

**DOGS ON THE STREET, PUMAS ON YOUR FEET:  
HOW CUES IN THE ENVIRONMENT INFLUENCE  
PRODUCT EVALUATION AND CHOICE**

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*ABSTRACT*

Little empirical research has examined the implicit effects of environmental cues on consumer behavior. Across six studies using a combination of field and laboratory methods, the authors find that products are more accessible, evaluated more favorably, and chosen more frequently when the surrounding environment contains more perceptually- or conceptually-related cues. The findings highlight the impact of frequent – in addition to recent – priming in shaping product evaluation and choice: More frequent exposure to perceptually- or conceptually-related cues increases product accessibility and makes the product easier to process. This increased accessibility, in turn, influences product evaluation and choice, which are found to vary directly with the frequency of exposure to conceptually-related cues. These results support the hypothesis that conceptual priming effects can have strong impact on real-world consumer judgments.

On July 4<sup>th</sup>, 1997, NASA landed the Pathfinder spacecraft on the surface of Mars. This “Mission to Mars” captured media attention worldwide over the course of the following months and during this period, candy bar maker Mars Inc. also noticed a rather unusual increase in sales (White 1997). Though the Mars Bar takes its name from the company founder and not from the Earth’s neighboring planet, consumers apparently responded to news about the planet Mars by purchasing more Mars bars. This was a lucky turn of events for the candy bar company, to be sure, but what does it mean for our understanding of consumer choice?

In this article, we examine how repeated incidental exposure to features of the everyday environment can influence product evaluation and choice. Building on recent processing fluency research (Lee and Labroo 2004; Whittlesea 1993), as well as classic work on spreading activation (Collins and Loftus 1975), we hypothesize that exposure to environmental cues will repeatedly “prime” perceptually- or conceptually-related product representations in memory. The resulting ease of processing the product representation, in turn, can cause increases in product evaluation, purchase likelihood, and choice (Lee and Labroo 2004; Nedungadi 1990).

Using a combination of laboratory and field methods, we investigate several hypotheses that further understanding of priming effects in the everyday consumer environment and the processes underlying such effects. First, we examine whether consumers whose environments contain more perceptually- or conceptually-related cues evaluate products more positively and choose them more often. Second, we examine the role of frequency of cue exposure in priming, hypothesizing that increased exposure frequency leads to increases in evaluations of related products. By doing so, we highlight the underlying role of fluency in producing these effects, extending past research by demonstrating that an accumulation of past exposures to related cues can increase product accessibility and evaluation in the same fashion as recent exposure.

We also pursue several smaller objectives, aimed to contribute to the understanding of priming effects in consumer environments. We examine whether such effects can arise via newly constructed links between previously unrelated constructs (in addition to well-learned semantic links), whether they occur for familiar brands (or only unfamiliar brands), and whether they can occur outside conscious awareness. Six studies examine these hypotheses and related objectives.

### *THEORETICAL BACKGROUND*

Once concepts are activated via direct exposure, they are known to impact judgment and decision-making. For example, recently primed brands are more likely to be included in and chosen from a consumer's consideration set (e.g., Nedungadi 1990; Shapiro 1999). Similarly, repeated exposure to an object can produce more favorable ratings of that object (Zajonc 1968), and such "mere exposure" effects have been shown to occur for everything from the attractiveness of people (Moreland and Beach, 1992) to brands (Baker, 1999; Janiszewski 1993). Thus, it has been well established that people prefer objects they have previously encountered, but can similar effects emerge for objects related to those that were previously encountered?

Psychological research has demonstrated that situational cues or primes can automatically activate associated representations in memory, leading them to become more accessible (e.g., Higgins, Rholes, and Jones 1977) and to automatically spread to related constructs via an associative network (Anderson 1983; Collins and Loftus 1975; Neely 1977). According to this spreading activation account, priming (or activating) a given construct in memory leads to the spontaneous activation of related constructs in memory. Thus priming a given construct can have downstream effects on perceptually or conceptually-related objects.

Indeed, though most studies have focused on direct exposure, research also suggests that product choice and evaluations can be influenced by exposure to perceptually or conceptually-related stimuli (Gordon and Holyoak 1983; Whittlesea 1993). Participants repeatedly exposed to random polygons, for example, showed increased favorability toward previously unseen polygons that were perceptually similar (Monahan, Murphy, and Zajonc 2000). Exposure to a given stimulus can also increase the choice and evaluation of conceptually-related targets (e.g., those with semantic or conceptual links to the primed stimulus, Lee and Labroo 2004; Whittlesea 1993). Nedungadi (1990) found that brand choice is affected not only by prior exposure to that specific brand, but also to competing brands. He theorized that activation of a brand spreads to related brands, causing them to be more accessible, which leads to increased likelihood of their inclusion in the consideration set. Predictive contexts can also lead people to evaluate items more positively: Participants rated a bottle of ketchup more favorably after viewing a pictorial story about a fast-food restaurant, as opposed to a supermarket, presumably because ketchup is more closely linked to fast-food restaurants (Lee and Labroo 2004). Because ease of processing is often positively valenced (Harmon-Jones and Allen 2001), the authors suggest these findings were driven by increases in conceptual fluency (ease of processing) that arose from exposure to the predictive context.

Importantly, according to the discrepancy-attribution hypothesis, such processing ease will only positively influence judgment when the fluency is unexpected (Whittlesea and Williams 1998; 2001a; 2001b). When people are aware of the reason for processing ease, there is no discrepancy between how much fluency they feel and how much they expect to feel (because they can easily attribute the ease of processing to the source) and thus no reason to attribute the

fluency to positive qualities of the target. If, however, there is a discrepancy between expected and experienced fluency, people are likely to attribute it to positive qualities of the target.

An interesting implication of this hypothesis is that obvious direct exposure to an object may not always positively impact judgment, because people may attribute their fluency experience to the fact that they have just observed the object. In contrast, indirect exposure or conceptual priming – when people are exposed to an object that is cognitively linked with the target – may be especially likely to produce positive judgments, because people are unlikely to make an attribution of the fluency to exposure to a seemingly irrelevant object. In this situation, people are not expecting to experience fluency, and thus will be less likely to correct for it.

#### *Downstream Priming Effects in the Everyday Environment*

The above-mentioned research presents a case for the importance of cue exposure in constructing evaluations and making choices, but there have been relatively few examinations of such effects in real-world contexts. In everyday life – as opposed to in the carefully controlled laboratory – consumers are inundated with a seemingly infinite number of cues (Peter and Olson 2005); how much influence can any one cue really have? Indeed, Bargh (2006) recently noted that one of the major remaining issues in the basic priming literature is how these effects play out in real-world environments, which are infinitely more complex than those in the lab. Simonson (2005) has suggested that until researchers can show that these automatic priming effects produce real-world change, the impact and importance of these laboratory findings is undetermined. The current manuscript contributes to growing efforts to understand how priming

effects shape everyday judgment and decision-making (Berger and Heath, 2005; Berger, Meredith, and Wheeler 2006; Kay et al. 2004).

Further, we know that direct product exposure (e.g., advertising or aisle displays) positively impact sales (e.g., Baker 1999; Bemmaor and Mouchoux 1991), but what about exposure to perceptually or conceptually linked stimuli? The more consumers see advertisements for Puma brand sneakers, the more they should like and purchase Puma sneakers, but what about exposure to stimuli related to Puma? Might it be the case that the more consumers see dogs, the more they will like and purchase Puma sneakers?

### *CURRENT RESEARCH*

The current research investigates the impact of incidental exposure to everyday environmental cues on product evaluation and choice. Because of the lack of empirical data on “priming” product representations in the everyday consumer environment, we first sought evidence that when consumers were in environments that provided many cues to a given product, the cognitive accessibility of that product would be increase.

**H1: Products are more accessible when consumers are frequently exposed to real-world stimuli with perceptual or conceptual links to those products.**

We examine this hypothesis in Field Study 1 and the pre-test to Experiment 4.

This, in turn, can have positive downstream consequences. Environments that contain perceptual or conceptual cues to a given product should repeatedly “prime” the product representation in memory, leading the product to be processed more easily. This should result in increased product choice, greater purchase likelihood, and more positive evaluations.



**H2: Products are more likely to be chosen if consumers are frequently exposed to real-world stimuli with perceptual or conceptual links to those products.**

We examine this hypothesis in Experiments 1 and 3.

**H3: Products are evaluated more positively if consumers are frequently exposed to real-world stimuli with perceptual or conceptual links to those products.**

We examine this hypothesis in Field Study 2 and Experiments 2 and 4.

Beyond examining these primary effects of conceptual priming, we also aim to extend past research by emphasizing the hypothesis that conceptual fluency is the underlying mechanism producing these effects. Past research in the consumer domain has not directly tested the underlying mechanisms: Indeed, Lee and Labroo (2004) note the need for work that tests the underlying role of ease of processing or fluency.

