefcases, boardroom tables, fountain pens, etc.) and half were asked to rate the relative sizes of pictures of plastic cups.

Next, all of the participants were asked to offer a hypothetical response to the payoff matrix characteristic of the Prisoner's Dilemma. For half of the participants, the dilemma in question was always referred to as the "Community Game," and for half it was simply referred to as the "situation." Our assumption was that labeling the Prisoner's Dilemma the Community Game (i.e., the explicit norm condition) would lead to more explicit and clearly defined norms (Liberman et al., in press) than referring to the game only as the situation (i.e., the non-explicit norm condition). Specifically, the instructions for both conditions read:

[The Community Game/The Situation]

In [the Community Game/this situation], two people are each told they have one move (in which they can pick either move A or move B) to collect as many points as possible, and that depending on how their move compares to their partners move, each person will be allocated anywhere from 5 to 25 points. Each person then has the following allocation rules explained to them: If both choose A, both get 20 points. If one chooses A and the other chooses B, A gets 5 points and B gets 25 points. If both choose B, both get 10 points.

Once both members of the pair understand the allocation rules, they select either move A or move B (without any knowledge of what the other person has selected). The two moves are then compared and points are allocated accordingly.

If you were to partake in [the Community Game/the situation just described to you] and knew nothing about the identity of the other person other than s/he is a Stanford student, do you think you would choose move A or B?

Responses were then made on a five point scale ranging from "definitely move A," to "50/50 chance of move A or B," to "definitely move B." Higher numbers, therefore, indicated a more competitive, or less communal, decision.

Results and discussion

Our prediction was that that prior exposure to pictures of business objects would lead to more competitive behavioral intentions in the prisoner's dilemma than exposure to pictures of neutral objects, but only in the non-explicit condition. To test this prediction, a two-way univariate ANOVA was performed on the continuous measure of behavioral intentions, in which both priming condition (business versus neutral) and ambiguity level (explicit versus non-explicit) were entered as manipulated factors. A main effect of ambiguity level (but not priming condition) was obtained, $F(1, 69) =$

4.63, $p < .05$ ($\eta_p^2 = .06$), indicating that participants acted more cooperatively when the Prisoner's Dilemma was explicitly labeled the Community Game, than when it was ambiguously labeled the situation ($M = 2.58$, $SD = 1.30$ and $M = 3.26$, $SD = 1.41$, respectively).

Of most importance, the interaction between priming condition and ambiguity level also reached significance, $F(1, 69) = 4.10$, $p < .05$ ($\eta_p^2 = .06$), indicating that the priming manipulation affected behavioral intentions in the ambiguous, non-explicit condition, but not in the less ambiguous, explicit condition (see Fig. 1). Specifically, this interaction reflected the fact that in the non-explicit norm condition, participants exposed to objects drawn from the business world subsequently reported significantly more competitive behavioral choice intentions than those participants exposed to neutral objects ($M = 3.75$, $SD = 1.42$ versus $M = 2.79$, $SD = 1.27$), $F(1, 35) = 4.71$, $p < .05$ ($\eta_p^2 = .12$), whereas in the explicit norm condition the relevant means ($M = 2.45$, $SD = 1.19$ versus $M = 2.75$, $SD = 1.44$, respectively) showed no such effect, $F(1, 34) = .49$, *ns*.

The results of this fifth study, therefore, are supportive of our contention that material priming effects are most likely to occur during conditions of high situational ambiguity. When the norms of the prisoner's dilemma were made explicit—i.e., when the game was labeled the Community Game—the relevant images exerted no discernible priming effect. Only when no hint regarding operative norms was provided did exposure to the business objects lead to more competitive, or less communal, behavioral intentions.

General discussion

Research on the effects of implicit priming conducted by investigators in the social cognitive and social psychological traditions (e.g., Bargh & Chartrand, 1999;

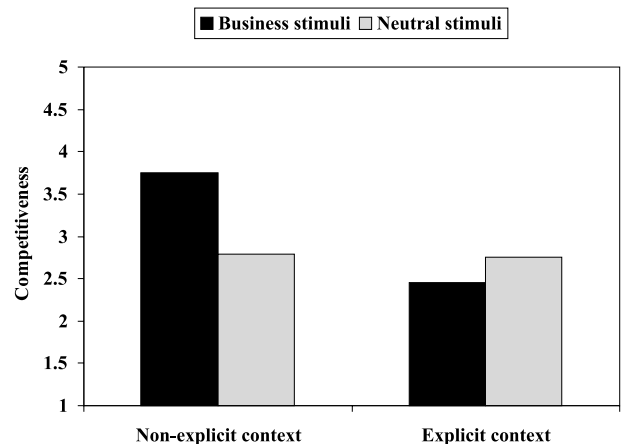


Fig. 1. Effect of exposure conditions (business materials and neutral materials) and explicitness conditions (explicit norms and non-explicit norms) on competitive behavioral intentions in the prisoner's dilemma.

