

# Consumer Contamination: How Consumers React to Products Touched by Others

Although consumers like to touch products while shopping, the authors propose a theory of consumer contamination, positing that consumers evaluate products previously touched by other shoppers less favorably. The authors test the theory by manipulating cues that increase the salience that consumer contact has occurred. Furthermore, the authors investigate the role of disgust as the underlying mechanism of the theory.

A recent article in *The New York Sun* (Vanech 2005) highlights the difficulty that cosmetic retailers have in managing consumers' touching and interacting with their product offerings. Matthew Waitesmith, vice president of MAC cosmetics, is quoted as saying "we never double-dip" (p. 20), in reference to stringent policies the company uses in an effort to alleviate consumer concern over trial and sampling of its retail products. Similarly, in the best-selling book, *Why We Buy*, Paco Underhill (2000) discusses the challenges that retailers face in effectively managing the impact of consumers' touching display products. He notes that consumers often open the packaging of products to touch and feel them but usually choose to buy products that have been or appear to be untouched by others. Indeed, it is common for consumers to try on an article of clothing or flip through a magazine but, after deciding to make a purchase, select a "fresh" one from the back of the display. It is clear that there is a strong consumer aversion to touched products, and it is difficult to manage consumer touching behavior. However, little research has investigated the reason for this phenomenon or has provided managers with insight into how to address its implications.

Recently, marketing researchers have found that information obtained through physical touch plays a central role in the evaluation of consumer products (Mooy and Robben 2002; Peck and Childers 2003). The importance of physical touch in consumption has been cited as one of the critical factors that has limited the adoption of online shopping, an environment that is void of tactile information (Alba et al.

1997; Citrin et al. 2003; McCabe and Nowlis 2003). Although prior research suggests that touch has a positive impact on consumer information search and product evaluations, the goal of the current research is to show that consumer contact with products may actually be a double-edged sword for marketers. Specifically, we develop a theory of consumer contamination, which we define as contamination from consumer touching. In the product context we investigated herein, this behavior results in negative implications for a touched product. Importantly, in our research, we test the impact of consumer contamination by examining cases in which products are unharmed objectively by contact with other consumers, but nevertheless the contact is still viewed as a contamination event. This differs from actual physical contamination in which a product becomes soiled or dirty as a result of consumer contact.

Using the law of contagion (Frazer [1890] 1959; Mauss [1902] 1972; Tylor [1871] 1974) as a theoretical framework, we propose that when consumers become cognizant that another consumer has previously touched a product, their evaluations of and purchase intentions for the product decrease. We test this prediction in a retail shopping environment by manipulating factors that increase the salience that consumer contact has occurred. We refer to such factors as "contamination cues." In particular, our research investigates the effects of three contamination cues—proximity to contact, time elapsed since contact, and the number of contact sources—on consumers' product evaluations and purchase intentions. In addition to establishing the impact of consumer contamination in a retail context, we also provide insight into the underlying process through which consumer contamination operates by investigating the role of disgust as the driving mechanism. Our research reveals that the increased salience of contact through a variety of contamination cues negatively affects consumer evaluations of touched products.

## Conceptual Background

### *Law of Contagion*

In the late 1800s and early 1900s, anthropologists developed a conceptual framework for the laws of sympathetic

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magic (Frazer [1890] 1959; Mauss [1902] 1972; Tylor [1871] 1974). These laws summarize a pattern of beliefs and practices that exist over several traditional cultures to describe how the world works. One of the central laws of sympathetic magic is the law of contagion. According to this law, when a source (person/object) and a recipient (another person/object) come into direct or indirect contact, the source influences the recipient (Rozin and Nemeroff 1990). This influence arises because when the two touch, the source transfers its essence (i.e., some or all of its essential properties) to the recipient (Nemeroff and Rozin 1994). Notably, the essence does not need to be visible to the naked eye and can be composed of invisible entities (Rozin and Nemeroff 1990). According to the law, the source's essence remains a part of the recipient even after contact has been broken (Rozin and Nemeroff 1990).

Previous research has indicated that the law of contagion can play a significant role in an interpersonal context. For example, in anthropological research on the Hua tribe of Papua New Guinea, Meigs (1984) finds that when a Hua woman marries and moves to her husband's community, no one in the community will consume the food she produces and/or serves. This refusal arises because the villagers believe that the woman's essence has been transferred to the food; if they accept the food, they will become polluted with her properties (Meigs 1984).

In a different context, correlational research has shown that people can have both positive and negative responses to objects that have been touched by others. Although people are reluctant and uncomfortable coming into physical contact with an object that has been used by a disliked person (e.g., a laundered sweater that belonged to Adolf Hitler), this research shows that they sometimes evaluate objects used by people they like more favorably (e.g., a hamburger with a bite taken out of it by their lover; Nemeroff 1995; Rozin, Markwith, and McCauley 1994; Rozin, Millman, and Nemeroff 1986; Rozin et al. 1989). However, the processes that are believed to underlie such negative and positive effects from contact are not identical. Negative contamination (i.e., the value of an object is decreased through contact) has been shown to be the result primarily of a residue model that results from physical contact. Conversely, positive contagion (i.e., the value of an object is increased through contact) has been found to be the result strictly of a symbolic interaction model that is based on interpersonal/moral factors (Nemeroff and Rozin 1994). Thus, previous research shows that negative contamination effects are driven primarily by a transfer of essence, as in the Hua tribe example, and that positive contamination effects arise primarily because people want to be associated with an item that belongs to someone about whom they have strong, positive feelings (Nemeroff and Rozin 1994). Although both positive and negative contamination are possible in the retail context under investigation in this article, we focus specifically on negative contamination effects.

### ***Negative Contamination in a Retail Context***

In O'Reilly and colleagues' (1984) study, 76% of survey respondents indicated that they would not buy used under-

clothing, and 20% refused to purchase used overcoats. The justification for the low desirability of the used products was related to a fear of contamination. Because the original owners of the used products remained anonymous to consumers, these feelings could not be based on associations but instead suggest a belief that the clothing was contaminated simply because it had been handled and owned by someone else previously. Indeed, there are many cases in which contact with consumers actually causes products to become less desirable to other consumers as a result of physical contamination from incidental touching or usage (e.g., floor-room models, demonstration products). In the current research, we argue that consumers generalize this notion for even brief and incidental contact that does not involve formal usage, ownership, or actual physical contamination.

This generalized contamination effect has negative implications for products that have been handled by consumers. Much like second-hand items or demonstration products that suffer devaluation (Kotler and Mantrala 1985), contamination that arises from incidental consumer contact should also lead consumers to devalue touched products. This devaluation should be manifested by lower evaluations of and purchase intentions for touched products than for untouched products.

Note also that consumer contact with a product does not need to be formally observed to produce contamination effects (Rozin, Markwith, and McCauley 1994; Rozin et al. 1989). Rarely does a person actually see who has put clothes on consignment or who has previously test-driven an automobile. In these cases, consumers infer that contact has occurred. Thus, simply a cue in the retail environment that signals to a consumer that someone else has previously touched the product is necessary for consumer contamination to occur. Given this, we expect that perceived contact between consumers and products is sufficient, and observed physical contact is not essential for the elicitation of consumer contamination effects. More formally,

$P_1$ : Perceived contact between a consumer and a product results in other consumers having less favorable evaluations of the touched product.

Implicit to our proposition is the presence of environmental signals that provide cues to the consumer that a product has been touched. These signals, or contamination cues, can be relayed through a variety of sources, including, but not limited to, other consumers, sales staff, merchandising placement, and product characteristics. These cues increase the salience of the contamination and thus increase the likelihood of consumer contamination. Angyal (1941) provides support for this idea by noting that the greater the salience or intimacy of a contamination event, the greater is the impact of contamination effects. Therefore, the more clearly a contamination cue signals that contact between a consumer and a product has taken place, the greater is the effect of contamination on other consumers' evaluations of that product. Moreover, the greater the intimacy of contact, the greater is the likelihood of contamination occurring. This implies that contamination effects differ depending on the type of cue present and the type of product, because the

degree of intimacy changes by product category. In the current research, however, we focus only on the effects of different contamination cues.