The manuscript furthers this goal in two ways: First, we investigate exposure frequency. Past research has focused on effects of *recent* incidental exposure on evaluations, in which judgments immediately follow cue exposure (i.e., within seconds or minutes, Lee and Labroo 2004; Whittlesea 1993). We examine whether similar effects result from *frequent* exposure to conceptual cues. We hypothesize that the more frequently consumers are exposed to conceptually-linked stimuli in their everyday lives, the higher the resultant product evaluations, even when judgments are not immediately preceded by cue exposure.

**H4: As frequency of exposure to conceptually-linked stimuli increases, the positivity of product evaluations will increase.**

We both measure self-reported frequency of exposure (Exp. 2 and 3) and manipulate it (Exp. 4).

Second, we explore the role of conscious awareness in this process. Because research has suggested a dissociation between explicit and implicit responses to prior exposure (e.g.,

Janiszewski 1993; Zajonc, 2001), we expect that conceptual priming effects on evaluation are unlikely to depend on conscious processing or rehearsal.

**H5: The effects of exposure to conceptually-linked stimuli will not depend on conscious awareness or deliberate learning.**

We examine this hypothesis in Experiment 4.

### *FIELD STUDY 1*

Because so little research has been conducted on priming in everyday environments, our first study simply sought to establish that real-world environmental cues can activate – or make more accessible – related product representations. To do so, we took advantage of a natural temporary difference in the prevalence of certain environmental cues (the color orange) due to a holiday (Halloween). We examined the accessibility of various consumer products at two times: The day before Halloween and one week later. Right before the holiday, pumpkins adorn the neighborhoods, and stores and advertisements prominently feature orange displays. But starting November 1<sup>st</sup>, these orange cues disappear. If the prevalence of real-world environmental cues can influence product accessibility, then products that are associated with the color “orange” (i.e., Reese’s, a product whose logo and packaging are largely orange in color or orange-colored products such as Sunkist or Orange Crush) should be relatively more accessible before Halloween than one week later.

### *Method*

Respondents (N = 144) were approached as they entered or exited a local supermarket and completed a “Quick Thinking” questionnaire. All participants were approached on a Saturday afternoon; half were approached the day before Halloween (target condition) and half a week later (control condition). All other aspects of the study were identical across the two conditions.

Respondents were told that the experimenters were “interested in what things come to mind when people think of different categories” and were asked to “list the first things that come to your mind” in the categories of candy/chocolate and soda. For the candy/chocolate category, they were asked to list “8 types of candy/chocolate” and given Twix and Hershey’s Kisses as examples. For the soda category they were asked to list 6 brands of soda (with no examples.)

We measured product accessibility two ways. First, we looked at the percentage of lists on which the product was mentioned. Second, we examined the ease with which these products came to mind relative to other products in the category using a “primacy of output” method (Higgins, King, and Mavin 1982). Items generated earlier in the list are considered to be more accessible in memory. For example, if Reese’s was listed 5<sup>th</sup>, it would receive a score of “5” for that respondent. If the product did not appear on the list, a score was recorded equivalent to the number below the last one on the list (i.e., 9 for chocolates and 7 for sodas).

### *Results*

As predicted, orange-associated products were relatively more accessible when the color orange was more prevalent in the environment. For the chocolate category, Reese’s was

mentioned by more participants the day before Halloween (54%) than one week later (30%;  $\chi^2(1, N = 144) = 3.97, p = .05$ ). Similarly, among sodas, orange sodas (e.g., Orange Crush, Sunkist) were mentioned by more participants the day before Halloween (47%) than one week later (30%;  $\chi^2(1, N = 143) = 4.37, p < .04$ ). No other orange products were generated by the participants.

We also examined product ordering within consumers' lists. As predicted, Reese's was more accessible – that is, it was generated more easily compared to other products – the day before Halloween ( $M = 6.00$ ), as compared to a week later ( $M = 7.18$ ;  $t(142) = 2.34, p < .02$ ). Orange sodas were also generated more easily the day before Halloween ( $M = 5.84$ ), as compared to a week later ( $M = 6.21$ ), but this effect did not reach significance ( $t(141) = 1.49, p = .14$ ).

### *Discussion*

Consistent with hypothesis 1, on days when there should be more real-world orange cues in the environment, orange-related products (e.g., Reese's, orange sodas) seemed to be more accessible. Our results demonstrate that the prevalence of environmental cues as simple as color can affect product accessibility, even in noisy real-world consumer environments.

It is difficult to explain these results through patterns of holiday consumption. Outside of color, Reese's is not uniquely linked with Halloween: A separate set of respondents ( $N = 30$ ) did not list Reese's more frequently than other types of candy (e.g., Snickers, Kit Kat, or Hershey's) when asked what candy they associated with Halloween ( $ps > .20$ ). Further, other chocolate products that were highly associated with Halloween (Snickers and Kit Kat) showed no significant boost in accessibility due to the holiday ( $\chi^2s(1, N = 144) < 1.00, ps > .20$ ).

As with most field studies, however, threats to internal validity exist. Rather than increased exposure to the color orange, one could argue that increased direct exposure to the products (on the shelves of the store) or different active goals consumers could have prior to Halloween (e.g., to buy something festive) may have driven the results. The fact that half our participants completed the survey before entering the store casts doubt on the first possibility, but this study does not allow us to rule out the second concern. Our next study uses an experimental design to hold constant other aspects of the situation while directly manipulating environmental cues.

### *EXPERIMENT 1*

Experiment 1 used a more controlled design to examine whether exposure to perceptually-related environmental cues can influence product choice. Participants were asked to complete a survey and were randomly given either an orange or green pen to do so. The survey asked them to make choices between consumer goods, some of which were related to the color orange (e.g., Fanta) or green (e.g., Sprite), while others were not linked to either color (e.g., Pepsi). We predict that exposure to perceptually-related environmental cues (in this case, pen color) will influence product choice. Relative to participants who use a green pen, those who use an orange pen will be more likely to choose orange-related products, and vice versa.

#### *Method*

Participants (N = 29) were approached on a university campus, asked to complete a short “Consumer Choice Survey” (all agreed), and randomly assigned to condition. The experimenter

carried ten pens in his pocket, half were orange and wrote in orange ink and half were green and wrote in green ink. After giving them a survey, the experimenter reached into his pocket, randomly selected a pen, and gave it to the participant to use to complete the survey.

Participants were told the experimenter was interested in the types of things people like, and to ensure that they had been exposed to the ink color, they were first asked to write a few sentences about a book they had read recently. After writing, they were asked which option they would choose from 20 different choice pairs (e.g. beverages, detergents, and candies). They were shown pictures of each option, and some of the options related to the color orange (e.g., Sunkist orange soda), green (e.g., Lemon-Lime Gatorade), or neither (e.g., All detergent).

### *Results*

The number of orange-related and green-related products each participant chose was summed and examined in a 2 (Environmental Cues: Orange vs. Green) x 2 (Product Color: Orange vs. Green) repeated measures ANOVA.

As predicted, exposure to different environmental cues influenced product choice. In addition to a main effect of Product Color ( $M_{\text{Orange}} = 6.39$  vs.  $M_{\text{Green}} = 5.11$ ;  $F(1,27) = 6.57, p = .02$ ), there was a significant Environmental Cue x Product Color interaction ( $F(1, 27) = 7.23, p = .01$ ). Participants who wrote with an orange pen were more likely to choose orange products ( $M = 7.15$ ) than participants who used a green pen ( $M = 5.63$ ;  $F(1, 27) = 4.46, p = .04$ ). Similarly, participants who wrote with a green pen were more likely to choose green products ( $M = 5.69$ ) than participants who used an orange pen ( $M = 4.54$ ;  $F(1, 27) = 5.05, p = .03$ ). Pen color did not affect choice of the control products ( $M_{\text{Green}} = 8.20$  vs.  $M_{\text{Green}} = 8.31, F < .5, \text{NS}$ ).

*Discussion*

Supporting Hypothesis 2, the results illustrate that exposure to perceptually-related environmental cues can influence product choice. Exposure to a colored pen led participants to choose more products of that same color: Participants chose more orange (green) products when they were exposed to the color orange (green).

The first two studies examined the effects of existing perceptual links between products and environmental cues and the next two studies examine whether similar effects occur using newly-constructed links that are conceptual in nature. During an initial lab session, participants learned a slogan linking a product and a previously unrelated everyday object. Because linking a product to a positive object could elicit increased choice or evaluation via conditioning, we chose objects that are neutral in valence (i.e., dining hall trays and luggage).

*FIELD STUDY 2*

The second field study examined whether real-world priming effects extend to purchase likelihood and willingness to pay, in addition to looking at conceptual (rather than perceptual) priming effects, and newly-constructed (rather than pre-existing) links. We investigated whether consumers who are frequently exposed to a given cue (a common everyday object) would react to conceptually-related products more favorably. Exposure to conceptually-related cues should increase a product's fluency (Lee and Labroo 2004) and lead to higher purchase likelihood and greater willingness to pay.