Higgins, 1996) and work in anthropology on the importance of material culture (see Dant, 1999; Miller, 1998) prompted the present studies on the effects of implicit material priming. The studies focused on the impact of such images and objects on the cognitive accessibility of associated concepts or meaning systems, and on assessments and decisions relevant to those meaning systems.

In particular, we found that prior exposure to business-related pictures and objects led our research participants to generate more competition-relevant word completions, perceive more competitiveness in an ambiguous social interaction, and make more competitive offers in the “Ultimatum Game.” Furthermore, the effects of the primes were moderated by features of the situation, such that primes exerted larger effects in less structured, more ambiguous situations (Study 5). All of these effects, it is important to note, occurred without participants’ conscious awareness that their responses had been influenced by the primes.

Theoretical and practical implications

In their influential paper, Berger and Luckmann (1966) suggested that members of institutions require, and acquire, a common social ‘language’—an overlapping set of social-psychological interpretations, understandings, and behavioral inclinations. The present research suggests one potential source of that “common language.” That is, exposure to material objects may, even without our awareness, help us to define situations, recognize operative situational norms, activate appropriate roles, and interact in ways that are congruent with those norms and roles (especially among members of the same organization or institution, who are likely to hold highly similar object-meaning associations).

The present findings also have implications for those specifically concerned with the types of social judgments and interactions that occur in particular institutional settings, such as business settings, in which resource allocation decisions are made and negotiations are conducted. Indeed, researchers interested in the psychological processes underlying negotiation judgments and behavior (e.g., Kray et al., 2001; Maxwell et al., 1999) have begun to address the potential role of priming and other nonconscious or automatic processes. To our knowledge, however, the present research provides the first demonstrations that implicit exposure to business-related objects can influence individuals’ decisions to make more and less competitive offers. This insight may be particularly important if one wants to set the stage for negotiations free of a competitive orientation, and of the negative consequences that researchers have suggested may result from that orientation (see Forgas, 1998; Maxwell et al., 1999; Pruitt & Carnevale, 1993).

Limitations and unanswered questions

The present research also raises a number of questions to be addressed in future research. First, all of the present studies focused primarily on one particular domain: the business world. The extent to which similar priming effects could be demonstrated in other important social and organizational contexts is thus another question of obvious interest. For example, will employees aim for more creativity in their work if there happens to be an artists’ easel placed as decoration in their work environment rather than a plastic tree? Future studies that address both the range of objects that can assume meanings and act as primes, and the types of contexts that may be particularly susceptible, or particularly immune, to such influence would demonstrate the range and domain of the present phenomena.

Second, although we have demonstrated that material primes lead to both changes in social perceptions and to changes in social judgments and decisions, the extent to which the latter were in fact mediated by the former remains unclear (see Wheeler & Petty, 2001). Indeed, while some researchers have suggested that the automatic effects of nonconscious primes on behavior may operate indirectly via mediating and intervening changes in social perception (see Wheeler & Petty, 2001), other researchers (e.g., Dijksterhuis & Bargh, 2001) have proposed that the effects of primes on behaviors are essentially unmediated by situational construals. Of course, situational objects and events can exert effects on one’s behavior in more than one way, such as directly through ideomotor means as well as indirectly through effects on situational construals (e.g., Mischel, 1973). In fact, these multiple mechanisms can operate in conjunction. For example, recent research has suggested that although changes in social perception may not always be *necessary* to produce behavioral effects, they may *strengthen* these effects and thereby increase the range of situations in which they can occur (Kay & Ross, 2003).