Although there are likely to be several possible contamination cues present in the retail environment, we focus our empirical investigation on three specific cues: proximity to contact, time elapsed since contact, and number of contact sources. In the next section, we discuss and develop specific hypotheses that are related to these contamination cues. Furthermore, drawing on previous work on contamination (Rozin and Fallon 1987; Rozin, Millman, and Nemeroff 1986), we also forward a prediction about the role of disgust as a central mechanism in the incidence of consumer contamination in a retail context.

## Hypotheses

### *Proximity to Contact as a Contamination Cue*

The first contamination cue we examine is proximity to contact, which we define as the physical location of the product relative to where it would be touched by other consumers in a retail setting. To understand how proximity to contact influences evaluations and purchase intentions of touched products, we draw from social impact theory (SIT; Latané 1981), which proposes that the presence or action of a real, implied, or imagined social presence affects a target. This impact results from three forces: immediacy (i.e., proximity), number (i.e., how many), and strength (i.e., importance; Latané 1981). One of the theory's principles predicts that the impact of each of the forces increases as a power function. Thus, in terms of proximity, the greatest impact arises from close proximity as opposed to being farther away (Argo, Dahl, and Manchanda 2005; Latané and Wolf 1981). Extending this principle to consumer contamination, we predict that contamination salience will be greater the closer a product is situated to a location of contact. We expect that this will happen because as the product moves closer in proximity to a contact location, consumers will perceive that there is an increase in the probability that the product has been touched. This expectation is consistent with observations from retail settings in which consumers often select products, such as magazines, that are located at the bottom or back of a display (i.e., where there is a lower probability that the product has been touched because it is located farther out of a consumer's reach). Thus, we expect that as contamination salience increases through proximity to contact, there will be an increase in the impact of consumer contamination on product evaluations and purchase intentions. On the basis of this discussion, we expect that this impact will be negative in valence.

H<sub>1</sub>: Consumer product evaluations and purchase intentions will be lower if a product is physically proximate (versus not physically proximate) to the location where another consumer is believed to have had contact with it.

### *Time Elapsed Since Contact as a Contamination Cue*

The second contamination cue we consider is the amount of time that has elapsed since consumer contact has occurred.

Unlike proximity to contact, it is unclear how time influences product evaluations and purchase intentions. The law of contagion suggests that when contact has been made between a source and a recipient, the source continues to influence the recipient indefinitely—"once in contact, always in contact" (Frazer [1890] 1959; Rozin, Markwith, and McCauley 1994). In other words, after an object has been contaminated, it should remain that way, even after the two items are no longer touching (Frazer [1890] 1959). Preliminary evidence for this idea has been found in two correlational studies. In the first study, Rozin and colleagues (1989) find that attempts to cleanse a contaminated item by washing it failed to eliminate the effects of contamination completely. In the second study, Hejmadi, Rozin, and Siegal (2004) demonstrate that children believed that juice continued to be contaminated even after a contaminant had been removed and the juice was purified. These findings provide some suggestive evidence that consumers will believe that a product is contaminated by physical contact with another consumer, regardless of the amount of time that has elapsed since it was last touched. Thus, the impact of consumer contamination on product evaluations and purchase intentions should be consistent across time.

However, recent research on construal-level theory suggests that consumers' responses to a contamination event vary at different points in time (Liberman and Trope 1998; Trope and Liberman 2003). Trope and Liberman (2003) examine how temporal distance systematically alters the way people mentally construe future events. They posit that when people consider distant-future events, they form high-level construals (i.e., abstract representations). In contrast, when people consider near-future events, they form low-level construals that involve more concrete and vivid details. Although Trope and Liberman focus exclusively on the impact of temporal distance for future events, they suggest that construal theory principles should apply to past events as well. Therefore, when people consider distant-past events, similar to the distant-future events, they will form higher-level, less concrete construals about the event than when they consider near-past events. Given this, it would be expected that the salience of consumer contamination would be mitigated as time passes. In other words, the shorter the time elapsed since consumer contact, the stronger is the consumer contamination effects realized. We offer two competing hypotheses:

H<sub>2a</sub>: Consumer product evaluations and purchase intentions will be lower if a product is believed to have had contact with another consumer, regardless of the time elapsed since contact.

H<sub>2b</sub>: Consumer product evaluations and purchase intentions will be lower if a product is believed to have had contact with another consumer; this effect will be mitigated as time elapses since contact.

### *Number of Contact Sources as a Contamination Cue*

The third contamination cue we examine is the number of contact sources. Specifically, we consider how consumer contamination effects are influenced by the number of consumers believed to have had physical contact with a prod-

uct. As we mentioned previously, SIT predicts that the impact of the number of people who constitute a real, imagined, or implied social presence will increase as a power function. Therefore, we expect that an increase in the number of sources that a consumer believes have previously touched a product will increase the contamination effects.

Although SIT predicts that contamination effects should be stronger (i.e., lower product evaluations) when more consumers are believed to have come in contact with a product, multiple contact sources might actually increase product evaluations by signaling that the product is popular. Thus, rather than lower the value of the product, contact by multiple consumers may heighten evaluations and purchase intentions of a touched product by emphasizing its popularity. We hypothesize the following competing predictions:

H<sub>3a</sub>: Consumer product evaluations and purchase intentions will be lower if a product is believed to have had contact with many (versus one) consumers.

H<sub>3b</sub>: Consumer product evaluations and purchase intentions will be higher if a product is believed to have had contact with many (versus one) consumers.

### **Feelings of Disgust as the Underlying Mechanism**

The previous discussion argues that as contamination becomes more salient to consumers, they are more likely to experience consumer contamination effects. What is unclear, however, is the underlying mechanism that drives consumers to respond unfavorably to products that have been touched by other consumers. Previous research has suggested that the law of contagion operates in the Western world in the domain of disgust (Rozin, Millman, and Nemeroff 1986), which is defined as revulsion in response to an offensive object (Rozin and Fallon 1987). Feelings of disgust have been shown to underlie contamination effects in various contexts, including food rejection, disease, and moral taint (Rozin, Haidt, and McCauley 1993; Rozin, Markwith, and Nemeroff 1992). Furthermore, in general, disgust manifested in rejection and/or lower evaluations of a contaminated object (Rozin and Fallon 1987; Rozin, Haidt, and McCauley 1993; Rozin and Nemeroff 1990; Rozin, Millman, and Nemeroff 1986).

Given these findings, we expect that consumers who perceive that physical contact has occurred between another consumer and a product will experience feelings of disgust toward the contaminated product. In turn, these feelings of disgust will translate into negative consumer evaluations and purchase intentions. Thus, disgust is the primary driving force that motivates a change in consumer evaluations for products that are touched by others.

H<sub>4</sub>: Disgust mediates the influence of consumer contamination on product evaluations and purchase intentions.

We test these hypotheses in three field-study experiments. In the first study, we investigate the role of the proximity to contact (H<sub>1</sub>) in facilitating contamination effects. Study 2 broadens the investigation by adding a manipulation of time elapsed since contact and provides an explicit test of the competing hypotheses put forth in H<sub>2</sub>. Finally, Study 3 examines how the number of contact sources (H<sub>3</sub>) influences consumer contamination. In each experiment, we

measure feelings of disgust as an underlying motivator (H<sub>4</sub>) in producing the contamination effects that consumers experience.

## **Study 1**

### **Overview**

The purpose of this study is to establish that consumer contamination operates in a retail setting, negatively influencing evaluations of products that have been touched by other consumers. Furthermore, we empirically test H<sub>1</sub> and H<sub>4</sub>. Study 1 consists of a one-way between-subjects experimental design with proximity to contact (close versus medium versus far) as the experimental factor. We randomly assigned 70 undergraduate students from a large North American university to one of the three conditions; they received course credit for their participation.