As in the prior studies, this study takes advantage of pre-existing differences in exposure to certain environmental cues. We conducted our study right before the beginning of the school year when some students had already arrived on campus while others had yet to travel to campus (they would travel between Time 1 and Time 2 of our study). Thus, some of our participants (who had not yet arrived) would be frequently exposed to luggage via the act of traveling to campus, while others (who had already arrived) would not be frequently exposed to luggage during the week of our study. At the onset of the study, all participants were contacted by email, and repeatedly exposed to a slogan linking the target product (a new digital music player) to an environmental cue. Half of our participants learned a slogan that linked the product to luggage – a cue whose prevalence varies between these groups – while the other half were exposed to a control slogan that linked the product to a cue that should not vary across groups (dining hall trays). One week later, all participants responded to a follow-up email survey indicating their purchase likelihood and willingness to pay. Thus, we used a 2 (Slogan: Luggage vs. Tray) x 2 (Group: Travelers vs. Non-Travelers) between subjects design.

We hypothesized that these variables would be affected by our “environment” grouping, which was simply based on whether participants traveled between Time 1 (when they learned the slogan) and Time 2 (when they completed the dependent variables). Participants yet to travel to campus should be exposed to luggage more frequently during the week of the study. Consequently, among participants who learned the slogan linking the product to luggage, those who traveled during the study should show higher purchase likelihood and willingness to pay. Traveling should have no effect on participants who learned the control (dining hall tray) slogan.



## *Method*

A week before the start of the school year, students ( $N = 116$ , 64% female) completed the first part of a two-part “Advertising Campaigns” study as part of a larger group of studies. One participant did not complete all the measures and was removed from the analysis.

*Slogan exposure.* Participants were told that a company was about to release a new digital music player (named ePlay) and asked to provide feedback on the company’s upcoming ad campaign. They read an in-depth product description and were shown the campaign’s slogan. Half received a slogan linking the product to luggage (“Luggage carries your gear, ePlay carries what you want to hear”) while the other half received a slogan linking the product to dining hall trays (“Dinner is carried by a tray, music is carried by ePlay”). Participants then completed a number of tasks designed to link the digital music player to the designated environmental cue (e.g., reciting the slogan in their head or evaluating the slogan in different fonts). They also wrote the slogan from memory several times. In all, they were exposed to the slogan (either directly or via rehearsal) twenty times.

*Dependent measures.* Four days later, participants were contacted via e-mail and asked to complete the second part of the study (dependent and ancillary measures). Participants responded to two questions regarding purchase likelihood (“How interested are you in purchasing the ePlay digital music player?” and “How likely would you be to purchase an ePlay digital music player?” both on 7-point scales). As expected, these two items were highly correlated ( $r = .81$ ) and were averaged to form a Purchase Likelihood Index. Participants were also asked to list how much they would be willing to pay for the music player (in dollars).

A few final measures (all on 7-point scales) were also included. Participants rated how much they would like to have a digital music player, how much having one would have made their past week more enjoyable, and how much they liked their luggage and dining hall trays. Participants were also asked “how much attention did you pay to the first portion of the study.” This allowed us to examine whether our results could be explained by participants who still had to travel somehow finding the luggage slogan more relevant and thus showing increased elaboration. Finally, they were asked whether they had traveled to campus during the week of the study.

### *Results*

*Preliminary analyses.* Traveling had no influence on how much participants reported wanting to have a digital music player ( $M_{\text{Travel}} = 4.90$  vs.  $M_{\text{No Travel}} = 5.10$ ;  $F < .5$ , NS) or whether they thought it would have made their past week more enjoyable ( $M_{\text{Travel}} = 4.63$  vs.  $M_{\text{No Travel}} = 4.87$ ;  $F < .5$ , NS). Similarly, traveling did not influence how much participants liked their luggage ( $M_{\text{Travel}} = 4.45$  vs.  $M_{\text{No Travel}} = 4.53$ ;  $F < .5$ , NS) or dining hall trays ( $M_{\text{Travel}} = 3.63$  vs.  $M_{\text{No Travel}} = 3.78$ ;  $F < .5$ , NS). Finally, while participants who received the luggage slogan reported paying more attention to part 1 of the study than participants who received the tray slogan ( $M = 5.17$  vs.  $4.58$ ;  $F(1,112) = 5.56$ ,  $p < .02$ ), the slogan  $\times$  group interaction was not significant ( $F < .75$ , NS), indicating that travelers did not report paying significantly more attention to the luggage slogan relative to the tray slogan ( $M = 5.09$  vs.  $4.31$ ) than did non-travelers ( $M = 5.24$  vs.  $4.84$ ).

*Main dependent measures.* A 2  $\times$  2 ANOVA examined the effect of slogan and group on purchase likelihood and willingness to pay (Table 1). In addition to main effects of Slogan (purchase likelihood,  $F(1,112) = 5.68$ ,  $p = .02$ ; willingness to pay,  $F(1,112) = 4.06$ ,  $p = .05$ ), the

analyses revealed the predicted, a Slogan x Group interaction (purchase likelihood,  $F(1,112) = 4.91$ ,  $p < .03$ ; willingness to pay,  $F(1,112) = 3.71$ ,  $p < .06$ ). Specifically, among participants who received the luggage slogan, those who traveled were more likely to purchase the product ( $M = 3.55$  vs.  $2.55$ ;  $F(1,112) = 6.68$ ,  $p = .01$ ) and were willing to pay approximately 50% (\$34) more to purchase it ( $M = \$103.10$  vs.  $\$68.16$ ;  $F(1,112) = 3.81$ ,  $p = .05$ ). There was no corresponding difference among participants who received the dining hall tray slogan ( $F_s < .75$ , NS). Similarly, among participants who traveled, those who saw the luggage slogan were more likely to purchase the product ( $M = 3.55$  vs.  $2.22$ ;  $F(1,112) = 7.73$ ,  $p < .01$ ), and were willing to pay twice as much, or more than \$50 more ( $M = \$103.10$ ;  $F(1,112) = 5.69$ ,  $p = .02$ ) than those who saw the tray slogan ( $M = \$50.31$ ). There was no corresponding difference among participants who did not travel over the period ( $F_s < .5$ , NS).

### *Discussion*

Results of the second field study suggest that the prevalence of conceptually-related environmental cues can influence consumers' purchase likelihood and willingness to pay. As predicted, consumers whose environments provided more conceptually-related cues to a digital music player reported being more likely to purchase the player and were willing to pay more to get it. We believe this to be the first evidence indicating that marketers can benefit by creating novel conceptual links between their product and features of the consumer environment, a finding that could lead to innovative marketing strategies.

The results help rule out several alternative explanations. Because groups did not differ in how much they reported needing a digital music player or liking their luggage, it is unlikely that

our effects were due to travelers recognizing a greater need to transport music or any kind of “affective contagion” spreading from luggage to the music player. Travelers also did not report paying more attention to the luggage slogan during Time 1 of the study, helping rule out the alternative that differences in elaboration or attention to the slogan are driving the effects.

As with most field studies though, threats to internal validity remain. Participants in our non-traveling group arrived at school earlier than those in the traveling group, and the type of students who arrive on campus early may be different from those that arrive later (e.g., involved in sports or special academic programs). Because such activities may make it harder to work the whole summer or have a job during the school year, students in such programs may be more affluent and thus willing to pay more for a digital music player. Though it is less clear how such existing differences between these groups would lead to the interactive pattern of results found, the next study uses an experimental grouping variable (whether participants’ dining hall uses trays at meals) for which such differences should be less likely. Furthermore, even stronger support for our hypothesis would come from providing direct evidence that exposure to related cues drove the effects. Thus our next study uses a more controlled design to examine whether exposure to conceptually-related cues predicts product evaluations.

## *EXPERIMENT 2*

Experiment 2 uses a 2 (Slogan) x 2 (Group) design to investigate whether the frequency of exposure to conceptually-related cues increases product evaluations. We used the slogans from Field Study 2, but rather than examining participants who varied in their exposure to luggage, we compared participants who varied in their exposure to dining hall trays. Half of our participants ate their meals in dining halls that used trays, and half ate in dining halls that did not use trays.

We predict a slogan x dining hall interaction: Participants whose dining halls use trays and who were exposed to a slogan linking the product to trays should report higher product evaluations. Repeated priming of the product by tray exposure should cause the product to be higher in accessibility, which (as it should be unexpected) will lead to positive product evaluations (Whittlesea and Williams 1998). We also measure reported exposure to trays to investigate the role of frequency of cue-exposure on evaluation.

