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How Counterfeits Infect Genuine Products: The Role of Moral Disgust

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We argue that moral disgust toward counterfeiting can degrade both the efficacy of products perceived to be counterfeits and that of genuine products resembling them. Five studies support our propositions and highlight the infectious nature of counterfeiting: Perceiving a product as a counterfeit made disgust more mentally accessible, and led participants to disinfect the item more and reduce how long they remained in physical contact with it (Study 1). Participants who perceived a mouse as a counterfeit, performed less well in a computer game using the mouse and expressed greater moral disgust, which mediated lowered performance (Study 2). Exposure to a supposedly counterfeit fountain pen in an unrelated prior task infected participants' performance using a genuine ballpoint pen resembling the "counterfeit;" individual differences in moral attitudes moderated the effect (Study 3). Exposure to a supposedly counterfeit mouse infected performance with a genuine mouse of the same brand; moral disgust mediated this effect (Study 4). Finally, moral disgust mediated lowered efficacy of a supposed counterfeit and that of a genuine item resembling the "counterfeit" (Study 5).

Keywords Counterfeiting; Counterfeit; Branding; Infection; Contagion; Contamination; Moral Disgust; Morality; Ethics; Public Policy

Counterfeiting is a rampant, immoral market phenomenon. The value of the worldwide annual trade of fake and pirated products is massive—$1.7 trillion in 2015 and expected to grow to $4.2 trillion by 2022 (ICC, 2017). In both developing and developed countries around the world, counterfeit goods are found in a wide spectrum of categories including apparel, electronics, beverages, food, pharmaceuticals, tobacco, and even vehicle and airplane parts. Existing research has shed light on important aspects of counterfeiting such as consumers' evaluation of fake goods and their preference for genuine products (e.g., Amaral & Loken, 2016; Commuri, 2009; Grossman & Shapiro, 1988a,b; Van Horen & Pieters, 2012; Wilcox, Kim, & Sen, 2009). However, the consumer-level consequences of this major immoral market phenomenon and their underlying causes remain under-studied (Gino, Norton, & Ariely, 2010; Kapferer & Michaut, 2014; Wertheimer & Wang, 2012). The current research aims to help fill this gap in the literature.

We investigate how and why counterfeiting can hurt the efficacy of genuine products—reducing how effectively consumers use the products for their intended propose. Our primary prediction is that counterfeiting can engender moral disgust,

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which can degrade the efficacy of products that are perceived to be fake, and infect the efficacy of genuine products that resemble counterfeits. Specifically, we propose that because people find counterfeiting unethical (e.g., Gino et al., 2010; Wilcox et al., 2009; Zaichkowsky, 2006) and because unethical behaviors can engender moral disgust (e.g., Chapman, Kim, Susskind, & Anderson, 2009; Moll, Zahn, Oliveira-Souza, Krueger, & Grafman, 2005; Rozin, Lowery, & Ebert, 1994), perceiving a product as a counterfeit can trigger this type of disgust. Similarly to how physical disgust triggers rejection of the offending source, moral disgust can reduce willingness to be proximal to or in physical contact with an item perceived as a counterfeit, interfering with effective product usage.

Stated differently, while the disgust conjured by fake items such as a pen may differ in its intensity from that evoked by typical physically disgusting objects such as rotten food, we expect the repulsion to be similar in nature and to hamper product efficacy. We further draw on research about physical disgust (e.g., Rozin, Millman, & Nemeroff, 1986), which showed that due to the Law of Similarity (Frazer, 1890/1959), disgusting items can infect—transfer "disgusting essence"—to objects that resemble them. For example, a plastic cockroach can elicit disgust because it is afflicted with the disgusting essence of real cockroaches (Rozin et al., 1986). Building on this, we posit that exposure to a counterfeit item can infect genuine products that resemble it, and thus degrade the efficacy of those genuine products.