In addition, intervening changes in situational construal are not the only means through which primes can indirectly affect behavior. Primes can also change behavior by altering perceptions of other actors (Smeesters, Warlop, Van Avermaet, Corneille, & Yzerbyt, 2003), or by activating selective portions of the self-concept that subsequently guide behavior (Wheeler, DeMarree, & Petty, in press). To the extent that these multiple mechanisms act in a congruent manner, the effects of primes on behavior should normally be enhanced. For example, business-related primes could simultaneously lead individuals to perceive the self, the situation, and their negotiation partners as more competitive. All of these factors, in turn, could potentially increase the competitiveness of the individuals both directly (e.g., making them: (a) feel competitive, (b) deem competition more appropriate, and (c) venture a com-

petitive offer so their “competitive” negotiation partner does not take advantage of them) and through feedback loops. For example, perceptions that a negotiation partner is competitive could lead one to make competitive offers. This behavior could then elicit similar behavior in one’s negotiation partner, which would serve to confirm one’s initial biased perceptions (of both the situation and the other person) and exacerbate one’s initial competitive tendency.

In support of this account, research has shown that individuals’ behavior can be altered by stereotype activation, even when they have not themselves been primed. In one experiment (Chen & Bargh, 1997), “perceiver” participants were subliminally primed with black or white faces prior to playing a game with other, non-primed “target” participants via an intercom system. Results indicated that *both* the primed “perceiver” and non-primed “target” participants acted more hostile (as rated by judges blind to the hypothesis) when the former were subliminally primed with black rather than white faces. Mediation analyses indicated that the effect of the primes on the non-primed participants was mediated by the primed participants’ hostility, such that increased hostility in the primed participants elicited increased hostility in the non-primed participants. Additionally, both the primed “perceiver” and non-primed “targets” perceived each other to be more hostile in the black, than in the white, face priming condition.

Hence, through these types of feedback loops, primed constructs can affect social behavior beyond a single action or decision and beyond even the individual who was primed. The present studies limited potential feedback loops, in that participants only made one initial offer, received no feedback, and had only limited (or no) exposure to the recipients of their offers. As a result, our assertions regarding feedback effects with object primes are necessarily speculative and should be tested by further research. However, the effects of the primes in multiple-stage negotiations could potentially be larger than those observed in the present studies, due to these types of feedback mechanisms (see also Wheeler & Petty, 2001).

The third question raised by our present findings is the degree to which, and the circumstances under which, material priming serves to coordinate people’s situation-specific expectations and actions within a given society, organization, or institutional setting. To investigate this question, future research should examine whether and how the presence of objects with shared meanings do in fact serve to facilitate social interactions and reduce the likelihood of unpleasant surprises. Potentially, material objects could facilitate social interactions by providing consensually shared situational interpretations and activating either congruent or complementary self-roles across individuals (see Tiedens & Jimenez, 2003), depending on the idiographic associations they have with those objects.

For example, a classroom desk is likely to activate both overlapping situational construals and divergent self-role associations among students and professors. Material objects could therefore potentially serve to “set the stage” for the ensuing interactions by cuing the appropriate situational definitions, self-definitions, and behaviors for that particular context. This disambiguating and coordination function may be particularly important in a society such as ours, in which people bring both shared and unshared ways of thinking to their many different types of daily social interactions. Future research could examine the extent to which a single set of objects could activate congruent situational construals but divergent roles and self-contents among those with different self-object associations.

Fourth, it should also be noted that the nonconscious influence of material objects may be more or less influential depending on the extent to which the presence of these objects is expected, or unexpected, in the relevant physical environment. On the one hand, given that unexpected objects in the social environment are likely to be more salient than expected objects, it is possible that incongruencies may enhance material priming effects. However, since extremely salient biasing agents have often been shown to lead to explicit correction attempts (e.g., Wegener & Petty, 1997; Wilson & Brekke, 1994), it is unlikely that increased salience would lead to increased material priming effects in a completely linear fashion. On the other hand, given that expected objects in the environment will, all else equal: (a) contradict less with situational norms, and (b) be more likely to hold implicit meanings that are relevant to the given context, they may serve as more *applicable* and thus more effective primes than unexpected objects (see Higgins, 1996). One could also argue, therefore, that congruent objects, rather than incongruent objects, will exert the greatest material priming effects.