### **Method**

*Procedure.* Participants were tested individually at the university student center. When they arrived, they were informed that the objective of the study was to gather marketing research information for the university bookstore. Participants were told to visit the store, look around to get an impression of the store (three to five minutes), and then complete an assigned task. To identify the task they needed to complete while in the store, they were instructed to select an envelope that would identify a task for them. They were told that the tasks ranged from making a purchase to trying or using a product. Unbeknownst to the participants, each envelope indicated that they would be required to perform the same task: to try on a specific T-shirt located in the store. The envelope included a picture of the target T-shirt and instructed participants to find a sales associate in the clothing section who would help locate the proper article of clothing. After selecting the envelope, participants proceeded to the bookstore. At this time, the experimenter text-messaged a trained confederate located in the store to indicate that the participant was en route and to provide a description of him or her. The confederate assumed the role of a sales associate at the bookstore and was responsible for implementing the proximity-to-contact manipulation. One male and one female confederate alternated the role, and both were blind to the experimental hypotheses.<sup>1</sup>

In all conditions, after participants located the sales associate in the store and showed him or her the photograph of a one-of-a-kind T-shirt, the sales associate said, "We only have one left in stock." In the close condition, the sales associate finished the sentence with "and someone is trying it on." The sales associate then took the participant over to the dressing room to wait, and a couple of seconds later, a second confederate, who assumed the role of another shopper (same gender as the participant), exited the dressing room, leaving the T-shirt in the room. In the medium condition, the sales associate completed the sentence with "and it is over here on the return rack" and then took the participant

<sup>1</sup>The sales associate was also responsible for monitoring the cleanliness of the T-shirt and replaced it with a new one after every second participant or if it became soiled.

to a return rack located near the dressing room. In the far condition, the sales associate finished the sentence with “and it is just over here on the rack” and took the participant to a regular display rack located a few feet away from the return rack. Note that at no time in any of the conditions did either confederate actually touch the target T-shirt. Physical contact with the target T-shirt was implied only by the proximity-to-contact manipulation.

After finishing the task and returning to the experimenter, participants completed a questionnaire. Participants were then debriefed and were thanked for their participation.

*Dependent variables.* The questionnaire contained both the dependent variables of interest and questions consistent with the cover story. We measured overall product evaluations using five seven-point scales. The items included “bad/good,” “negative/positive,” “undesirable/desirable,” “unfavorable/favorable,” and “dislike/like.” We averaged the responses to form an evaluation index ( $\alpha = .95$ ). We measured purchase intentions using a seven-point scale that asked participants to indicate how likely they would be to buy the product (1 = “very unlikely to buy,” 7 = “very likely to buy”).

We also asked participants to indicate how they felt during the shopping experience using a battery of both positive and negative affect terms (1 = “not at all,” 7 = “very”). Embedded in this list were four items intended to measure feelings of disgust (Haidt, McCauley, and Rozin 1994; Smith and Ellsworth 1985) and other negative emotional responses that could be elicited by the shopping experience and could potentially account for changes in product evaluations. We created a disgust index by averaging the following four items: disgusted, revolted, unclean, and gross ( $\alpha = .76$ ). To rule out the possibility that negative emotions other than disgust accounted for the results, we created another index for other negative emotions by averaging the following five items: frustrated, bad, annoyed, angry, and mad ( $\alpha = .85$ ).

To determine whether participants’ reactions toward the product were a direct result of specific physical contamination or a more general contamination effect, we asked them, “How dirty was the product you used/tried?” We averaged two seven-point scales (“dirty, unsanitary” and “not at all/very”) to create a dirty index ( $r = .70, p < .01$ ). After completing these measures, participants completed a manipulation check for proximity to contact (location recall measure) by answering an open-ended question that asked where they found their target product. Participants also indicated their gender, age, and major and completed an open-ended suspicion probe. Responses to the demographic measures (including match/mismatch on gender relative to the confederate) were not significant in this study or any of the subsequent studies; thus, we do not discuss this issue further.

## Results

*Preliminary analyses.* Of the 70 participants who took part in the study, 67 successfully completed the assigned task. The sample used in the subsequent analysis consisted

of 67 participants (males = 30, females = 37); cell sizes ranged from 21 to 24. An analysis of the manipulation check for proximity indicated that all participants were cognizant of where the product was located. An examination of responses to the suspicion probe revealed that no participants were aware of the experimental hypotheses.

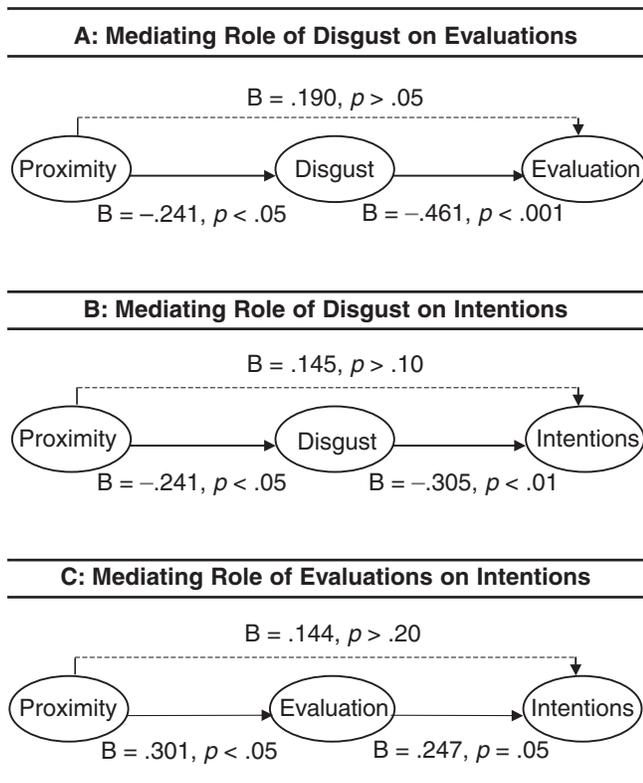
*Test of hypotheses.*  $H_1$  predicted that product evaluations and purchase intentions would decrease as the product became closer to where contact with another consumer took place (i.e., contamination salience increased). An analysis of variance (ANOVA) using proximity to contact as the independent variable and the evaluation index as the dependent variable produced a significant main effect ( $F(2, 64) = 22.95, p < .001$ ). Post hoc tests indicated that reducing proximity to contact results in a linear decrease in product evaluations. Participants evaluated the T-shirt significantly more positively when it was located on the regular rack ( $M_{\text{far}} = 5.20$ ) than when it was on the return rack ( $M_{\text{medium}} = 3.86, t(64) = 3.24, p < .01$ ) or in the dressing room ( $M_{\text{close}} = 2.47, t(64) = 6.77, p < .001$ ), and they evaluated it significantly more positively when it was located on the return rack than when it was in the dressing room ( $t(64) = 3.50, p < .001$ ).

To determine whether proximity to contact also significantly influenced participants’ purchase intentions, we conducted a second ANOVA. Again, we found a significant effect ( $F(2, 64) = 9.04, p < .001$ ). Post hoc comparisons showed that participants’ purchase intentions were lower as the proximity to the contact location became closer ( $M_{\text{close}} = 2.46; M_{\text{medium}} = 3.64, t(64) = 2.20, p < .05$ ; close versus far:  $M_{\text{far}} = 4.76, t(64) = 4.25, p < .001$ ; medium versus far:  $t(64) = 2.03, p < .05$ ). Thus, we found support for  $H_1$ .

