

Vicissitudes of Desire: A Matching Mechanism for Subliminal Persuasion

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Abstract

Recent research on subliminal persuasion has documented effects primarily when people have a preexisting need related to the target of influence. Based on the situated inference model of priming effects (Loersch & Payne, 2011), we propose a novel matching mechanism and describe how it expands the circumstances under which subliminal primes can produce persuasive effects, doing so without a consideration of preexisting need states. In two studies, we alter the desirability of various products by selecting subliminal primes that address the basic questions participants consider while judging product desirability. Subliminal persuasion depends on the precise match between the subliminal primes and the question under consideration. These results are evident when the question participants consider varies naturally due to the type of product that is judged, and when the core question is directly manipulated by altering the aspect of a product on which participants focus.

Keywords

attitude change, judgment and decision making, persuasion, priming, subliminal persuasion

Scientists, corporations, government agencies, and the lay public alike have been fascinated by the idea of subliminal persuasion for well over 50 years (Packard, 1957). Although many parties were excited and encouraged by reports of early success in this domain (Cousins, 1957), subsequent research largely debunked the early findings (Greenwald, Spangenberg, Pratkanis, & Eskenazi, 1991), eventually leading researchers to conclude that “subliminal procedures offer little or nothing of value” with respect to persuasion (Pratkanis & Greenwald, 1988). Despite strong statements of this kind, the obvious value in persuading people without their awareness sustained interest in the idea, and investigators eventually succeeded in altering individuals’ attitudes via subliminal means.

In one of the first successful demonstrations of subliminal persuasion (Strahan, Spencer, & Zanna, 2002), participants were subliminally presented with the words *thirst* and *dry* (or neutral words) prior to a beverage taste test. Participants for whom the concept of thirstiness had been primed found their drink more desirable, consuming more fluid than control counterparts. Importantly, this effect only emerged for individuals who were already thirsty because they had abstained from fluids before the laboratory session. Subsequent studies in this research program replicated these findings using other measures of product desirability (e.g., ratings of drink “greatness” and the number of 50¢ off drink coupons taken at the conclusion of the experiment). Together these experiments demonstrated the viability of subliminal persuasion and appeared to provide an explanation for the historic difficulty of producing such an effect: The procedure was only effective

for individuals possessing a preexisting need related to the primed construct.

Subsequent research using the same basic paradigm replicated and extended these findings. For example, the same effects were obtained when the need for fluids was measured rather than manipulated (Velkamp, Aarts, & Custers, 2008). In addition, desirability has been altered by subliminally presenting the product’s name (Karremans, Stroebe, & Claus, 2006) or label (Bermeitinger et al., 2009). And finally, the phenomenon has been documented for both novel products and non-thirst-related objects (Bermeitinger et al., 2009; Strahan et al., 2002, study 3). Importantly, across every study, subliminal persuasion only occurred for participants who had a measured or manipulated need related to the primed construct.

In sum, it appears that subliminal persuasion (a) is a replicable phenomenon that can be produced across laboratories and (b) requires the presence of a preexisting need related to the subliminally primed construct to occur. The reason prior needs moderate the effect, however, remains an open question (see Strahan et al., 2002, p. 567). The consistent presence of this

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moderator is even more striking when one considers the ability of other subliminal procedures to produce attitude change without considering participants' need states. Although not usually cited within the subliminal persuasion literature, mere exposure (e.g., Monahan, Murphy, & Zajonc, 2000), classical conditioning (e.g., Krosnick, Betz, Jussim, & Lynn, 1992; Loersch, McCaslin, & Petty, 2011), and approach/avoidance training (e.g., Kawakami, Phillips, Steele, & Dovidio, 2007) have all altered attitudes using subliminally presented stimuli. In the current work, we utilize a recent theoretical account of priming, the situated inference model (Loersch & Payne, 2011), to help understand the prior moderation of subliminal persuasion effects by preexisting needs. We then outline a new "matching mechanism" inspired by this model, describe how it suggests a broader route to subliminal persuasion, and provide two studies demonstrating the mechanism's power to produce nuanced and targeted persuasive effects without a consideration of preexisting needs.