We tested our propositions in a series of experiments. Study 1 showed that perceiving a product as a counterfeit increased mental accessibility of disgust, drove participants to disinfect the item more, and reduced how long they remained in physical contact with the item. In Study 2, perceiving a computer mouse as a counterfeit led participants to perform less well in a computer game using the mouse, and moral disgust mediated the performance differences. Subsequent studies demonstrated the infectious nature of the effect: In Study 3, perceiving a fountain pen as a counterfeit in one task, infected participants' performance in an unrelated text-copying task using a genuine ballpoint pen resembling the "counterfeit." Individual differences in moral attitudes moderated the effect. In Study 4, perceiving a computer mouse as a counterfeit infected participants' performance using a genuine mouse of the same brand; moral disgust mediated this effect. Finally, in Study 5, moral disgust mediated the lowered efficacy of a supposed counterfeit as well as that of a genuine item resembling the counterfeit (Study 5). While factors such as performance expectations may also reduce the efficacy of fake products, our results offer converging support for a distinct role of moral disgust.

Our work has theoretical and practical implications. For example, we identify the impact of moral disgust on product efficacy, and illustrate that such disgust can even infect genuine items resembling the counterfeits. Our results also suggest, for instance, that firms' efforts to draw consumers' attention to the existence of fake versions of their products may unintentionally hurt the efficacy of genuine products. Our research may also help inform calculations of damages caused by counterfeiting (e.g., to impose corresponding fines or restitutions), as our findings suggest that the damages can be broader than currently believed, hurting the consumption of genuine items that resemble the counterfeits.

The remainder of the paper is organized as follows. We develop our conceptualization, and present five empirical studies that test our hypotheses. We conclude with a discussion of theoretical contributions of our research, potential implications of our findings, and directions for future research.

Counterfeiting

Research in economics (e.g., Grossman & Shapiro, 1988a,b) explored detrimental effects of counterfeiting and how firms can combat them. For instance, as counterfeit goods become less distinguishable from the originals in terms of their quality, more consumers become less willing to pay the higher prices of genuine goods, which dampens firms' willingness to invest in innovation and produce high-quality genuine goods (e.g., Akerlof, 1970). According to Qian (2008), firms can fight negative effects of counterfeiting, for example, by innovating, engaging in self-enforcement, signaling through higher prices, and vertically integrating downstream retailers.

Research in marketing examined how consumers judge and why they buy counterfeit goods. Van Horen and Pieters (2012), for instance, showed that moderately similar imitations were evaluated more positively than imitations that were highly similar, when those were evaluated along with genuine products. Moores and Chang (2006) found that buyers recognized that counterfeiting is an infringement of intellectual property rights, but this understanding did not necessarily dampen their willingness to acquire counterfeit goods.

Marketing researchers also explored how counterfeiting affects consumers' acquisition of genuine

goods. For example, Commuri (2009) found that once consumers were aware that their favorite brands had been counterfeited, they would, for instance, reclaim the brands by fixating on past consumption experience, or disguise the brand cues. Wilcox et al. (2009) showed that consumers' preference for genuine versus counterfeit products depends on whether the goods are meant to serve social-adjustive or value-expressive functions. Han, Nunes, and Drèze (2010) found that consumers with a high need for status who cannot afford genuine products use "loud counterfeits" (e.g., fakes with a highly visible logo) to emulate more well-off consumers who acquire the genuine items. Amaral and Loken (2016) showed that higher-class consumers tend to denigrate a brand when lower classes use counterfeit versions of the brand, yet lower-class consumers tend not to denigrate when higher classes use counterfeit versions.

Effects of consuming counterfeits on people's subsequent behaviors in non-consumption domains have also been documented. For instance, consuming counterfeits can alter people's self-concept, causing them to cheat more and evaluate unethical behavior more favorably (Gino et al., 2010). Our research seeks to explore another significant consequence of counterfeiting—the infectious impact of moral disgust engendered by counterfeiting on product efficacy.

The Efficacy of Perceived Counterfeits

Because the quality of fake products can be lower than that of genuine products they imitate, consumers may think that fake products are worse and hence hold lower product performance expectations. This can lead to lower product efficacy, as performance expectations can be self-fulfilling. Study participants in Shiv, Carmon, and Ariely (2005), for example, expected an energy drink sold at a higher (versus a lower) price to perform better. After consuming the energy drink, those who paid more indeed performed better on a task that required mental acuity. Plassmann, O'Doherty, Shiv, and Rangel (2008) showed that higher prices increased activity in medial orbitofrontal cortex, an area believed to encode experienced pleasure (cf. McClure, Laibson, Loewenstein, & Cohen, 2004). Prior research thus suggests that perceived counterfeiting could affect efficacy due to lowered product performance expectations. Note that while expectation-based accounts can predict important effects, they also entail challenges. For example, performance expectations are often multiply determined—they can be influenced by different co-occurring factors such as perceived product quality, consumers' self-efficacy, and prior consumption experiences. As another example, Shiv et al. (2005) showed that measuring product performance expectations in and of itself significantly boosted their impact on product efficacy (see also, e.g., Ofir & Simonson, 2007).