*Pre-Test: Effect of Experimental Grouping in the Absence of Cue Exposure*

Prior to the main study, we conducted a pre-test to examine whether existing differences between the experimental groupings could influence product evaluation. A separate sample of participants ( $N = 38$ , half from each type of dining hall) learned just the tray slogan, and filled out product evaluation measures (see the main dependent measures section) immediately, as opposed to 10 days later. Because the dependent measures were collected right away, and the survey was completed online (when conceptually-related cues were unlikely to be present), we precluded the possibility that intervening exposure to the conceptually-related cue (dining halls trays) could influence product evaluation. Consequently, if the experimental grouping (dining hall type) does not affect evaluations among these participants, it suggests that any effects of experimental group in the main study are not caused by pre-existing group differences and provides greater confidence that they are due to frequency of tray exposure.

As expected, participants who ate in dining halls with trays reported seeing trays more frequently ( $M = 6.57$ ) than participants in dining halls without trays ( $M = 2.06$ ;  $t(37) = 10.07$ ,  $p <$

.001), but there were no differences on product evaluation ( $M_{\text{Trays}} = 3.81$  vs.  $M_{\text{No Trays}} = 3.43$ ;  $t(37) < 1$ , NS).

### *Method*

Undergraduates ( $N = 65$ , 55% female) completed a two-part “Advertising Study” as part of a group of studies for which they were paid \$10. They were randomly assigned to condition and approximately half ate in dining halls that used trays.

*Slogan exposure.* The slogan exposure procedure and the slogans themselves were identical to those used in Field Study 2.

*Dependent measures.* Ten days later, participants were contacted via email and completed the dependent measures (on 7-point scales). Two items measured participants’ overall product evaluation: “How much do you like the ePlay digital music player?” and “How favorable are your attitudes toward the ePlay digital music player?” ( $r = .79$ , averaged to form product evaluation index). Participants rated how much they thought they needed a digital music player, how much they liked dining hall trays, and how frequently they had seen trays in the past week. Finally, they provided their dorm name and whether the dining hall used trays.

### *Results*

*Preliminary analyses.* As expected, participants who ate in dining halls with trays reported seeing trays more frequently ( $M = 6.03$ ) than those who ate in dining halls without trays ( $M = 1.79$ ;  $t(63) = 12.61$ ,  $p < .001$ ). Also as expected, conditions did not differ in reported need for a

digital music player ( $ps > .20$ ). There was an unexpected marginal effect of slogan on tray liking ( $F(1, 65) = 3.07, p = .09$ ), indicating that participants who received the luggage slogan reported liking trays somewhat more ( $M = 4.41$ ) than those who received the tray slogan ( $M = 3.77$ ), but if anything, the direction of this effect should work against our hypothesis.

*Product evaluations.* A 2 (Slogan) x 2 (Group) ANOVA examined the effect of slogan and group on product evaluations. There were no main effects of either Slogan or Group ( $F_s < 1$ , NS), but as hypothesized, there was a significant Slogan x Group interaction ( $F(1, 61) = 5.26, p < .03$ , Figure 1). Participants who received the tray slogan evaluated the product more favorably if they ate in dorms that used trays ( $M = 3.75$ ) than if they ate in dorms that did not use trays ( $M = 2.89$ ;  $F(1, 61) = 4.49, p < .04$ ). There was no difference between dorms for those who received the luggage slogan ( $F(1, 61) = 1.23, p > .25$ ). As predicted, participants who ate in dining halls with trays evaluated the product more favorably if they had received the tray slogan ( $M = 3.75$ ) than the luggage slogan, ( $M = 2.87$ ;  $F(1, 61) = 5.65, p < .02$ ). No effects due to slogan emerged for participants who ate in dining halls without trays ( $F < 1$ , NS).

*Moderated mediation analysis.* We also conducted a moderated mediation analysis (Preacher, Rucker, and Hayes, 2006) to examine whether, as predicted, reported exposure to dining hall trays would mediate the relationship between Group and product evaluation for people exposed to the tray slogan, but not for people exposed to the luggage slogan. First, an OLS regression found that the independent variable (experimental group) predicted the mediator (reported exposure to trays,  $t(1, 64) = 12.61, p < .001$ ). Then an OLS multiple regression model was used to predict the product evaluations based on the mediator (frequency of seeing trays), the moderator (Slogan), the independent variable (Group), and the interaction between the mediator and the moderator.

As predicted, results indicate the presence of moderated mediation (see web appendix for a full illustration); the effect of the mediator on the dependent variable depended on the moderator as evidenced by a significant mediator x moderator interaction ( $t(1, 64) = 2.35, p < .02$ ).

Specifically, reported exposure to trays mediated the relationship between group and product evaluation for participants exposed to the tray slogan (indirect effect,  $z = 2.81, p < .005$ ) but not for participants exposed to the luggage slogan (indirect effect,  $z = .57, NS$ ).

Individual mediational analyses for each condition clarify the results. For participants in the tray slogan condition, all four conditions for mediation were met. Dining hall type was correlated with device liking ( $\beta = .37, p < .04$ ) and frequency of seeing trays ( $\beta = .91, p < .001$ ). When both dining hall and frequency of trays were included in a regression predicting device liking, frequency of seeing trays was significant ( $\beta = .82, p < .04$ ) but dining hall was not ( $\beta = -.38, p > .20$ ). This pattern of results did not emerge in the luggage slogan condition. Dining hall type was correlated with frequency of seeing trays ( $\beta = .79, p < .001$ ) but not with device liking ( $\beta = -.19, p = .28$ ) and when both terms were included in a regression predicting product evaluation, neither trays ( $\beta = .13, p = .64$ ) nor dining hall ( $\beta = -.30, p = .30$ ) were significant predictors.

### *Discussion*

Supporting Hypothesis 3, results of Experiment 2 illustrate that product evaluations can be influenced by frequent exposure to conceptually-related cues. Participants evaluated a novel product more favorably when the product had a conceptual link to cues that were encountered frequently in their everyday environment. By using a control slogan, and control groups that evaluated the product in the absence of exposure to environmental cues, our results help rule out



alternative explanations. A moderated mediation provided further support for Hypothesis 4 that differences in frequency of exposure to conceptually-related cues drove the difference in evaluations. Reported exposure to trays mediated the relationship between group and product evaluation, but only for participants who had previously learned a conceptual link between the product and that cue. For participants who learned to link the product to a different cue (luggage), no such pattern of mediation emerged.

### *EXPERIMENT 3*

Experiment 3 examines how everyday exposure to features of the environment can influence actual consumption. We investigated whether students would eat more fruits and vegetables if a slogan reminding them to do so was linked to a common feature of their everyday environment (dining hall trays). Participants recorded what they ate over a two-week period; half-way through, they learned one of two slogans. Because only some of our participants ate in dining halls that use trays, we again chose a slogan involving the word “tray.” We theorized that this differential cueing by the environment would cause participants who were exposed to trays in their daily environment to consume more fruits and vegetables.

We tested this hypothesis in two ways. First, we compared the effect of our tray slogan for participants who eat in dining halls with trays (High Exposure group) to those who eat in dining halls without trays (Low Exposure group). Second, we compared effects of the tray slogan on our High Exposure group to a group that received a slogan that should not be cued as frequently by the environment (Competing Slogan group).

## Method

*Slogan pre-test.* Before conducting the main study we pre-tested possible slogans. Thirty-five respondents (all from dining halls with trays) rated a number of slogans. They were told that the National Board for Better Health was designing a campaign, and were asked to rate how much they liked each of 10 slogans (1 = Not at all, 7 = A great deal). They also rated how much they thought each slogan would influence their fruit and vegetable consumption (1 = Not at all, 7 = A great deal). We selected two slogans for our main experiment. One that would not be cued by the environment (competing slogan: “Live the healthy way, eat 5 fruits and veggies a day”) and one that would be frequently cued for half the sample (target slogan: “Each and every dining hall tray, needs 5 fruits and veggies a day”). Participants actually liked the *competing* slogan ( $M = 4.11$ ) more than the target slogan ( $M = 1.91$ ;  $t(34) = 8.85, p < .001$ ) and believed it was more likely to influence their consumption ( $M = 3.54$  vs.  $2.27$ ;  $t(34) = 5.15, p < .001$ ).

*Main study procedure.* Undergraduates ( $N = 59$ , 56% female) completed a group of studies and were compensated \$20 for their time. In one of the studies, participants were told that the experimenter was interested in how eating habits varied by day of the week and were asked to record what they ate over a two week period. Each evening, participants received an e-mail directing them to a website where they recorded their meals. They were asked to complete the survey as soon as they received the e-mail and were asked to be specific regarding what they ate.