Subliminal Persuasion—A Matching Hypothesis

The matching mechanism we describe below is derived from the situated inference model of priming (Loersch & Payne, 2011). According to this perspective, primes produce downstream effects when the content they make accessible is mistakenly viewed as originating from one's own internal thought processes. Whenever this misattribution occurs, prime-related mental content becomes a possible source of information to address whatever questions or concerns are afforded by the current situation (Loersch & Payne, 2012). The inferred meaning of this prime-related content, however, can vary greatly and the use of this information to answer qualitatively different questions can lead a single prime to produce very different judgment effects. Because of individuals' fundamental need to understand and predict the world around them, the environment continuously affords these different questions and concerns.

Consider these processes from the perspective of a common subliminal persuasion paradigm. In one such study (e.g., Karremans et al., 2006), researchers began by subliminally presenting words related to a particular product (e.g., Lipton Ice Tea[®]). After the priming manipulation, participants were then presented with a choice between two beverages. This situation naturally affords the question, "Which drink do I want?" To the extent that people (a) mistakenly view prime-related content as emerging from their own reaction to the situation and (b) feel that the prime-related content is relevant to the question under consideration, then the primed information will naturally be used to construct an answer ("The Lipton seems best."). When this occurs, the primed product is more likely to be chosen and its desirability will naturally increase (Brehm, 1956; Harmon-Jones, Harmon-Jones, Fearn, Sigelman, & Johnson, 2008). We label this a matching mechanism, because knowing the extent to which the primes "match" or provide a reasonable answer to the question under consideration is crucial for determining the persuasive effect.

Critically, because beverages are generally consumed to quench thirst, people's answers to such questions will differ strongly depending on their current level of thirst. In particular, someone whose thirst is completely satiated already has a preformed answer that is not easily affected by subliminal primes. If a non-thirsty person is presented with a situation affording questions such as "Which drink do I want?" or "How much of this beverage should I drink?" they will simply answer with "neither" or "none." The primes to which they are exposed are less likely to influence the decision-making process, because their physical state already provides an answer.

Importantly, this perspective suggests that individuals' prior needs are not a core aspect of subliminal persuasion. Instead, one must understand the question that is considered while evaluating target desirability, and the information that comes to mind during this decision making process. If people enter the persuasion setting with a ready answer to the question considered during product evaluation, then subliminal persuasion is unlikely to occur. Only in the absence of a ready answer can the subliminal primes alter the information considered and begin to exert an influence. Importantly, this perspective also provides an explanation for why people who habitually use a particular product are immune to subliminal persuasion (Verwijmeren, Karremans, Stroebe, & Wigboldus, 2011). When people evaluate something that they use all the time, they also have a preformed answer that prevents the primes from exerting an effect.

It is in this way that the processes proposed by the situated inference model (Loersch & Payne, 2011) account for prior research on subliminal persuasion. Our goal in the current work, however, is not to demonstrate that all past findings occurred through this mechanism. Instead, we seek to provide evidence for our proposed matching mechanism and demonstrate its ability to produce nuanced subliminal persuasion effects that occur without a consideration of preexisting need states. In the two studies that follow, we try to achieve these goals by demonstrating that subliminal persuasion is dependent on how the information made accessible by subliminal primes addresses the question most likely to come to mind within the product evaluation setting. Although prior work has only demonstrated increases in product desirability (or null effects), we designed the current studies such that our primes should have opposite effects depending on the question under consideration. Across these studies, we predict relative increases in product desirability when the answer provided by the primes is consistent with a positive evaluation, and relative decreases in product desirability when the answer is consistent with a negative evaluation.

Experiment I

To test these ideas, we created a paradigm in which participants rated the desirability of various cleaning products after being exposed to subliminal primes. We manipulated the focal question that participants considered while completing the product rating task. Half of participants were asked to consider their

personal need for each product while judging its desirability. We did this with the expectation that a consideration of personal need would focus participants on the question of how clean or dirty their general environment was. This is because cleaning products are only needed when some aspect of the situation or environment is dirty (e.g., having a grimy kitchen, feeling greasy hair). The other half of participants were instead asked to focus directly on the physical state of the products they were judging. Here, we expected people to consider the physical attractiveness of the product itself.