To determine whether feelings of disgust mediated the impact of proximity to contact on product evaluations and purchase intentions ( $H_4$ ), we conducted a mediation analysis. Following the work of Baron and Kenny (1986), we found that proximity to contact significantly predicted feelings of disgust ( $F(2, 64) = 28.02, p < .001; M_{\text{close}} = 4.11, M_{\text{medium}} = 2.35, M_{\text{far}} = 1.27$ ). Next, we estimated a path analysis that included the direct path for the effect of proximity to contact on product evaluations and an indirect path mediated by disgust. The results produced a significant indirect path, indicating that disgust fully mediated the effect of the independent variable on product evaluations (see Figure 1, Panel A). We also conducted a path analysis to establish whether disgust significantly mediated purchase intentions. A second mediation analysis indicated that disgust fully mediated the effect of proximity to contact on purchase intentions (see Figure 1, Panel B). We conducted an additional path analysis to determine whether product evaluations mediated the impact of proximity to contact on purchase intentions. As we show in Figure 1, Panel C, product evaluations fully mediated the relationship.

*Additional analyses.* To rule out the possibility that contamination made participants experience other negative emotions and that these negative emotions caused the lower evaluations of the contaminated products, we conducted an analysis using the negative emotion index. The ANOVA indicated that proximity to contact failed to significantly

**FIGURE 1**  
**Study 1: Path Analysis**



influence other negative emotions ( $F(2, 64) = 1.71, p > .10$ ), providing evidence that feelings of disgust are specific in the facilitation of consumer contamination effects. A more general, negative reaction does not appear to drive the lower evaluations and purchase intentions for a product that has been touched by other consumers.

We also conducted an analysis using the dirty index as a dependent variable ( $F(2, 64) = 1.89, p > .10$ ). Null effects for this measure indicate that consumers do not perceive actual physical contamination from the consumer touching that is inherent in our manipulation but rather experience a more general contamination effect that directly affects their evaluations and purchase intentions for the product. An analysis in subsequent studies (i.e., Studies 2 and 3) also shows null effects for both the negative emotion and dirty indexes; thus, we do not discuss these measures further.

### Discussion of Study 1

Study 1 provides the first empirical evidence in support of the existence of consumer contamination. The results show that when consumers receive a signal that another consumer has touched a product, they lower both their evaluations and their purchase intentions for that product. Notably, participants never actually observed other people touching the product; instead, they inferred contact through the contamination cue of proximity to contact. By changing where the product was located in the store, we also manipulated the salience of contamination. In particular, when the product was located closer to the perceived point of contact, participants' evaluations of and purchase intentions for the product

were lower. This decrease in evaluations and intentions appears to be driven by feelings of disgust that arise when another shopper is believed to have contaminated a product through contact.

Although the results of Study 1 are consistent with a theory of consumer contamination, it is possible that the lower product evaluations and purchase intentions in the dressing room and return rack (compared with the regular rack) conditions were not the outcome of contamination but rather the result of consumers thinking that the product they were asked to try on had been previously rejected. In other words, the location of the product (i.e., either in the dressing room or on the return rack) may have signaled to participants that the product was deficient because someone else had previously tried it on but decided not to purchase it. To test this alternative explanation, we implemented an additional experimental condition (rejection condition).

In the rejection condition, as in the far condition, the sales associate indicated that the product was located on a regular rack in the store. However, when the sales associate and the participant arrived at the rack, they found that it was empty. After the sales associate vocalized that it appeared as though someone else already had the T-shirt, another shopper (i.e., a confederate), who was standing nearby holding the target T-shirt and a couple other items by the hangers, looked over and said, "I was going to try it on, but I don't want it after all." Without ever making contact with the shirt, he or she then handed the participant the one-of-a-kind T-shirt on the hanger. Independent sample t-tests compared the rejection condition and the far condition, and the results indicated that the two conditions did not differ significantly for either product evaluations ( $t(38) = .74, p > .20, M_{\text{rejection}} = 4.87$ ) or purchase intentions ( $t(38) = .35, p > .20, M_{\text{rejection}} = 4.58$ ). The absence of statistical significance suggests that negative product evaluations and purchase intentions in the dressing room and return rack conditions are consistent with consumer contamination and are not explained by another consumer rejecting the product.

Another possible explanation for the results of Study 1 that cannot be addressed with the current findings is that the location of the product not only manipulated proximity to contact but also may have changed perceptions about the amount of time elapsed since contact. Specifically, when the product was located in the dressing room or on the return rack, consumers may have thought that the product was more recently contaminated than when it was located on the regular rack. In turn, knowledge about the time elapsed since contact may have subsequently affected product evaluations and purchase intentions. We tease apart these two competing explanations in Study 2 by adding an explicit manipulation of time elapsed since contact from another consumer.

## Study 2

### Overview

We conducted Study 2 to investigate the role of time elapsed since contact in the realization of consumer contamination. This study empirically tests the competing hypotheses  $H_{2a}$  and  $H_{2b}$ . Furthermore, in this study, to clar-

ify the role of proximity to contact and time elapsed since contact in producing contamination effects, we manipulate both contamination cues separately. Participants in the study included 95 students from a large North American university. We randomly assigned them to a condition in a 2 (proximity to contact: medium versus far)  $\times$  2 (time elapsed since contact: short versus long) + 1 (control: no touch) between-subjects experimental design. The 48 male and 47 female participants received \$10 for compensation for their participation. Cell sizes ranged from 18 to 20.

### Method

**Procedure.** We used the same procedure as that in Study 1, but with two exceptions: First, we used only two levels of proximity to contact, medium and far. We manipulated both the medium and the far conditions as in Study 1. Second, to manipulate time elapsed since contact, the sales associate indicated the amount of time that had passed since the T-shirt was last touched by another consumer. In the short condition, the sales associate told the participant that the T-shirt had just been tried on, whereas in the long condition, the sales associate indicated that the T-shirt had not been tried on for a few days. We included an additional group in the design to serve as a control group. Participants in this condition found the target product located on the regular rack (similar to the far proximity-to-contact condition) but were not provided with any contact information. The manipulation check for time elapsed since contact used two nine-point scales that asked, “How long do you think the product was in the same exact location where you found it?” (1 = “very short period of time,” 9 = “very long period of time”) and “How much time do you think the product was in the same exact location where you found it?” (1 = “minutes,” 9 = “months”). We averaged these two items and combined them to form a time index ( $r = .73, p < .001$ ). Dependent measures followed those in Study 1 (evaluation index  $\alpha = .96$ , disgust index  $\sigma = .97$ , location recall measure, and purchase intentions).