After one week, participants came to the lab for an ostensibly unrelated study. They were told that the National Board for Better Health wanted feedback about a new campaign aiming to increase student health. The slogan exposure materials were similar to those used in the previous two studies but modified to involve fruits and vegetables. Approximately half the participants

whose dining halls used trays received the target slogan (High Exposure group, “Each and every dining hall tray, needs 5 fruits and veggies a day”), while the other half received the competing slogan (Competing Slogan group, “Live the healthy way, eat 5 fruits and veggies a day”). All participants whose dining halls did not use trays received the target slogan (Low Exposure group, “Each and every dining hall tray, needs 5 fruits and veggies a day”).

After two weeks, participants completed the final measures. They were asked how positively they felt about dining hall trays and how frequently they had seen trays in the past week (on 7-point scales). Participants recorded their gender and whether their dining hall used trays.

## *Results*

*Preliminary analyses.* Participants who ate in dining halls that used trays reported seeing trays more frequently in the past week than participants whose dining halls did not use trays ( $M = 5.89$  vs.  $1.42$ ;  $t(57) = 13.02$ ,  $p < .001$ ). There were no differences in liking for trays across the conditions ( $M_{\text{High Exposure}} = 4.43$  vs.  $M_{\text{Low Exposure}} = 3.96$  vs.  $M_{\text{Competing Slogan}} = 4.13$ ;  $F < 1$ , NS).

Using federal serving size guidelines, a coder (blind to condition) recorded the number of fruit and vegetable servings each participant consumed each day prior to, and following, the slogan manipulation. Because gender has been shown to have a significant impact on eating behaviors (Roos, Lahelma, Virtanen, Prattala, and Pietinen 1998) our main analysis included gender as a covariate. A 2 (Week) x 4 (Day) x 3 (Condition: Low Exposure vs. High Exposure vs. Competing Slogan) repeated measures ANCOVA found no significant Week x Day x Condition interaction ( $F(6,165) = 1.05$ ,  $p > .5$ ), thus we collapsed across days of the week and examined consumption using a 2 (Week) x 3 (Condition) repeated measures ANCOVA.

*Fruit and vegetable consumption.* There were no main effects of Week or Condition ( $p$ s > .20), but as predicted, a significant Week x Condition interaction emerged ( $F(2,55) = 3.14, p = .05$ , Figure 2). Participants in the High Exposure group were more affected by the slogan than those in the Low Exposure ( $F(1, 55) = 4.02, p < .05$ ), and Competing Slogan groups ( $F(1, 55) = 4.89, p < .03$ ). While participants in the control groups did not change their consumption (Low Exposure group,  $M_{\text{Pre-Slogan}} = 2.31$  vs.  $M_{\text{Post-Slogan}} = 2.18$ ; Competing Slogan group,  $M_{\text{Pre-Slogan}} = 2.60$  vs.  $M_{\text{Post-Slogan}} = 2.34$ ;  $F$ s < 1, NS), those in the High Exposure group increased consumption by 25% ( $M_{\text{Pre-Slogan}} = 2.16$  vs.  $M_{\text{Post-Slogan}} = 2.69$ ;  $F(1, 55) = 5.23, p < .03$ ).

*Relation to perceptions of cue frequency.* We also examined whether participants' self-reports of how frequently they were exposed to trays was correlated with product consumption. Consistent with our hypotheses, the more target slogan participants reported seeing trays, the more they increased their consumption of fruits and vegetables ( $r = .33, p = .03$ ). When both frequency of tray exposure and dorm type was entered in a mediational analysis, however, neither remained significant predictors of consumption behavior ( $\beta$ s < .19,  $p$ s > .50).

### *Discussion*

Supporting Hypothesis 1, results of Experiment 3 illustrate that the prevalence of everyday stimuli affected product choice outside of the laboratory setting: Creating a conceptual link between a reminder to eat more fruits and vegetables and a common real-world object increased fruit and vegetable consumption. Comparison groups and pretests allow us to eliminate several alternative explanations. These effects cannot be attributed to qualities of the slogan itself, as the same slogan did not change consumption for participants in the Low Exposure group. The

findings cannot be attributed to the particular dining halls either: Consumption did not increase for participants in the Competing Slogan Group. Thus, it was neither the slogan, nor the environment, that caused the consumption change, but rather the interaction between the slogan and cues in the environment.

The correlation between reported tray exposure and consumption is consistent with our hypothesis that product evaluations (measured here by consumption) increases with exposure frequency (H4). However, in contrast, the mediational test did not reach significance, as it did in the prior study. Of course, though exposure to conceptually-related cues should increase fluency, and thus product evaluation, choice and consumption are based on many factors in addition to evaluation. In this case, whether someone chose fruits and vegetables was likely based not only on their evaluations of those foods, but also on what they happened to do before the meal, who they happened to talk to while ordering, etc. In addition, both the priming and mere exposure literatures have repeatedly emphasized the disconnect between explicit or conscious awareness of exposure to the cue/prime and a variety of downstream effects of on everything from judgment to complex behaviors (Bargh et al. 2001; Fitzsimons and Bargh 2003; Kunst-Wilson and Zajonc 1980). Consequently, it should not be entirely surprising that participants' self-reported subjective perception of cue exposure is not always strongly predictive of the effects of this exposure on evaluations or choice. Indeed, we failed to find mediation by explicit self-report in Field Study 2 as well. The possibility exists that our self-report measure is not sensitive enough to pick up small variations in exposure, although it did significantly mediate the effects of tray exposure on liking in Experiment 2.

In five studies, we have illustrated that exposure to everyday objects in real-world environments can have a strong impact on accessibility, choice, and evaluation. Next,

Experiment 4 builds on those results by directly testing the role of our proposed underlying mechanism, conceptual fluency. Past research has found that fluency generated from exposure to conceptually-related primes (i.e., predictive contexts) can have a positive impact on product evaluations (Lee and Labroo 2004). Experiment 2 found initial evidence for the role of frequency of exposure, as measured via explicit self-report. But, Field Study 2 and Experiment 3 did not find evidence for mediation by frequency of exposure, perhaps because of the disconnect between explicit memory and effects of prior exposure (Kunst-Wilson and Zajonc 1980). Experiment 4 adopts a more objective method of measuring the effects of frequency, by manipulating the number of exposures directly.

#### *EXPERIMENT 4*

Experiment 4 examines the role of frequency in producing conceptual priming effects, investigating how evaluations are affected by varying exposures to conceptually-related cues. By conducting this study in a lab setting, we can manipulate frequency of exposure (versus relying on self-report), which permits a stronger test of the role of fluency in conceptual priming effects.

Experiment 4 also tests the boundaries of conceptual priming effects on product evaluations. We return to using pre-existing conceptual links (in this case, between cats and dogs) to further examine whether our effects are limited to novel or unfamiliar products, and whether they are dependent on deliberate learning and practice. Using existing links, rather than slogans, also allows us to rule out a possible alternative explanation for our results. One could argue that the results of Field Study 2 and Experiments 2 and 3 were due to cues priming the slogan over time, leading the slogan to become more fluent, and thus more effective (rather than the cues

influencing the fluency of the product itself). By relying on existing conceptual links, we can avoid this possibility. A funneled debriefing task (Bargh and Chartrand 2000) also allows us to examine the involvement of consciousness (H5).

We hypothesize that participants will evaluate Puma products more favorably when they have been exposed to dog images more frequently. It is well-established that cats and dogs have a strong cognitive association in memory, due to their many feature similarities as domestic pets (Smith, Shoben, and Rips 1974), and their frequency of co-occurrence in the lexicon (e.g., raising cats and dogs, fighting like cats and dogs; Lucas 1999; O'Seaghdha 1989). Because of these strong links between cat and dog, the activation of "dog" constructs in memory should spread to the related construct "cat." Indeed, research has shown that when asked for the first word that comes to mind when they hear "dog," 75% of people responded with the word "cat" (Moss and Older 1996). Consequently, we suggest that when exposed to dog images, the "cat" category will become active.

Research has also shown that activation naturally spreads from the category label to members of that category (Collins and Loftus 1975; Collins and Quillian 1969; 1972) and thus we assume that when the "cat" category is primed, members of that category (e.g., lions, pumas) will also become more accessible. Because the Puma brand is strongly linked to cats both directly (there is a picture of a cat on their logo) and indirectly (the brand-name is a member of the cat category), we assume that the Puma brand will be more accessible in memory following dog priming. We support this thinking in a pretest.

The increased accessibility of the Puma brand should clearly be unexpected and unpredictable to participants, as they have no recall of exposure to the brand. Thus, following the discrepancy-attribution hypothesis (Whittlesea and Williams 1998), we hypothesize that

participants will attribute the fluency to positive feelings toward the Puma brand, and respond with higher evaluations of Puma products.

We also provide an even stronger test of our theorizing by examining individual differences in recognition of Puma products. Exposure to dog images may increase the accessibility of the Puma brand, but this accessibility should only translate into a boost in evaluation of Puma products if participants have knowledge that those products as made by Puma. Consequently, we expect that exposure to dog images should only increase evaluation of Puma sneakers for participants who recognize those sneakers as made by the Puma brand.