Before judging the desirability of these products, participants were also exposed to subliminal primes. In one condition, participants were primed with words related to the concept of cleanliness. In the other, they were exposed to words related to dirtiness. We chose these primes because of their unique ability to differentially match the two questions on which participants were focused during the product rating task. For example, when someone is focused on assessing whether they need cleaning products or not, they must assess the relative state of their environment (i.e., how clean is my house, body, clothes, etc.). If priming activates the concept of “clean” and this is used to answer this question (i.e., my environment or body is clean), then people will naturally decide that the products are not very desirable. If, however, priming activates the concept of “dirty,” the exact opposite should occur, leading to greater desirability of cleaning products. Because priming manipulations increase the accessibility and use of prime-related mental content (Higgins, 1996; Meyer & Schvaneveldt, 1971), the clean and dirty primes should naturally bias this decision-making process, differentially altering the desirability of the products as outlined above.

Because of these processes, the primes should have the exact opposite effects for participants in the product focus condition. When people are instead focused on assessing the physical appearance of the products, any information that suggests the products themselves are dirty should make them less desirable. Because of this, the dirty primes should actually decrease product desirability relative to the clean primes. Notably, if this pattern is obtained, it would be the first demonstration that a single set of subliminal primes can produce completely opposite persuasive effects. By carefully manipulating the match between the question under consideration and the primed construct, we should be able to flip the effects of the primes, producing much more nuanced effects than those obtained in prior research.

Method

Participants

One hundred and one students were randomly assigned to a 2 (subliminal prime: clean vs. dirty) \times 2 (judgment focus: environment vs. product), between-subjects design. Six individuals who had spoken English for less than 10 years were excluded, leaving 95 participants.

Materials and Procedure

Subliminal primes. Participants were subliminally primed with words related to either cleanliness (*clean, fresh, and pure*) or dirtiness (*dirty, filthy, and foul*) during a 30-trial lexical decision task. Each prime was presented 10 times. On each trial participants viewed a series of stimuli presented at the center of the screen: a fixation point (1,000 ms), the prime (17 ms), a masking string of Xs (225 ms), and then the target letter string (displayed until categorized as a word or non-word).

Product desirability. Next, participants rated the desirability of *Ajax*[®] bleach, *Clorox*[®] cleaner, *Dial*[®] soap, and *Scotch-Brite*[®] sponges. In the environment focus condition, participants were asked, “Considering your potential need for this product, how desirable is it?” In the product focus condition, participants were asked, “Considering this product’s physical state, how desirable is it?” Participants used a 9-point scale ranging from 0 (*not at all*) to 8 (*extremely*). A picture of the product under consideration was displayed next to the scale.

Funnel debriefing. We also administered a funnel debriefing to probe for knowledge of the priming stimuli and experimental hypotheses (Bargh & Chartrand, 2000). Participants were asked the following questions: (1) “What do you think was the purpose of the experiment?” (2) “Did anything about the experiment seem strange or suspicious to you? If yes, what was strange or suspicious?” (3) “Was there anything strange or suspicious about the task where you identified letter strings as words or non-words? If yes, what was it?” and (4) “Did you see any actual English words flashed before you saw the critical letter string that you had to judge (i.e., just before the “XXXXXXXXX”)? If yes, what were they? Was there any theme?” No participant reported knowledge of the experimental hypotheses or priming stimuli.