Given the general finding in the literature that the most reliable nonconscious priming effects occur in situations that keep the influence of the prime implicit but relevant, and involve dependent measures that possess sufficient response ambiguity (see Higgins, 1996), our intuition is that the greatest differences between the presence and absence of material primes will occur in relevant (i.e., applicable) but ambiguous contexts. Future research that more directly investigates this issue, however, is clearly needed.¹

In conclusion, we hope that the present research demonstrates the value of attending to the material properties of particular social contexts, and the messages they convey both implicitly and explicitly, rather than only the self perceptions and social perceptions of the actors who function within those social contexts.

¹ We thank Margaret Neale for this insight.

Such an endeavor would foster a healthier dialogue between social-cognitive psychologists who have concentrated on the theoretical possibility of non-conscious priming effects on social judgment and behavior, and more traditional social scientists—such as mainstream social psychologists and organizational behaviorists—who see their discipline as a vehicle to understand social phenomena and address important social and organizational issues.

References

- Baldwin, M. W., Carrell, S. C., & Lopez, D. F. (1990). My advisor and the Pope are watching me from the back of my mind. *Journal of Experimental Social Psychology*, *26*, 435–454.
- Baldwin, M. W., & Holmes, J. (1987). Salient private audiences and awareness of the self. *Journal of Personality and Social Psychology*, *52*, 1087–1098.
- Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist*, *54*, 462–479.
- Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). New York: Cambridge University Press.
- Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, *71*, 230–244.
- Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). Automating the will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology*, *81*, 1014–1027.
- Bargh, J. A., Raymond, P., Pryor, J., & Strack, F. (1995). Attractiveness of the underling: An automatic power sex association and its consequences for sexual harassment and aggression. *Journal of Personality and Social Psychology*, *68*, 768–781.
- Barker, R. G., & Wright, H. F. (1955). *Midwest and its children*. New York: Harper & Row.
- Baumeister, R. F., & Sommer, K. L. (1997). Consciousness, free-choice, and automaticity. In R. S. Wyer (Ed.), *Advances in social cognition* (Vol. X, pp. 75–81). Mahwah, NJ: Erlbaum.
- Bazerman, M. H., Curhan, J. R., Moore, D. A., & Valley, K. L. (2000). Negotiation. *Annual Review of Psychology*, *51*, 279–314.
- Berkowitz, L. (1968). Impulse, aggression, and the gun. *Psychology Today*, *September*, 18–22.
- Berger, P. L., & Luckmann, T. (1966). *The social construction of reality*. New York: Irvington Publishers.
- Chen, M., & Bargh, J. A. (1997). Nonconscious behavioral confirmation processes: The self-fulfilling consequences of automatic stereotype activation. *Journal of Experimental Social Psychology*, *33*, 541–560.
- Chen, S., Lee-Chai, A. Y., & Bargh, J. A. (2001). Relationship orientation as a moderator of the effects of social power. *Journal of Personality and Social Psychology*, *80*, 173–187.
- Dant, T. (1999). *Material culture in the social world: Values, activities, lifestyles*. Philadelphia, PA: Open University Press.
- De Saussure, F. (1915). Course in general linguistics. In C. Bally & A. Sechehaye (Eds.), W. Baskin (Tr.). New York: McGraw-Hill.
- Dijksterhuis, A., & Bargh, J. A. (2001). The perception-behavior expressway: Automatic effects of social perception on social behavior. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 33, pp. 1–40). San Diego, CA: Academic Press.
- Dittmar, H. (1992). *The social psychology of material possessions: To have is to be*. United Kingdom: Harvester Wheatsheaf.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). Reading, MA: Addison-Wesley.
- Fitzsimons, G. M., & Bargh, J. A. (2003). Thinking of you: Nonconscious pursuit of interpersonal goals associated with relationship partners. *Journal of Personality and Social Psychology*, *84*, 148–163.
- Forgas, J. P. (1998). On feeling good and getting your way: Mood effects on negotiator cognition and bargaining strategy. *Journal of Personality and Social Psychology*, *74*, 565–577.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.
- Graves-Brown, P. M. (Ed.). (2000). *Matter, materiality and modern culture*. London, England: Routledge.
- Guth, W., Scmittberger, R., & Schwarz, B. (1982). An experimental analysis of ultimatum bargaining. *Journal of Economic Behavior and Organization*, *3*, 367–388.
- Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133–168). New York: Guilford.
- Higgins, E. T., & King, G. (1981). Accessibility of social constructs: Information processing consequences of individual and contextual variability. In N. Cantor & J. F. Kihlstrom (Eds.), *Personality, cognition, and social interaction*. Hillsdale: Erlbaum.
- Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology*, *13*, 141–154.
- Kay, A. C., & Ross, L. (2003). Nonconscious influences and conscious reflection: The interplay of implicit cues and explicit situational construals in the Prisoner's Dilemma. *Journal of Experimental Social Psychology*, *39*, 634–643.
- Kray, L. J., Thompson, L., & Galinsky, A. (2001). Battle of the sexes: Gender stereotype confirmation and reactance in negotiations. *Journal of Personality and Social Psychology*, *80*, 942–958.
- Lieberman, V., Samuels, S., & Ross, L. (in press). The name of the game: Predictive power of reputations vs. situational labels in determining Prisoner's Dilemma game moves. *Personality and Social Psychology Bulletin*.
- Maxwell, S., Nye, P., & Maxwell, N. (1999). Less pain, some gain: The effects of priming fairness in price negotiations. *Psychology and Marketing*, *16*, 545–562.
- McCracken, G. (1987). Clothing as language: An object lesson in the study of expressive properties of material cultures. In B. Reynolds & M. A. Scott (Eds.), *Material anthropology: Contemporary approaches to material culture*. Lanham, MD: University Press of America.
- Messick, D. M., Moore, D. A., & Bazerman, M. H. (1997). Ultimatum bargaining with a group: Underestimating the importance of the decision rule. *Organizational Behavior and Human Decision Processes*, *69*, 87–101.
- Miller, D. T. (1998). *Material cultures: Why some things matter*. London, England: UCL Press.
- Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review*, *80*, 252–283.
- Neale, M. A. (1984). The effects of negotiation and arbitration cost salience on bargainer behavior: The role of arbitrator and constituency on negotiator judgment. *Organizational Behavior and Human Decision Processes*, *34*, 97–111.
- Payne, K. B. (2001). Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, *81*, 181–192.
- Pruitt, J. D., & Carnevale, P. J. D. (1993). *Negotiation in social conflict*. Buckingham, England: Open University Press.
- Robert, C., & Carnevale, P. J. (1997). Group choice in ultimatum bargaining. *Organizational Behavior and Human Decision Processes*, *72*, 256–279.
- Ross, L., & Nisbett, R. E. (1991). *The Person and the Situation: Perspectives on Social Psychology*. New York: McGraw-Hill.