*Pretest: Effect of Exposure to Dogs on Puma Brand Accessibility*

We first examined the assertion that varying exposure to dog images would impact the ease of processing (i.e., accessibility) of the Puma brand. If we are correct in suggesting that frequent cue exposure should increase the accessibility of conceptually-related products, then a higher number of exposures to dog images should increase the accessibility of the Puma brand and lead participants to recognize Puma as a brand of sneakers more quickly.

Participants (N = 46) completed two ostensibly unrelated studies. The first “study” manipulated exposure to images under the guise of examining the ability to perceive hue differences. Participants were shown a number of photos, told some of the photos had been altered to have green or red hues, and asked to rate the photos based on the specific color properties displayed.

The purpose of this task was to expose participants to varying numbers of exposures to conceptually-related cues (i.e., photos of dogs). Participants were shown 20 images. Those in the



zero exposure condition saw 20 images unrelated to the Puma brand (e.g., a stapler). Participants in the low exposure condition saw five images of dogs (and 15 unrelated images); participants in the high exposure condition saw 10 dog images (and 10 unrelated images).

Participants then began a response time task (see Whittlesea 1993 for use of a similar task to examine conceptual fluency). They were asked to quickly decide whether or not the stimulus presented (words or images) represents a brand of sneakers, and to press one of two keys to indicate their decision. In each of 40 trials, a word or picture appeared in the center of the screen and remained until the participant pressed one of the designated keys. Stimuli appeared in random order. Six were related to Puma (e.g. the word Puma or the Puma logo); fillers were from other categories (e.g. the word “Plank” or a Toyota logo). Our dependent variable was response latencies to the Puma brand. We averaged the response time for Puma stimuli and examined this index in a one-way (Number of Product Cues: None vs. Small vs. Large) ANOVA.

As predicted, exposure to conceptually-related cues influenced product accessibility ( $F(2, 44) = 3.60, p = .04$ ). Response latencies indicated that compared with participants exposed to no images of dogs ( $M = 1118$  ms), participants were able to more quickly identify Puma stimuli if they had been exposed to five ( $M = 813$  ms;  $t(44) = 2.56, p = .01$ ), or ten ( $M = 849$  ms;  $t(44) = 1.99, p = .05$ ) dog images. Participants exposed to five vs. ten images did not differ ( $t < .5, NS$ ). We now turn to examine the effect of exposure to dogs on evaluations of the Puma brand.

### *Main Study Method*

Participants ( $N = 109$ , 71% female) completed two ostensibly unrelated studies. Participants were randomly assigned to condition and were entered in a drawing for \$25 gift certificates as

compensation. The first study was identical to the image exposure task used in the pretest, and exposed participants to varying numbers of conceptually-related cues (dog photos).

The second study examined product evaluation. Participants evaluated products from the target brand (four pictures of Puma sneakers,  $\alpha = .82$ ) as well as products from other sneakers brands (e.g., Reebok sneakers).<sup>1</sup> Participants then completed some ancillary measures and a funneled debriefing task. To examine whether participants recognized the Puma sneakers as belonging to the Puma brand, they were shown a number of sneaker images (including the pictures of Puma sneakers) and asked to write the brand name. Following Bargh and Chartrand (2000), the debriefing task asked them to speculate on the purposes of the two studies, if they were connected, if their response to the second was affected by the first, and if so, how. Finally, they reported their mood on three 7-point scales (happy, excited, and upbeat,  $\alpha = .89$ ).

## *Results*

*Preliminary analyses.* Exposure to product related cues did not affect participants' reported mood ( $M_{\text{Zero}} = 3.96$  vs.  $M_{\text{Five}} = 4.07$  vs.  $M_{\text{Ten}} = 3.89$ ;  $F(2, 106) = .6$ , NS). No participants guessed the connection between the two studies. Even when asked to imagine how such influence might have occurred, the large majority of participants denied the possibility. Evaluations of the Puma sneakers and the sneakers from other brands were each averaged to create an evaluation index for the cue-related and cue-unrelated products. Participants were split by whether they correctly identified all Puma sneakers as from the Puma brand. Evaluations were examined using a 3

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<sup>1</sup> A few pairs of the sneakers contained small pictures of cats next to the Puma insignia. We digitally removed these images to ensure we were measuring evaluations of the Puma brand itself, removing any possible interfering role of cat images alone. Participants could still recognize the sneakers as Pumas (based on the insignia and brand-typical features).

(Frequency: Zero vs. Low vs. High Exposure) x 2 (Product Recognition: High vs. Low) x 2 (Sneaker Brand: Conceptually-Related vs. Unrelated) ANOVA.

*Main analyses.* The analysis revealed a main effect of Sneaker Brand ( $F(1, 106) = 4.30, p = .04$ ), a two-way Sneaker Brand x Product Recognition interaction ( $F(1, 106) = 4.63, p = .03$ ), as well as the predicted three-way Frequency x Product Recognition x Sneaker Brand interaction ( $F(2, 106) = 5.72, p < .005$ , See Table 2).

To better understand this interaction, we split the data in two ways. First, we ran separate Frequency x Sneaker Brand ANOVAs for participants who did vs. did not recognize Puma sneakers. As predicted, among participants who recognized the Puma sneakers, the analysis revealed a significant Frequency x Sneaker Brand interaction ( $F(2, 66) = 5.42, p < .01$ ). Specifically, exposure to a greater number of dogs increased evaluations of the conceptually-related products (i.e., Puma-brand sneakers;  $F(2, 66) = 7.43, p = .001$ ) but had no effect on evaluations of unrelated products (i.e., other sneakers;  $F < .25, NS$ ). Among participants who did not recognize the Puma sneakers, there was no Frequency x Sneaker Brand interaction ( $F(2, 41) = 1.38, p > .25$ ), only a main effect of Sneaker Brand ( $F(1, 41) = 7.58, p = .01$ ).

We also ran separate Frequency x Product Recognition ANOVAs for each sneaker brand. For Puma sneakers, there was a significant Frequency x Product Recognition interaction ( $F(2, 106) = 4.64, p = .01$ ). Exposure to more dogs increased the evaluation of Puma sneakers for participants who recognized those products as made by Puma ( $F(2, 106) = 7.20, p = .001$ ) but had no effect on participants who did not recognize those products as made by Puma ( $F < .5, NS$ ). For unrelated products there were no significant effects ( $Fs < .75, NS$ ).

As hypothesized (H4), the effects of cue frequency on product evaluations were linear in nature. Compared to the evaluations of participants who saw zero pictures of dogs ( $M = 2.85$ ),

participants evaluated Puma sneakers more favorably if they saw five pictures of dogs ( $M = 3.67$ ;  $t(66) = 2.11, p = .04$ ), or 10 pictures of dogs ( $M = 4.53$ ;  $t(66) = 16.11, p < .001$ ). Participants who saw 10 pictures of dogs also evaluated Puma sneakers more favorably than participants who saw only five pictures of dogs ( $t(66) = 2.00, p = .05$ ).

### *Discussion*

Supporting Hypotheses 3 and 4, Experiment 4 illustrates that fluency caused by repeated exposure to a conceptually-related stimulus can increase product evaluations. Participants evaluated Puma sneakers more favorably the more frequently they were exposed to pictures of dogs, but only if they recognized those sneakers as made by the Puma brand. Similar effects were not found on evaluations of products that were less related to the cue (i.e., sneakers from other brands). These findings extend the findings of the previous experiments to a context in which cue exposure is manipulated, rather than measured.

Supporting Hypothesis 5, these results also illustrate that conceptual priming effects can emerge without deliberate learning and can occur outside of conscious awareness. While participants in prior studies learned to link the product and cue, and could thus possibly have elaborated on it consciously when making product evaluations, the pre-existing conceptual link between dogs and cats produced the same pattern of results in Experiment 4. Responses to the funnel debriefing task further support the lack of conscious involvement in these conceptual priming effects, indicating that participants possessed no awareness of how the dog photos affected their ratings of Pumas. Given this lack of understanding, it is safe to presume that

participants were not consciously thinking about the conceptual connection between dogs and Pumas, and that these effects resulted from the automatic spread of one construct to another.

Finally, the accessibility pretest supports the suggestion that frequent exposure to conceptually-related cues affects a product's conceptual fluency or ease of processing (Lee and Labroo 2004). Participants were faster to recognize Puma as a sneaker brand when they had been previously exposed to pictures of dogs. Together, these findings underscore our suggestion that conceptual priming elicits positive evaluations by increasing fluency. By manipulating frequency of exposure, we were able to avoid the problems of measuring exposure via explicit and memory-based self-report items. Further, the fact that directly manipulating exposure frequency produced a linear pattern of results on evaluations provides strong support for the role of exposure frequency in producing conceptual priming effects, helping answer some of the questions raised by the inconsistent results using reported exposure as a mediator in our prior studies. Importantly, while this lab experiment allowed us to provide a better test of our proposed mechanism by manipulating exposure in a controlled setting, it used repeated exposures occurring over a very brief period. The types of cue exposure we are most interested in occur over days and weeks, not seconds. If accessibility were measured after a week in which participants were exposed to different numbers of conceptually-related cues, accessibility increases should be more visible.