Results and Discussion

Desirability ratings of the four cleaning products were averaged and submitted to a 2 (subliminal prime: clean vs. dirty) \times 2 (judgment focus: environment vs. product) analysis of variance (ANOVA). The only significant effect was the predicted interaction, $F(1, 91) = 14.88, p < .01, \eta_p^2 = .14$ (see Figure 1). Simple effects analyses showed that participants in the environment focus condition judged the products as more desirable when primed with dirty ($M = 4.47, SD = 1.57$) than when primed with clean ($M = 3.11, SD = 1.46$), $F(1, 91) = 10.02, p < .01, \eta_p^2 = .10$. Participants in the product focus condition, however, judged the products as more desirable when primed with clean ($M = 4.18, SD = 1.52$) than when primed with dirty ($M = 3.21, SD = 1.31$), $F(1, 91) = 5.22, p = .02, \eta_p^2 = .05$. In support of our hypotheses, the alternative simple effects were also significant, with the primes having different effects across the two judgment conditions. Dirty primes made the cleaning products more desirable in the environment focus condition than in the product focus condition, $F(1, 91) = 9.40, p < .01, \eta_p^2 = .09$, whereas clean primes made the cleaning products more

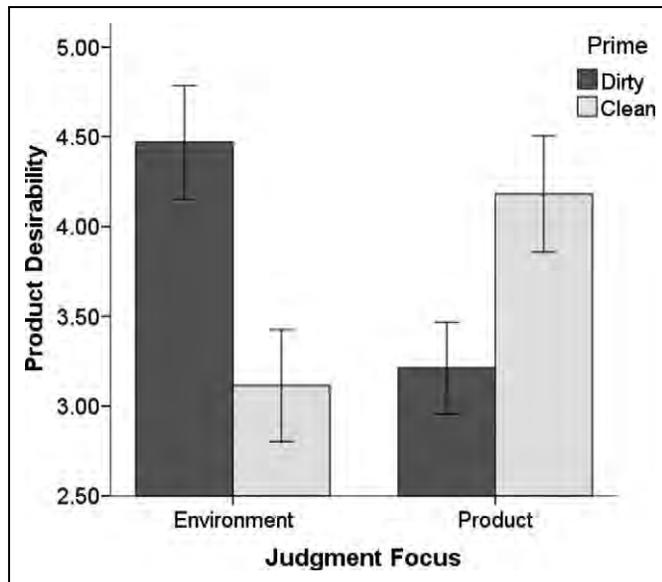


Figure 1. Mean desirability of cleaning products in Experiment 1 as a function of subliminal prime and judgment focus. Error bars represent ± 1 standard error.

desirable in the product focus condition than in the environment focus condition, $F(1, 91) = 5.84, p = .02, \eta_p^2 = .06$.

These findings provide evidence that subliminal persuasion can be produced by our proposed mechanism. Matching the subliminal primes with the questions considered during product evaluation led to pronounced differences in attitudes toward these products. When participants were focused on the state of their environment and personal need for the products, making information related to dirtiness accessible caused the products to become more desirable than when information related to cleanliness was made accessible. When participants were focused on the physical state and appearance of the products, however, the effects of the primes reversed such that priming information related to dirtiness now decreased product desirability. This effect was evident both when comparing this mean to the average rating of those participants who focused on the same question but were primed with clean, and when comparing it to the ratings of participants who were also primed with dirty but instead focused on the state of the environment. As predicted by our perspective, the mental content activated by the subliminal primes influenced product desirability by addressing the core issue people were manipulated to think about when evaluating the items. These results provide evidence for our matching mechanism and are difficult to account for from other perspectives on subliminal persuasion.

Experiment 2

Although Experiment 1 provided evidence in support of our matching mechanism, some readers may be concerned that the manipulation was somewhat heavy-handed. Although this approach is highly useful in documenting that our mechanism can occur, it does not necessarily indicate that the same

processes would occur spontaneously. That is, perhaps we only achieved the observed effects because we forced participants to think about particular questions during product evaluation. Therefore, our goal in Experiment 2 was to replicate these effects while letting the question under consideration vary naturally. To achieve this, we manipulated the actual products that participants rated. Our hypothesis was that different products would naturally afford different questions and that the persuasive effect of the subliminal primes would vary depending on the match between the prime and the question naturally afforded by a particular product.