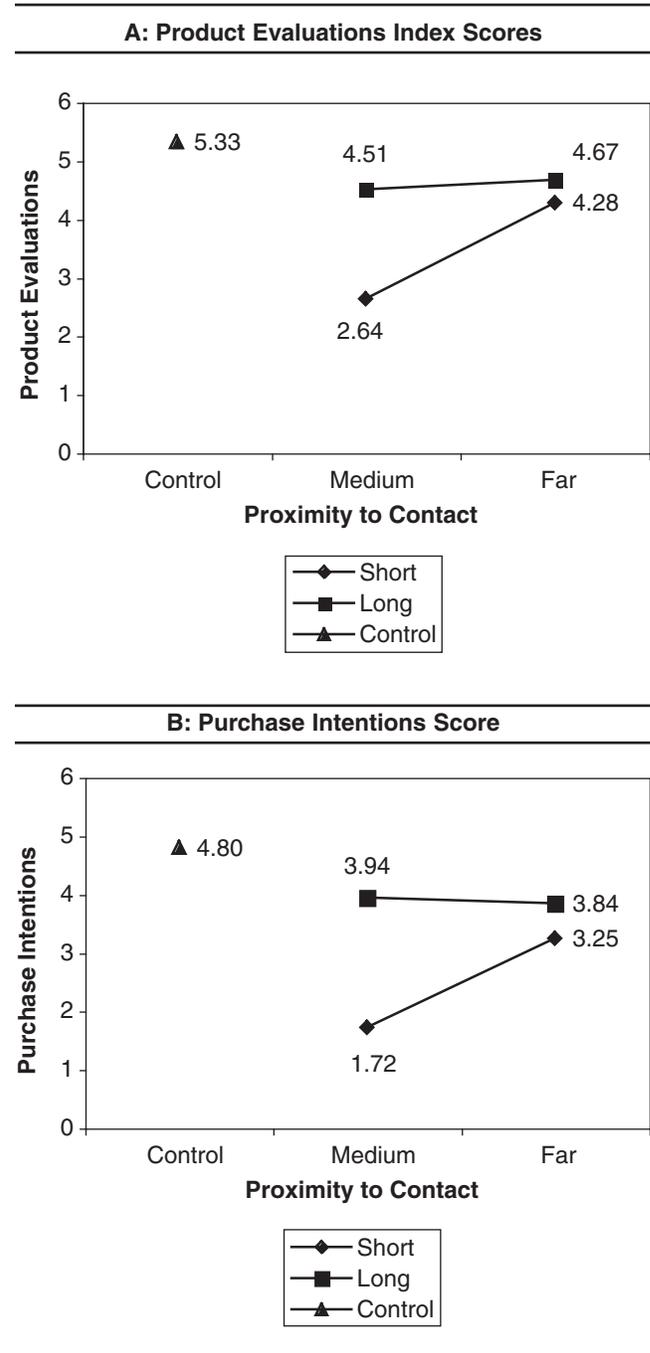
### Results

**Preliminary analyses.** All participants were cognizant of the product’s location. A 2  $\times$  2 ANOVA with the time index as the dependent variable produced only a significant main effect for time elapsed since contact ( $F(1, 71) = 13.25, p = .001; M_{\text{long}} = 5.26, M_{\text{short}} = 3.63$ ).<sup>2</sup> Thus, the manipulation checks were successful. We also examined responses to the suspicion probe, which revealed that participants were unaware of the experimental hypotheses.

**Test of hypotheses.** Recall that  $H_2$  put forth competing predictions about the role of time elapsed since contact for consumer contamination.  $H_{2a}$  proposed that the passing of time would not influence contamination, whereas  $H_{2b}$  proposed that the passage of time would mitigate contamina-

tion effects. A 2 (proximity to contact: medium versus far)  $\times$  2 (time elapsed since contact: short versus long) ANOVA with the evaluation index as the dependent variable produced a main effect for proximity to contact ( $F(1, 71) = 8.09, p < .01; M_{\text{medium}} = 3.58, M_{\text{far}} = 4.47$ ) and a main effect for time elapsed since contact ( $F(1, 71) = 12.78, p = .001; M_{\text{long}} = 4.60, M_{\text{short}} = 3.51$ ). However, these main effects were qualified by a significant interaction between the two factors ( $F(1, 71) = 5.43, p < .05; M_{\text{medium and short}} = 2.64, M_{\text{medium and long}} = 4.51, M_{\text{far and short}} = 4.28, M_{\text{far and long}} = 4.67$ ; see Figure 2, Panel

**FIGURE 2**  
**Study 2: Influence of Proximity to Contact and Time Elapsed Since Contact**



<sup>2</sup>We conducted a one-way ANOVA with the control group and the amount of time conditions for the time delay index ( $F(2, 92) = 15.95, p < .001; M_{\text{control}} = 6.14$ ; control versus long:  $t(92) = 2.24, p < .05$ ; control versus short:  $t(92) = 5.39, p < .001$ ).

A). Planned contrasts indicated that participants' evaluations of the product were significantly lower when the product had just been touched and was located on the return rack than when it was on the regular rack ( $t(71) = 3.68, p < .001$ ). Furthermore, evaluations were significantly lower when the product was located on the return rack and had just been touched than when it was touched days before ( $t(71) = 4.10, p < .001$ ). No other comparisons were significant ( $t_s < 1$ ). These findings support  $H_{2b}$  and suggest that the impact of consumer contamination disperses over time. It appears that for consumer contamination, "once in contact" does not mean "always in contact."

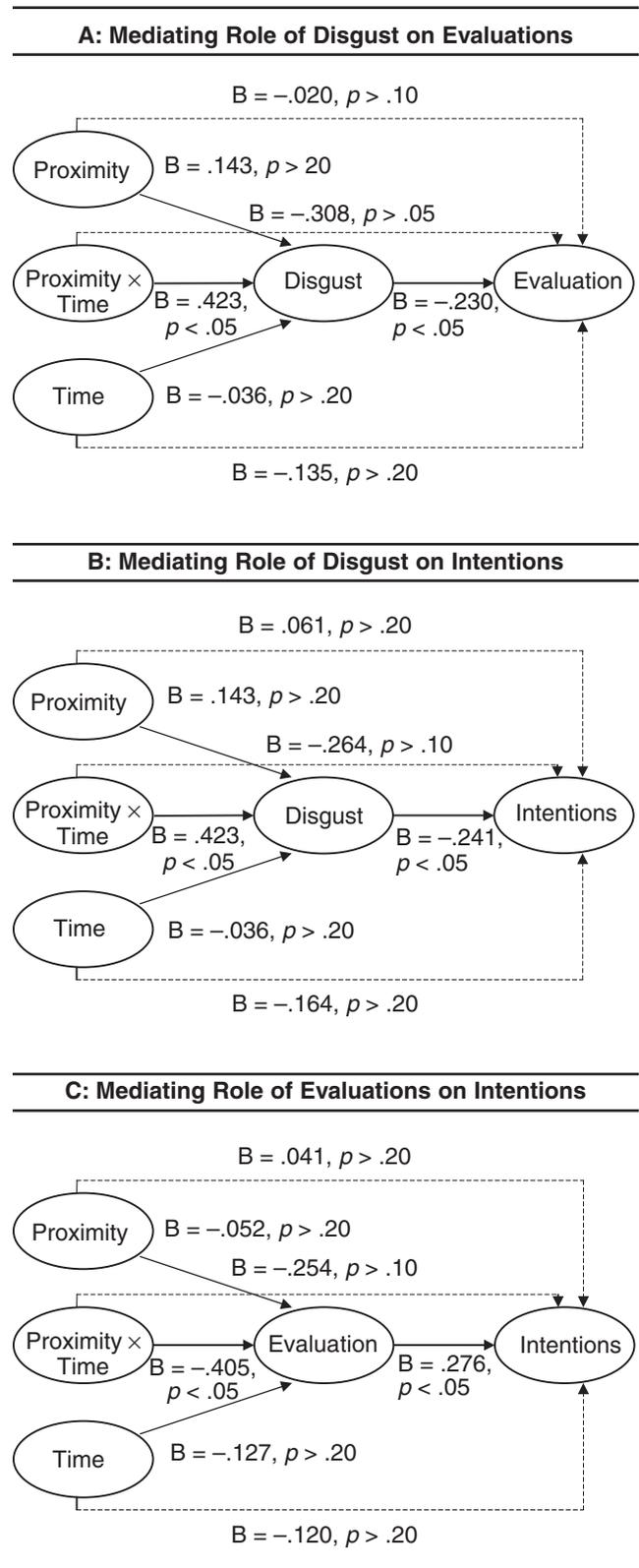
A second ANOVA indicated that purchase intentions were also significantly influenced by time elapsed since contact ( $F(1, 71) = 12.25, p = .001; M_{\text{long}} = 3.89, M_{\text{short}} = 2.53$ ) and marginally influenced by proximity to contact ( $F(1, 71) = 3.14, p < .10, M_{\text{medium}} = 2.83, M_{\text{far}} = 3.54$ ). However, again, these main effects were qualified by a significant interaction between proximity to contact and time elapsed since contact ( $F(1, 71) = 4.11, p < .05; M_{\text{medium and short}} = 1.72, M_{\text{medium and long}} = 3.94, M_{\text{far and short}} = 3.25, M_{\text{far and long}} = 3.84$ ; see Figure 2, Panel B). Planned contrasts produced the same pattern as that for product evaluations. Specifically, participants were less willing to purchase the product when it had recently been touched and was located on the return rack than when the product was on the regular rack ( $t(71) = 2.70, p < .01$ ). Furthermore, participants were less willing to purchase the product when it was on the return rack and had just been touched than when it had been days since the product had been touched ( $t(71) = 3.83, p < .001$ ). No other contrasts were significant. Again, this result provides support for the notion that consumer contamination is not permanent but dissipates over time ( $H_{2b}$ ).