### *GENERAL DISCUSSION*

Researchers have argued that “consumer behavior is strongly influenced by subtle environmental cues” (Dijksterhuis, et al. 2005, p. 193), but few papers have empirically

investigated this argument. The current research contributes to this goal by examining how everyday exposure to conceptually-related cues can affect product accessibility, evaluation, and choice. The following sections review the key findings and implications.

### *Summary of Findings and Contributions*

Six studies illustrate that the prevalence of perceptually and conceptually-related stimuli can shape real-world judgment and decision-making. Experiment 1 found that merely using a different color of pen to complete a survey led people to choose more perceptually-related products; participants who used an orange (green) pen choose more orange (green) products. Similar effects were found using conceptually-related cues and actual product choice in the real-world environment. People who learned a slogan linking fruits and vegetables to an environmental cue, and whose daily environment contained more of those cues, consumed more fruits and vegetables (Exp. 3). Results showed that the prevalence of conceptual primes also influences product evaluations and purchase likelihood, whether those primes were measured in participants' everyday environments (Field Study 2, Exp.2) or manipulated in the lab (Exp. 4).

The data further suggest that these effects reflect an increase in fluency. Field Study 1 illustrated that products were more accessible in times of the year when there were more perceptually-related cues in the surrounding environment. Experiments 2 and 3 found that participants' reported exposure to conceptually-related cues was correlated with product evaluations (Exp. 2) and actual consumption (Exp. 3). Similar results were found when exposure to conceptual primes was directly manipulated (Exp. 4) and the Experiment 4 pretest directly illustrated that exposure to conceptual primes increased ease of processing. The set of results

also suggest that conceptual fluency effects are not dependent on deliberate learning of the conceptual link, can operate outside awareness, and can occur for novel and familiar brands.

These findings contribute to our understanding of the influence of real world environments on consumer behavior. People do not choose products in isolation, and yet we know little about the role that daily environments play in shaping consumer choice. By showing that cues have an impact even in noisy real-world situations, this work extends psychological research on priming (e.g., Dijksterhuis and Bargh 2001) and marketing research on the effects of cue exposure (e.g., Lee 2002; Shapiro 1999). The ecological validity of priming has recently attracted interest in both marketing and psychology literatures (Bargh 2006; Dijksterhuis et al. 2005; Simonson 2005); our findings support the relevance of this research for real marketing contexts.

These findings also support Lee and Labroo's (2004) argument that exposure to related cues can influence responses to a stimulus via conceptual as well as perceptual connections. Most research on cue exposure has focused on the influence of direct exposure to a stimulus (e.g., Zajonc, 1968). Our findings show that cue exposure can not only affect attitudes towards the exposed object but also towards any object that shares a conceptual relation (see also Lee and Labroo 2004; Nedungadi 1990; Whittlesea 1993). By moving beyond the use of pre-existing conceptual links by constructing novel associations, the results provide a powerful demonstration of the impact of conceptual priming effects on consumer behavior.

Finally, these findings contribute to recent research on conceptual fluency. Past research has focused on the effects of recent exposure on judgment and decision making, showing that conceptually-related stimuli are evaluated more positively immediately following priming. Our findings extend this work by suggesting that similar effects can result from frequent exposure to a related stimulus. This finding suggests that conceptual fluency can "accumulate" in some sense

over a period of time. Supporting the theorizing of previous researchers on the role of fluency in cue exposure effects (Lee and Labroo 2004; Whittlesea 1993), our findings also show that an underlying mechanism of conceptual priming effects is ease of processing.

### *Implications*

Our results suggest that marketers will be more effective to the extent that they link their product to prevalent environmental cues. In addition to relying on existing conceptual relationships, our findings indicate that marketers can also *create* novel links between their product and a commonly encountered feature of the consumer environment. This finding could lead to innovative marketing strategies, in which marketers customize slogans, brand names, and advertising messages based on the specific features common to various environments, whether those be specific geographic regions (e.g., Palm trees for West Coast consumers) or even specific demographic groups (e.g., lockers for students or toys for new parents). Further, a given cue may have different conceptual links for different subpopulations (e.g., men and women may have different associations with shopping), and thus the same cue may have different effects on different groups (Wheeler and Berger 2007). Consequently, marketers should also be aware of the specific links among the specific group they are trying to reach.

These results also speak to marketers' efforts to make their slogans catchy in order to increase sales. In Experiment 3, our comparison slogan was liked more and our participants found it more persuasive. Nonetheless, the slogan that was more effective was the one that linked the product to a commonly encountered feature of the participants' everyday environment. Thus



while catchiness may indeed be important, this result suggests that marketers should also pay greater attention to whether their slogans (and products) will be cued by the environment.

More generally, these results speak to the importance of examining how the distribution of cues in different environments affects consumer behavior. While laboratory based studies have made great strides in understanding the mechanisms behind the effects on primes on behavior, research is just starting to examine how these effects play out in real world consumer environments (Berger & Heath, 2005; Berger, Meredith, & Wheeler, 2006; North, Hargreaves, & McKendrick, 1997). Environmental cues influence the success of implementation intentions (Gollwitzer, 1999), trigger addictive behaviors (Bernheim & Rangel, 2004), and influence the salience of cultural identities (Hong, Morris, Chiu, & Benet-Martinez, 2000). Consequently, the distribution of cues in different environments should have important affects on the prevalence of different behaviors in those environments (see Berger & Heath, 2005; Saiz & Simonsohn, 2007 for methods of measuring cue distribution).

In conclusion, marketers should consider the nature of consumer environments when designing product names, packages, and advertising campaigns. A car dealership in Minnesota might consider linking itself to cold weather or mittens, while a restaurant in Arizona might want to consider links to the dry climate. Depending on what planet NASA decides to go to next, the Mars candy company might even want to think about introducing a new candy bar.

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TABLE 1:  
FIELD STUDY 2: EFFECT OF TRAVEL AND SLOGAN ON PURCHASE LIKELIHOOD  
AND WILLINGNESS TO PAY

	<b>Purchase Likelihood</b>		<b>Willingness To Pay</b>	
	<i>No Travel</i>	<i>Travel</i>	<i>No Travel</i>	<i>Travel</i>
<b>Luggage Slogan</b>	2.55 <sup>a</sup>	3.55 <sup>b</sup>	\$ 68.16 <sup>a</sup>	\$ 103.10 <sup>b</sup>
<b>Tray Slogan</b>	2.50 <sup>a</sup>	2.22 <sup>a</sup>	\$ 67.05 <sup>a</sup>	\$ 50.31 <sup>a</sup>

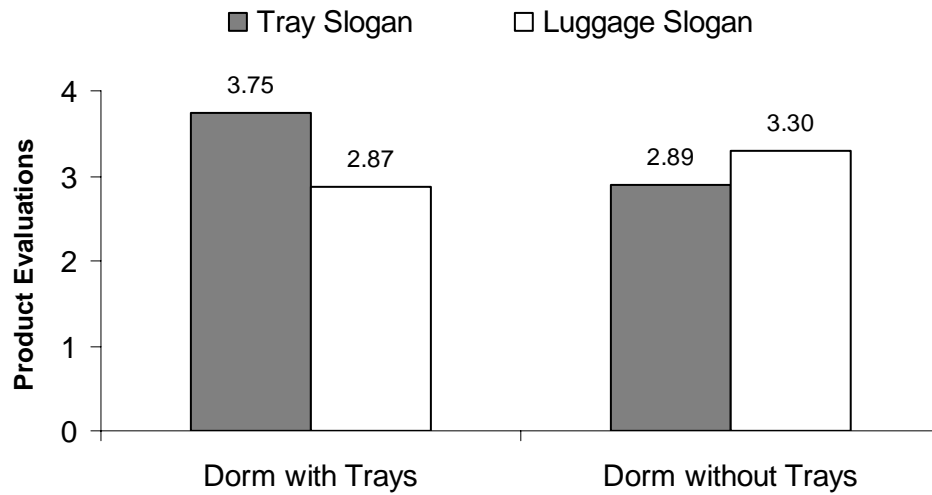
Caption: Within each dependent variable, means with different superscripts differ significantly at  $p < .05$ . Participants reported higher purchase likelihood and greater willingness to pay for a digital music player when it was linked conceptually to cues that were encountered frequently in their everyday environment.