The basic procedure was almost identical to that used in Experiment 1. Participants were subliminally primed with the concepts of either clean or dirty before judging the desirability of various consumer products. Experiment 2, however, varied the afforded question by manipulating the type of product judged. Half of participants rated the desirability of food products, whereas the other half rated the desirability of cleaning products. These product types were initially selected because both are a natural fit to our clean and dirty primes, cleaning products because of their function, and food products because of the basic human need to ingest clean, uncontaminated nutrients (Rozin & Fallon, 1987). Based on these facts, we suspected that the two product types would afford very different questions during product evaluation. This was confirmed in an initial pilot test in which we found that food products naturally focused our participants on questions of product appearance (e.g., “Is my food clean and appealing?”), whereas cleaning products naturally focused them on questions of product need (e.g., “Do I need to clean anything?”).¹

Critically, because these two product types differentially afford the two questions on which we focused participants in Experiment 1, we should be able to replicate those effects in a more natural situation. That is, when participants judge the general desirability of the cleaning products, they should spontaneously consider their personal need for the products based on how clean or dirty they or their environments are. If this occurs, the subliminal primes should have the same effects as they did in the environment focus condition of Experiment 1, where dirty primes made the products more desirable than clean primes. When participants judge the desirability of the food products, the effects of the primes should reverse. These individuals should naturally consider the physical state of the products, as in the product focus condition of Experiment 1. If this occurs, the dirty primes should make the products less desirable than the clean primes. Thus, we should be able to replicate the matching effects of Experiment 1 without forcing participants to consider a particular question. In this way, we can demonstrate that natural variations in the questions people consider produce the same effects documented earlier.

Method

Participants

Ninety-nine students were randomly assigned to a 2 (subliminal prime: clean vs. dirty) \times 2 (product type: food vs.

cleaning), between-subjects design. Twelve individuals who had spoken English for less than 10 years were excluded, leaving 87 participants.

Materials and Procedure

Participants evaluated the desirability of either four foods (lettuce, pasta, an onion, and eggs) or four cleaning products (*Head and Shoulders*[®] shampoo, *Windex*[®] glass cleaner, *Resolve*[®] carpet cleaner, and *Stanley Steamer*[®] spot remover). For each item, participants were asked, "How desirable is this product?" on a 9-point scale ranging from 0 (*not at all*) to 8 (*extremely*). Subliminal prime presentation and all other aspects of the study were identical to Experiment 1. No participants reported suspicion of the subliminal primes or experimental hypotheses during the funnel debriefing.

Results and Discussion

Because preliminary analyses found a large difference in the mean desirability of the food ($M = 3.38$, $SD = 1.66$) and cleaning products ($M = 4.32$, $SD = 1.43$), $t(85) = 2.82$, $p < .01$, $d = .61$, we first examined the effects of the primes on the desirability judgments of cleaning and food products independently.² Thus, participants' ratings of the food or cleaning products were averaged and submitted to separate t -tests. Replicating the effects in the product focus condition of Experiment 1, participants who judged food products and had been primed with clean rated the products as more desirable ($M = 3.86$, $SD = 1.67$) than those who had been primed with dirty ($M = 2.88$, $SD = 1.53$), $t(41) = 2.01$, $p = .05$, $d = .63$. The primes had the opposite effects among participants who judged cleaning products, replicating the effects of the environment focus condition of Experiment 1. Those participants who had been primed with clean rated these products as less desirable ($M = 3.86$, $SD = 1.40$) than those who had been primed with dirty ($M = 4.70$, $SD = 1.36$), $t(42) = 2.00$, $p = .05$, $d = .62$.

Because of the inherent differences in desirability between our cleaning and food products, we sought to equate all products in terms of average desirability before examining the interaction between subliminal prime and product type. To do this, we mean centered the desirability ratings of each product and then averaged these four centered values to create a single-item index representing the average desirability of whatever products were rated.³ This variable was then submitted to a traditional 2 (subliminal prime: clean vs. dirty) \times 2 (product type: food vs. cleaning) ANOVA. The only significant effect was the interaction between these two factors, $F(1, 83) = 8.01$, $p < .01$, $\eta_p^2 = .09$ (see Figure 2). Simple effects analyses mirrored the results of the earlier t -tests, showing that participants primed with clean found the food products more desirable than those primed with dirty, $F(1, 83) = 4.64$, $p = .03$, $\eta_p^2 = .05$. The primes tended to have the opposite effects for cleaning products, where participants primed with dirty judged the products as relatively more desirable than those primed with clean, $F(1, 83) = 3.41$, $p = .07$, $\eta_p^2 = .04$. More