A two-way ANOVA with the disgust index as the dependent variable produced two main effects (proximity to contact:  $F(1, 71) = 14.48, p = .001; M_{\text{medium}} = 2.69, M_{\text{far}} = 1.47$ ; time elapsed since contact:  $F(1, 71) = 4.23, p < .05; M_{\text{long}} = 1.74, M_{\text{short}} = 2.36$ ) and a significant interaction ( $F(1, 71) = 5.82, p < .05; M_{\text{medium and short}} = 3.40, M_{\text{medium and long}} = 1.97, M_{\text{far and short}} = 1.41, M_{\text{far and long}} = 1.53$ ). To establish whether disgust mediated the impact of contamination cues on product evaluations, we conducted a mediation analysis. We estimated a path analysis that included direct paths for proximity to contact, time elapsed since contact, and their interaction on product evaluations and an indirect path that was mediated by disgust. The results produced a significant indirect path, indicating that disgust fully mediated the effects of the independent variables on product evaluations (see Figure 3, Panel A). We also conducted a path analysis for purchase intentions. Similar to product evaluations, the results revealed a significant indirect path, suggesting that disgust also fully mediated the impact of the contamination cues on intentions (Figure 3, Panel B). Finally, we conducted a path analysis to establish whether product evaluations mediated the impact of contamination cues on purchase intentions; as we indicate in Figure 3, Panel C, full mediation was present.

*Control group.* We compared the control group with the time-elapsed-since-contact conditions in a series of one-

way ANOVAs, which produced significant results (product evaluations:  $F(2, 92) = 11.87, p < .001; M_{\text{control}} = 5.33$ ; purchase intentions:  $F(2, 92) = 12.55, p < .001; M_{\text{control}} = 4.80$ ; disgust:  $F(2, 92) = 4.51, p < .05; M_{\text{control}} = 1.25$ ). Post hoc

**FIGURE 3**  
**Study 2: Path Analysis**



tests indicated that though the control group differed significantly from the short condition (product evaluations:  $t(92) = 4.63, p < .001$ ; purchase intentions:  $t(92) = 4.75, p < .001$ ; disgust:  $t(92) = 2.90, p < .01$ ), it did not differ significantly from the long condition (product evaluations:  $t(92) = 1.86, p > .05$ ; purchase intentions:  $t(92) = 1.89, p > .05$ ; disgust:  $t(92) = 1.29, p > .10$ ). This provides further support for the findings that over time, the impact of contamination dissipates.

## Discussion of Study 2

The findings of Study 2 provide additional support for the existence of consumer contamination in a retail setting. Consistent with Study 1, we found that as the salience of contamination increased with proximity to contact, consumer evaluations of and purchase intentions for a contaminated product decreased. However, the introduction of a second contamination cue, time elapsed since contact, moderated this finding. In particular, the results for proximity to contact only held when participants believed that other consumers had recently contaminated the product. We address the concerns identified in Study 1 by separately manipulating time elapsed since contact and defining its independent influence on consumer contamination. Following construal-level theory (Liberman and Trope 1998; Trope and Liberman 2003), when the time elapsed since contact increased, the impact of proximity to contact was mitigated. We add to the law of contagion by identifying a contamination context in which the effects of contamination appear to dissipate over time. Indeed, contamination effects do not appear to be permanent in an interpersonal, retail context.

## Study 3

### Overview

Studies 1 and 2 demonstrate how two contamination cues, proximity to contact and time elapsed since contact, influence consumers' evaluations of products that have been in contact with other consumers. The primary goal of Study 3 is to investigate the influence of a third contamination cue: the number of contact sources. Study 3 also extends the impact of consumer contamination to another dependent measure: willingness to pay (WTP) for the product. We randomly assigned 104 undergraduate participants to a condition in a 2 (proximity to contact: medium versus far)  $\times$  2 (number of contact sources: one versus many) + 1 (control: no touch) between-subjects experimental design. Participants received \$10 as compensation for their participation.

### Method

*Procedure.* We used the same procedure as that in Study 2, but with two exceptions: First, to manipulate the number of contact sources, in the one-contact-source condition, the sales associate informed participants that one other person had tried on the shirt, whereas in the many-contact-sources condition, the sales associate indicated that a lot of other people had tried on the shirt. We assessed the effectiveness of this manipulation by asking participants to indicate on an eight-point scale approximately how many other people had tried on/used the exact same product as them (1 = "no one,"

8 = "more than seven"). Second, we introduced a new dependent measure in the study; we asked participants what they would be willing to pay for the product (i.e., dollar amount). Other measures followed those used in Study 1 (evaluation index  $\alpha = .97$ , disgust index  $\sigma = .86$ , and location recall measure).

## Results

*Preliminary analyses.* Of the 104 participants who took part in the study, 3 were unable to complete the assigned task successfully. Thus, the sample used in the analyses reported here consisted of 101 participants (31 males and 70 females); cell sizes ranged from 18 to 22.

Analysis of the location recall question showed that all participants were cognizant of the location of the product. A 2  $\times$  2 ANOVA with the rating of how many people had tried on the product as the dependent variable produced a significant main effect for number of contact sources ( $F(1, 77) = 11.51, p < .001$ ;  $M_{\text{one}} = 3.60, M_{\text{many}} = 5.18$ ).<sup>3</sup> An examination of the suspicion probe indicated that no participants were aware of the experimental hypotheses.

*Test of hypotheses.*  $H_3$  put forth competing predictions about the influence of the number of contact sources in producing consumer contamination.  $H_{3a}$  predicted that consumer product evaluations and purchase intentions would be lower if a product was thought to have had contact with many (versus one) consumers, whereas  $H_{3b}$  predicted that product evaluations and purchase intentions would be higher in this instance. A 2 (proximity to contact: medium versus far)  $\times$  2 (number of contact sources: one versus many) ANOVA with the evaluation index as the dependent variable produced a main effect for number of contact sources ( $F(1, 77) = 4.45, p < .05$ ) and a main effect for proximity to contact ( $F(1, 77) = 5.08, p < .05$ ). The interaction effect between the two independent variables was not significant ( $F < 1$ ). Consistent with  $H_{3a}$ , participants evaluated the product more positively when they believed that only one other person had touched the product before them ( $M_{\text{one}} = 3.86$ ) than when they believed that several other people had touched the product before them ( $M_{\text{many}} = 3.19$ ). Furthermore, consistent with  $H_1$ , participants evaluated the product more positively when the product was located on a regular rack in the store ( $M_{\text{far}} = 3.89$ ) than when it was on the return rack ( $M_{\text{medium}} = 3.19$ ).

We conducted a similar analysis using WTP as the dependent variable. The results for WTP also produced two main effects (proximity to contact:  $F(1, 77) = 4.38, p < .05$ ; number of contact sources:  $F(1, 77) = 4.73, p < .05$ ). Participants were willing to pay more to purchase the product when it was located on the regular rack in the store ( $M_{\text{far}} = \$20.00$ ) than when it was on the return rack ( $M_{\text{medium}} = \$11.85$ ), and they were willing to pay more when only one

<sup>3</sup>We conducted a one-way ANOVA with the control group and the number of contact source conditions for the number index ( $F(2, 100) = 15.38, p < .001$ ;  $M_{\text{control}} = 2.15$ ; control versus one:  $t(98) = 2.64, p = .01$ ; control versus many:  $t(98) = 5.39, p < .001$ ).

person had touched it ( $M_{\text{one}} = \$16.18$ ) than when multiple people had touched it ( $M_{\text{many}} = \$11.72$ ). Again, there was no significant interaction effect ( $p > .10$ ).