TABLE 2:  
 EXPERIMENT 4: EFFECT OF FREQUENCY OF EXPOSURE TO INDIRECT PRODUCT  
 CUES AND RECOGNITION OF PRODUCT MAKER ON EVALUATION OF DIFFERENT  
 TYPES OF PRODUCTS

	Low Puma Recognition		High Puma Recognition	
	Puma Sneakers	Non-Puma Sneakers	Puma Sneakers	Non-Puma Sneakers
Zero Dog Images	3.39 <sup>a</sup>	3.55 <sup>a</sup>	2.85 <sup>a</sup>	3.67 <sup>a</sup>
Five Dog Images	3.17 <sup>a</sup>	4.00 <sup>a</sup>	3.67 <sup>b</sup>	3.84 <sup>a</sup>
Ten Dog Images	2.93 <sup>a</sup>	4.18 <sup>a</sup>	4.53 <sup>c</sup>	3.50 <sup>a</sup>

Caption: In a given column, means with different superscripts differ significantly at  $p < .05$ . Participants evaluated Puma sneakers more favorably the more frequently they were exposed to conceptually-related cues (images of dogs), but only if they recognized the sneakers as made by the Puma brand. Similar effects were not found for sneaker brands that were conceptually unrelated to the cue.

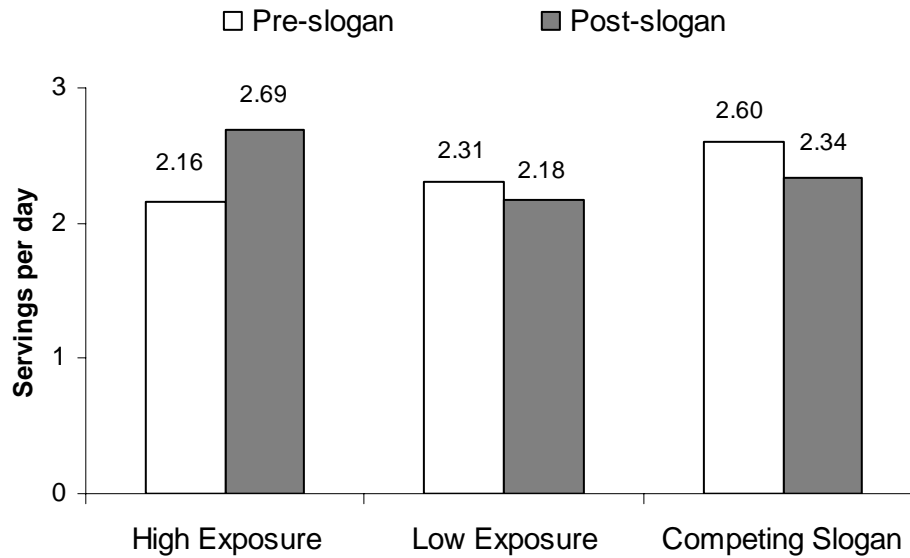
FIGURE 1:  
EXPERIMENT 2: EXPOSURE TO ENVIRONMENTS WHICH CONTAIN MORE  
CONCEPTUALLY LINKED PRODUCT CUES LEADS TO MORE FAVORABLE PRODUCT  
EVALUATIONS



Caption: People evaluated the digital music player more favorably when it was conceptually linked to cues that were encountered frequently in their everyday environment.



FIGURE 2:  
EXPERIMENT 3: CONCEPTUALLY LINKING A PRODUCT TO A CUE WHICH  
FREQUENTLY APPEARS IN THE ENVIRONMENT CAN INCREASE PRODUCT CHOICE



Caption: The High Exposure and Low Exposure conditions refer to whether the participants' environments contained a relatively high or low number of cues linked to the dependent variable (fruits and vegetables).

## WEB APPENDIX

Notes on Field Study 1: One might expect that any Halloween-related candy (even ones not related to orange) should show at least some increase in accessibility due to the holiday. However, general Halloween cues (outside of the color orange) should activate many of these non-orange candies equivalently, and thus no single one would be likely to show a significant increase in accessibility relative to the others.

Notes on Experiment 1: Below is a sample choice pair from the experiment.

## EXAMPLE OF CHOICE PAIR FROM EXPERIMENT 1



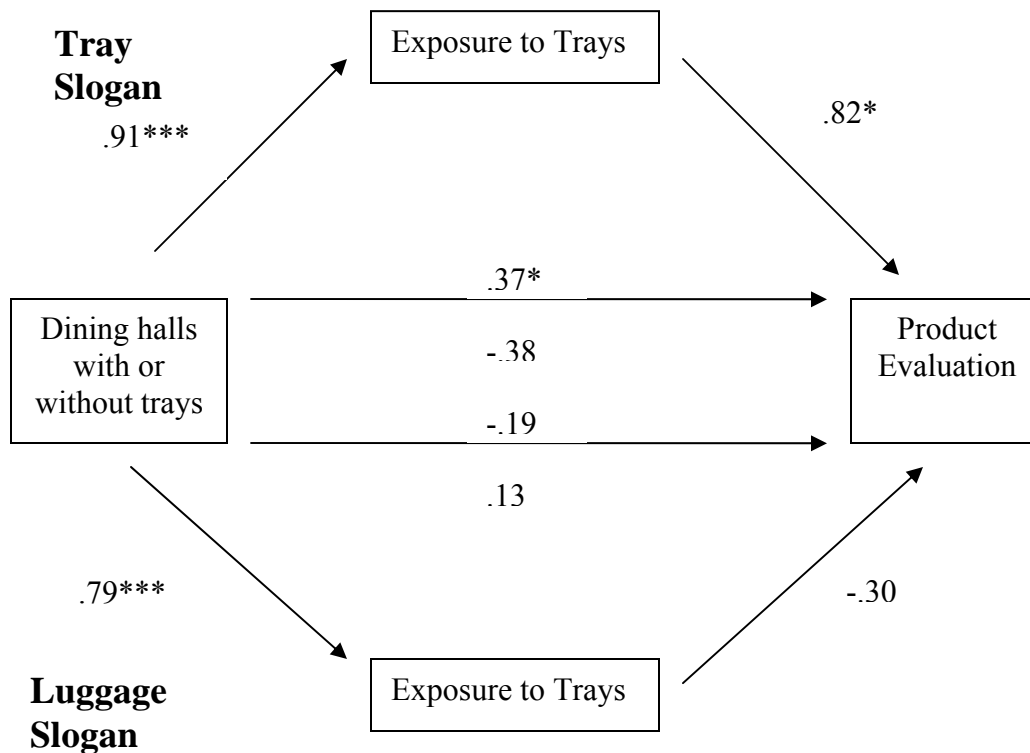
Notes on Field Study 2: The two slogans used were liked equivalently. Pretest participants ( $N = 20$ ) rated how much they liked the slogans (1 = Not at all, 7 = A great deal) and the two slogans were liked equivalently ( $M_{\text{Luggage}} = 2.80$ ,  $M_{\text{Tray}} = 2.30$ ;  $t(19) = 1.39$ ,  $p > .15$ ).

Notes on Experiment 2: Participants also completed the purchase likelihood and willingness to pay measures from Field Study 2. Results on these measures were essentially identical to those found on product evaluations, and were thus omitted for the sake of brevity. Below are the means from the preliminary analyses.

## MEANS FOR THE PRELIMINARY ANALYSES IN EXPERIMENT 2

	Need for Digital Music Player		Tray Liking		Frequency of Exposure to Trays	
	Luggage Slogan	Tray Slogan	Luggage Slogan	Tray Slogan	Luggage Slogan	Tray Slogan
Dorm without Trays	2.53	2.42	4.27	3.75	2.00	1.58
Dorm with Trays	2.37	3.06	4.53	3.78	5.95	6.11

Below is a display of the paths for the moderated mediation. Reported exposure to an environmental cue (dining hall trays) mediated the relationship between experimental grouping and product evaluation, but only among participants who had previously learned a conceptual link between the product and the cue. The coefficient above a given path represents the direct effect without the mediator in the model, and the coefficient below a given path represents the direct effect when the mediator is included in the model. \*,  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , two-tailed.



Notes on Experiment 3: The consumption analysis yielded similar results when gender was not included. One possible alternative explanation is that increased consumption only occurred in instances when participants were themselves having meals with a tray, because the slogan instructed that every tray needed a certain number of fruits and vegetables. While we cannot rule out this alternative, the fact that the other experiments found similar results when the cue was not present during evaluation supports our overall interpretation.

Notes on Experiment 4: Participants in the main study also evaluated a few products unrelated to sneakers (e.g., boots and belts). The effects on these items were identical to those found on non-Puma sneakers (i.e., no effect of exposure to dogs), and are omitted for the sake of brevity. Below is an example of one of the stimuli (i.e., dog images) used in the priming task, as well as one of the pairs of Puma sneakers that was evaluated.

#### EXAMPLE STIMULI AND ITEM RATED FROM EXPERIMENT 4