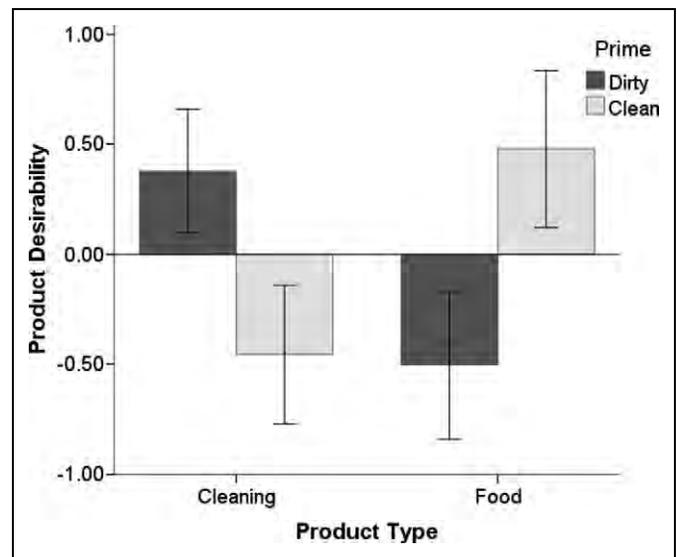


Figure 2. Average desirability of products (mean-centered) in Experiment 2 as a function of subliminal prime and product type.

importantly, this analysis allowed us to examine our hypothesis that the effects of the primes would differ across product types. These simple effects were also significant: Clean primes made food products significantly more desirable than cleaning products, $F(1, 83) = 4.09$, $p = .05$, $\eta_p^2 = .05$, whereas dirty primes made cleaning products significantly more desirable than food products, $F(1, 83) = 3.92$, $p = .05$, $\eta_p^2 = .04$.

Replicating Experiment 1, we influenced product desirability by matching the subliminally primed construct to the basic question individuals considered while judging the products. This allowed us to produce targeted persuasion effects, with product desirability depending upon the exact match between the prime and question. These results provide evidence that the results of Experiment 1 also occur in situations where the question under consideration varies naturally due to specific aspects of the product being evaluated.

General Discussion

Inspired by our efforts to understand the moderating role of preexisting needs, the current work outlined a novel matching mechanism of subliminal persuasion. In line with hypotheses derived from the situated inference model (Loersch & Payne, 2011), we found that the mental content made accessible by subliminal primes served as a source of information which was used to answer the basic questions afforded within the product evaluation setting. The precise match between these factors determined the persuasive effect observed. Experiment 1 showed that very different questions can be considered for a single object of evaluation, and the information made accessible by subliminal primes is flexibly used to inform desirability decisions whenever relevant to this judgment (see also DeMarree & Loersch, 2009). Experiment 2 showed that the influence of subliminal primes can vary because certain objects naturally afford different questions. Although our studies do not

demonstrate that prior subliminal persuasion effects occurred through the matching mechanism, the results do highlight the power of our perspective to produce targeted subliminal persuasion that can occur without an assessment of preexisting need (see also Veltkamp, Custers, & Aarts, 2011). Future work should examine the extent to which the current mechanism may also account for the effect of this moderator in other studies.

Interestingly, our results do serve as a replication of the “normal” null effects which occur when you do not take into account participants’ prior need states. That is, collapsing across judgment focus in Experiment 1 or product type in Experiment 2 results in a null effect of subliminal priming. Only when you consider both the question considered by participants and the primed content do subliminal persuasion effects emerge. In emphasizing the match between these two factors, we help bring the subliminal persuasion literature in line with the conclusions from more traditional persuasion research. That is, matching any influence attempt to a particular aspect of the person (Wheeler, DeMarree, & Petty, 2008) or situation (Petty, Wheeler, & Bizer, 2000) is a critical consideration for effectively changing individuals’ attitudes.