- Smeesters, D., Warlop, L., Van Avermaet, E., Corneille, O., & Yzerbyt, V. (2003). Do not prime hawks with doves: The interplay of construct activation and consistency of social value orientation on cooperative behavior. *Journal of Personality and Social Psychology*, *84*, 972–987.
- Srull, T. K., & Wyer, R. S. (1979). The role of category accessibility in the interpretation of information about persons: Some determinants and implications. *Journal of Personality and Social Psychology*, *37*, 1660–1672.
- Thaler, R. H. (1988). Anomalies: The ultimatum game. *Journal of Economic Perspectives*, *2*, 195–206.
- Tiedens, L. Z., & Jimenez, M. C. (2003). Assimilation for affiliation and contrast for control: Complementary relationship schemas and complementary self-construals. *Journal of Personality and Social Psychology*, *85*, 1049–1061.
- Wegener, D., & Petty, R. E. (1997). The flexible correction model: The role of naïve theories of bias in bias correction. *Advances in experimental social psychology* (Vol. 29, pp. 141–207). New York: Academic Press.
- Wheeler, S. C., DeMarree, K., & Petty, R. E. (in press). The roles of the self in priming-to-behavior effects. In A. Tesser, J. Wood, & D. Stapel (Eds.), *On building, defending, and regulating the self: A psychological perspective*. New York: Psychology Press.
- Wheeler, S. C., & Petty, R. E. (2001). The effects of stereotype activation on behavior: A review of possible mechanisms. *Psychological Bulletin*, *127*, 797–826.
- Williams, E., & Costall, A. (2000). Taking things more seriously: Psychological theories of autism and the material–social divide. In P. M. Graves (Ed.), *Matter, materiality and modern culture* (pp. 97–111). London, England: Routledge.
- Wilson, T. D., & Brekke, N. C. (1994). Mental contamination and mental correction: Unwanted influences on judgments and evaluations. *Psychological Bulletin*, *116*, 117–142.