A two-way ANOVA with the disgust index as the dependent variable produced only two main effects (proximity to contact:  $F(1, 77) = 4.24, p < .05$ ;  $M_{\text{medium}} = 3.13$ ,  $M_{\text{far}} = 2.55$ ; number of contact sources:  $F(1, 77) = 5.66, p < .05$ ;  $M_{\text{one}} = 2.52$ ,  $M_{\text{many}} = 3.19$ ). To determine whether feelings of disgust led to changes in product evaluations, we conducted a mediation analysis. To test for mediation, we estimated a path analysis that included direct paths for the effects of proximity to contact and number of contact sources on product evaluations and indirect paths mediated by disgust. The results produced a significant indirect path, indicating that disgust fully mediated the effects of the independent variables on product evaluations (see Figure 4, Panel A). We also conducted a similar path analysis for WTP, and the results indicated that disgust fully mediated the impact of contagion cues on WTP (see Figure 4, Panel B). Finally, to test the causal relationship between evaluations and WTP, we conducted another path analysis. The

results indicated that evaluations mediated the impact of contamination cues on WTP for the contaminated product (see Figure 4, Panel C).

**Control group.** We compared the control group with the number-of-contact-sources conditions in a series of one-way ANOVAs. The results were significant for all the key dependent variables (product evaluations:  $F(2, 98) = 15.19, p < .001$ ;  $M_{\text{control}} = 5.39$ ; WTP:  $F(2, 98) = 14.90, p < .001$ ;  $M_{\text{control}} = \$25.45$ ; disgust:  $F(2, 98) = 16.00, p < .001$ ;  $M_{\text{control}} = 1.31$ ). Post hoc tests indicated that the control group differed significantly from the one-source and many-sources conditions for all the variables (product evaluations: control versus one [ $t(98) = 3.92, p < .001$ ] and control versus many [ $t(98) = 5.50, p < .001$ ]; WTP: control versus one [ $t(98) = 3.76, p < .001$ ] and control versus many [ $t(98) = 5.46, p < .001$ ]; disgust: control versus one [ $t(98) = 3.72, p < .001$ ] and control versus many [ $t(98) = 5.66, p < .001$ ]).

### Discussion of Study 3

The findings of Study 3 provide additional evidence for our general proposition that perceived contact between a consumer and a product results in other consumers having less favorable evaluations of the touched product. Our results show support for  $H_{3a}$  and SIT, indicating that when consumers believe that many people have touched a product, their evaluations and WTP for the product are significantly lower. Rather than signaling the popularity of a product as  $H_{3b}$  predicted, multiple contact sources seemed to increase the level of contamination realized. Our findings are telling, given that the experimental procedure may have also signaled the popularity of the product (i.e., the item was “the only one left in stock”). The results for Study 3 also show consistent effects for proximity to contact such that participants responded more negatively to a product that was situated closer to a possible contact location. Finally, as in Studies 1 and 2, the results of Study 3 also show that the feelings of disgust that consumers experience in response to product contamination lead to the changes in product evaluations and WTP.

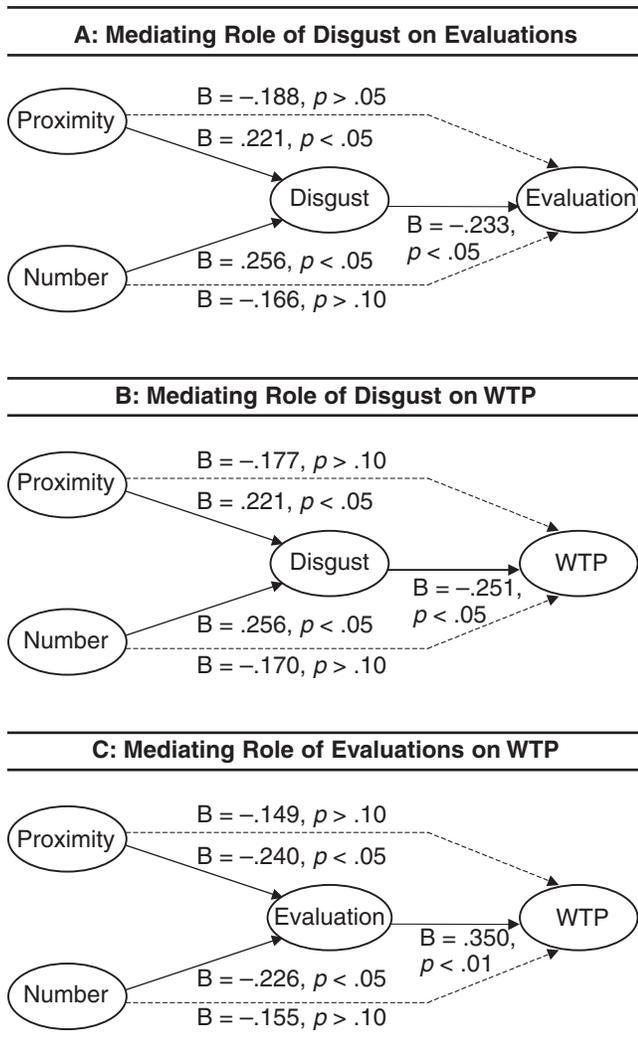
## Conclusions and Implications

Recent marketing research has found that consumers like to use the sense of touch to learn about products (Mooy and Robben 2002; Peck and Childers 2003). However, the current research demonstrates that though consumers enjoy touching products themselves, they respond negatively when other consumers have had contact with the products. Using a retail shopping environment, the current research provides the first evidence for a theory of consumer contamination, in which consumers are believed to contaminate products simply by having contact with them. In general, we find that contamination cues that increase the salience of contact between another consumer and a product have a negative impact on consumer responses to the product.

### Theoretical Implications

**Contamination cues.** Across three field experiments, we demonstrate that when proximity to contact is closer and when the number of contact sources is higher, consumer

**FIGURE 4**  
**Study 3: Path Analysis**



evaluations, purchase intentions, and WTP for a touched product decrease. Notably, the results for the impact of proximity to contact hold only when a short period of time has elapsed since the product was perceived as being touched. When time since contact is longer, the effects of consumer contamination appear to dissipate.

We argue that these contamination cues increase the salience of contamination by effectively signaling to the consumer that the product has previously come in contact with another person or people. It is important to recognize that in our research, this contact was implied and not physical in nature. As is shown by the null findings from our dirty index, although consumers were cognizant that no physical contamination was engendered to the product by the implied touching, they were still influenced by the contamination from the other consumer. Indeed, the lingering perceived essence of another seems to be enough to stigmatize the product for the consumer. The contamination cues we identify appear to activate a contamination heuristic, which, though arguably misapplied, has important repercussions for consumer evaluations and intentions.

*Time and contamination.* The identified temporary nature of consumer contamination emphasizes a key theoretical finding that builds on previous work in this area (Hejmadi, Rozin, and Siegal 2004; Rozin et al. 1989). Prior research has examined cases of contamination in which people had extremely strong attitudes toward the source of contamination. These sources have been life threatening (e.g., poison) or have been people about whom others have strong, preexisting negative attitudes and associations (e.g., Adolf Hitler). After the source has come into contact with the object, these strong negative attitudes toward the source seem to transfer permanently and are then associated with the object (Hejmadi, Rozin, and Siegal 2004; Rozin et al. 1989). In the current research, however, consumers have no preexisting attitudes toward the contamination source, because the source is either unfamiliar or completely unknown to consumers. Furthermore, consumers recognize that the contamination is not life threatening in nature. Thus, there is no permanent association to be transferred on contact, and any contamination effects that occur are indicative of a perceived transfer of essence. Our findings qualify previous thought by empirically showing that for the type of contamination investigated in the current research, an increase in temporal distance mitigates the strength of the contamination effect.

*Feelings of disgust.* Consistent with previous research (Rozin, Haidt, and McCauley 1993; Rozin, Markwith, and Nemeroff 1992; Rozin, Millman, and Nemeroff 1986), we found that disgust operates readily in the domain of contamination in the consumption context. In particular, the results indicate that consumers lower their evaluations of touched products because they feel disgusted by the contamination from other shoppers. The analyses demonstrating full mediation of disgust on evaluations, purchase intentions, and WTP support this assertion. Importantly, we show discriminate validity for disgust by finding null effects for other negative emotions. The visceral reaction that disgust represents in this context points to the basic nature and strength that contamination effects exemplify.