In addition to demonstrating the effectiveness of subliminal persuasion attempts that match primed content with individuals’ immediate questions or concerns, our results suggest a greatly expanded set of effective primes. Whereas past work has assumed one must either prime objects directly related to the persuasive target (e.g., *thirst* and *dry* when trying to increase the desirability of some beverage; Veltkamp et al., 2008) or the particular product one is trying to make more desirable (Brand X energy pills; Bermeitinger et al., 2009), the current findings suggest that almost any prime can produce subliminal persuasion. For any given question under consideration, the critical factor seems to be whether the primes provide an answer that casts the target in a favorable light.

Finally, because we were able to make the persuasive effects of our priming manipulations reverse by manipulating the match between the prime and question under consideration, these results are difficult to account for from alternative perspectives. For example, in past work on subliminal persuasion, primes have either increased product desirability (for those with a preexisting need) or had a null effect. As far as we are aware, no prior research has articulated a process by which the mechanism outlined in that prior work would produce the diametric persuasion effects we observe here. Similarly, because clean is a more positive category than dirty (Harris & Sachau, 2005), a general evaluative positivity perspective also has trouble accounting for our results. Instead, it would likely predict that clean primes would increase the desirability of all products. The same issues hold for accounts that assume our effects are driven by the prime’s active disambiguation of the products. The results of Experiment 1 are especially strong in this regard. Because all participants judged the same four products, this mechanism would predict only a main effect of prime. Because of limitations like these, we view the current perspective as the most parsimonious account of the findings.

Implications for Priming Theories

In addition to their value for understanding subliminal persuasion, the current data are novel from a more general priming perspective, with important implications for broader theories of how conceptual primes affect judgments. Specifically, these results provide some of the first evidence that the general semantic content made accessible by subliminal priming can serve as a source of information that people then use to answer the questions afforded by the current situation. As noted earlier, these findings are consistent with the situated inference model (Loersch & Payne, 2011), providing evidence for the model’s proposal that conceptual primes often exert effects on judgment, behavior, and motivation through this process.

Although these results are the first to demonstrate that conceptual primes can affect judgments through this mechanism, the findings mimic past work regarding the influence of mood and feelings on judgment (e.g., Schwarz & Clore, 2007). In particular, these results merge nicely with research on “feelings-as-information” showing that mood can differentially impact judgments depending upon the exact question that individuals seek to answer (Martin, Abend, Sedikides, & Green, 1997; Martin, Ward, Achee, & Wyer, 1993). In addition, the results fit well with recent research demonstrating that prime-to-behavior effects can be moderated by the question on which participants focus after priming (Jefferis & Fazio, 2008; DeMarree, Wheeler, & Petty, 2007). Taken together, these various lines of work illustrate that a broad span of information can serve as an input into processes underlying attitude change and decision making, and that external manipulations of this content can have powerful downstream effects on judgment and behavior. That these similarities exist across diverse research areas suggests that the use of accessible mental content to answer questions afforded by the environment is a core process that can account for a number of psychological phenomena, including subliminal persuasion.

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Notes

1. In this pilot study, 60 participants judged the desirability of the same food and cleaning products used in Experiment 2. After rating each set of products, participants were asked, “What did you consider when attempting to decide how desirable these various food

[cleaning] products were?" Two individuals unaware of our hypotheses coded these free responses as related to either product need or appearance ($\kappa = 0.69, p < .01$). Participants were more likely to consider the physical appearance of food than cleaning products, McNemar's $\chi^2(1, N = 60) = 6.05, p = .01$, but were more likely to consider their personal need for cleaning than food products, McNemar's $\chi^2(1, N = 60) = 16.06, p < .01$.

2. These same differences were apparent when we reexamined the data from our pilot; food products ($M = 3.16, SD = 1.49$) were significantly less desirable than cleaning products ($M = 4.27, SD = 1.50$), $t(59) = 4.88, p < .01, d = 1.26$.
3. For a thorough discussion of this approach, see Petty, Fabrigar, Wegener, and Priester (1996) and Rosnow and Rosenthal (1991).

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