## **Managerial Implications**

*Store design and merchandising.* The consumer contamination effects demonstrated in each of our three studies underscore the importance of management decisions related to store layout and design. Although it is critical to enable consumers to touch merchandise (Mooy and Robben 2002; Peck and Childers 2003), consideration should also be given to limiting how and where consumers touch products. Effective store design can provide opportunities and constraints with respect to consumer contamination. For example, instead of using product bins or table displays that encourage rummaging and searching, firms can effectively design shelving and rack displays to minimize consumer handling of products. Furthermore, a front-room/back-room layout that provides “fresh” products for trial can potentially mitigate consumers’ contamination perceptions. Retail environments in which consumers try on merchandise (e.g., clothing, footwear) need to be sensitive to consumers viewing others handling the products. As *The Washington Post* (Pressler 2003) noted recently, effective design and management of dressing room areas is an understated factor in retailer success. Notably, the article indicates that the primary complaint of clothing shoppers is that other consumers tried on clothing that cluttered the dressing room.

Appropriate merchandising and well-managed product displays are also central in effectively addressing contamination concerns. Cues that a product has previously been used or touched, such as ripped tags or disheveled displays, raise contamination fears and negatively affect consumer evaluations. Managers must make an effort to minimize the salience of contamination so that consumers are not motivated to think that a given product has been contaminated. Effective merchandising of products can be useful in allaying and preventing contamination effects from materializing. Indeed, Underhill (2000, p. 179) notes that retailers “place the dark shades down where they can be reached easily, and display the beiges and pale grays and off-whites up high, where they can be seen but not touched. If a sweater displayed on a table comes in several shades, you’ll always find the lighter ones on the bottom and the dark on top, where they’ll be rubbed and grubbed, but who will know?”

*Service personnel and communication.* Our results also point to a strong need for proper employee training and service practices. Employees need to be cognizant of the issues surrounding consumer contamination and have the ability to address related consumer concerns. MAC cosmetics is an example of a company that has responded to this opportunity, turning contamination concerns into a competitive advantage in the industry. MAC employees are trained to wipe sample lipstick both before and after consumer trial and use disposable applicators (e.g., mascara, blush) for consumer promotion activities. Employees must be mindful to remove the evidence of consumer contamination as quickly as possible in a retail environment. Refolding, restocking, repackaging, and returning products quickly to shelf locations are examples of simple activities that can alleviate consumers’ contamination concerns. Companies, such as Nordstrom and Banana Republic, that encourage their personnel to be vigilant in this regard communicate a

safe, comfortable, and individualized shopping environment in which sales staff are sensitive to specific consumer needs and concerns about contamination.

In a broader sense, a company's communication with consumers should also be sensitive to contamination. Advertising, promotions, and other communication efforts should be careful not to raise contamination concerns in their creatives. Communication that highlights the incidence of consumer contact and identifies who is touching products may result in contamination signals that alienate potential customers.

*Policy and procedures.* Acceptance of the effects and implications of consumer contamination gives way to the effective integration of this issue into store systems and policies. Policies that are created specifically to respond to contamination outcomes provide direction and a means to manage the negative implications of this phenomenon. As we alluded to previously, effective policies and procedures that empower employees to recognize and address consumer contamination are an effective approach. The development of policies for more physical forms of contamination is also imperative for organizations. For example, Best Buy has adopted a classification of "Open Box Products," which describes products that have been handled, opened, or have had the packaging disrupted. In this case, the product and warranty are intact, but the policy calls for an "Open Box" labeling of the product and a price discount. Return policies, warranties, and consumer trial all should be examined with an eye toward contamination effects. Recent trends in the retail environment of bulimic shopping and retail borrowing (Piron and Young 2000) make this a growing concern.

### **Limitations and Future Research Opportunities**

The limitations of our research are inherent to the experimental methodology and sample we used in conducting our studies. Each of our three studies used the same product (i.e., clothing) as the experimental stimuli, followed a similar procedure, and was consistent in the retail environment. However, as we mentioned previously, because contamination effects are expected to differ depending on the salience and intimacy of contact (Angyal 1941), the results reported herein may be limited only to product categories for which consumers have close, intimate contact. Indeed, it seems likely that contamination effects are moderated by the level of contact or intimacy that consumers have with a product while using it: The more contact a product has with a consumer's body, the greater are the contamination effects. Prior anthropological work supports this notion, demonstrating stronger contamination effects for ingestion, the most intimate form of contact, than for mere interaction with an object (Appadurai 1981). This suggests that contamination effects in retail contexts could be most prevalent for food items, creating a true challenge for grocery retailers. Further research should test contamination effects across different product categories to examine these issues more closely.

Another possible moderating factor of contamination effects is product packaging. In the studies we presented

herein, products were always free from packaging and completely vulnerable to contact with consumers. Thus, it would be interesting to investigate whether product packaging can protect products from consumer contamination and whether the level of protection varies by the packaging material. Recent work that has examined contamination effects among products (Morales and Fitzsimons 2005) has found that clear packages facilitate contamination effects and opaque packages prevent them. Specifically, this research shows that when a consumable product is displayed inside a clear, plastic package and is touching a disgusting product, the consumable product becomes contaminated, but when the consumable product is displayed inside a solid, paper package, evaluations of the product remain constant. Whether these findings for packaging hold true for consumer contamination, however, remains unclear and is left for further research.

Another area for extension is to investigate the potential for positive contamination effects in a consumer context. As we mentioned previously, research has found that when a contamination source has a positive relationship with the recipient (i.e., friend, lover), responses toward contamination are more positive in nature than when a relationship does not exist. This result is consistent with young sports fans keeping a home-run ball that is hit by an admired baseball player or David Beckham's missed soccer ball selling for \$16 million on eBay. However, unlike the cases we examined in the current work, these examples of positive contamination are primarily the result of a symbolic interaction model based on associations rather than a residue model resulting from physical contact alone (Nemeroff and Rozin 1994). As such, for positive contamination effects to occur in consumer settings, the identity of the contamination source needs to be known and have a strong, positive association with the consumer. In contrast to the negative contamination effects demonstrated here, simply knowing that a product has been touched by an anonymous source is not enough for positive contamination to arise. For positive effects, the contamination source should be as important as the contact.

In addition to influencing whether positive or negative contamination effects will occur, the source of contamination might also serve as a moderating factor in general. For example, salespeople are constantly arranging displays and moving around products. Do consumers view this touching as contamination? How do consumers integrate their rules for contamination across different "actors" (i.e., salespeople versus other shoppers) in the consumption context? Is touching by some consumers actually considered positive, whereas touching by other consumers considered extremely negative? Further research could attempt to understand how touching by anonymous versus different known sources fits into the developed theory of consumer contamination.

Similarly, additional work is also needed to examine how the type of retail outlet influences consumer contamination effects. Consumers might have different ideas for the amount of contamination they would expect to find in an upscale store such as Nordstrom versus a discount center such as Wal-Mart. It may be that some retail outlets generate strong contamination effects because physical contact

among consumers and products is expected to be controlled and limited, whereas others do not because previous consumer contact with products is expected, as in a consignment store. Such speculation suggests that consumers may create rules (and exceptions) or frame information differently (Rozin and Nemeroff 1990) depending on the contamination context. These and other contextual differences could be investigated in further research on contamination.

Finally, in the current research, we consider the impact of three types of contamination cues: proximity to contact,

time elapsed since contact, and number of contact sources. In the retail environment, there are likely several other types of contamination cues that may be prevalent. For example, physical clues (e.g., cut or handwritten price tags or marked products) related to contact may all have a role in the realization of contamination effects. Future investigation should broaden our research framework to provide additional insight into the antecedents and outcomes of consumer contamination.

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