In this research, we propose and test a complementary account of how counterfeiting can impact product efficacy. In addition to predict the impact of counterfeiting on product efficacy, the moral disgust account we propose suggests other predictions relating to the infectious nature and consequences of this phenomenon. Stated differently, the moral disgust-based account offers one theoretical explanation of how counterfeiting can influence product efficacy, and offers additional predictions. This account can help predict, for example, that items that are perceived as counterfeits can evoke disgust-related responses, that the impact of counterfeiting on product efficacy is mediated by moral disgust, and that exposure to a counterfeit can subsequently infect the efficacy of genuine products resembling it and moral disgust mediates this effect. In sum, while factors such as performance expectations may also lower the efficacy of counterfeit products, the results of the five studies that we report offer converging support for a distinct role of moral disgust.

The Role of Moral Disgust

Disgust is said to have originated from distaste, an oral rejection impulse when a repugnant (e.g., bitter) substance is ingested (Chapman et al., 2009; Rozin & Fallon, 1987). This repulsive reaction has an important adaptive function, as a foul taste can signal that the food ingested is harmful because it has gone bad or it is poisonous, for example (Garcia & Hankins, 1975). Disgust triggered by ingestion of a substance is thought to be "hard-wired" (Chapman & Anderson, 2013). For example, newly born infants who ingest a foul-tasting substance produce the same repulsive facial expressions and expel the substance as adults do (Steiner, 1973). Disgust can also be triggered without oral ingestion. For example, for most people, mere sight of substances such as vomit can result in feelings of disgust. Even thinking about an item that one finds disgusting, such as feces, can also evoke disgust. The impulse to reject has an adaptive function as it discourages physical contact

with potentially toxic substances (Rozin, Haidt, & McCauley, 2000).

Disgust has also been shown to substantially affect subsequent behaviors. For example, experiencing disgust in an unrelated context can not only reduce people's appetite to drink and eat (Chan, Van Boven, Andrade, & Ariely, 2014), but also reverse the very powerful and robust endowment effect (Lerner, Small, & Loewenstein, 2004) and status quo bias (Han, Lerner, & Zeckhauser, 2012) and lead to more negative attitudes toward a social group (Inbar, Pizarro, & Bloom, 2012). Research in marketing shows, for example, that consumers believe that physical contact allows physically disgusting products to transfer offensive properties, negatively affecting consumer evaluations (Morales & Fitzsimons, 2007). As another example, the experience of disgust has been shown to enhance compliance with fear appeals (Morales, Wu, & Fitzsimons, 2012).

Another form of disgust reflects the revulsion that people feel toward unethical and socially unacceptable behaviors (Chapman & Anderson, 2013; Pizarro, Detweiler-Bedell, & Bloom, 2006; Pizarro, Inbar, & Helion, 2011; Rozin et al., 2000). Taboo behaviors such as incest, as well as milder violations such as hypocrisy and deception can all lead to feelings of disgust (Haidt, Rozin, McCauley, & Imada, 1997). Like physical disgust, moral disgust serves the adaptive function of repelling people from engaging in socially unacceptable behaviors. In other words, moral and physical disgust evoke similar types of responses. For example, both types of disgust result in similar activation of the levator labii muscle region of the face (Chapman et al., 2009; Rozin et al., 1994) and trigger partially overlapping brain regions in the frontal and temporal lobes (Moll et al., 2005).

We propose that, like other unethical acts that evoke moral disgust (Chapman et al., 2009; Moll et al., 2005; Rozin et al., 1994), counterfeiting can also engender moral disgust. Note that consumers tend to view counterfeiting as unethical (e.g., Commuri, 2009; Gino et al., 2010; Zaichkowsky, 2006), but nevertheless obtain fake goods for reasons such as affordability and economical social signaling (e.g., Han et al., 2010; Wilcox et al., 2009). In other words, consumers' willingness to acquire fake goods need not conflict with their belief that counterfeiting is unethical (cf. Carrigan & Attalla, 2001). Behavioral manifestations of disgust include rejection of and repulsion toward the source (Rozin & Fallon, 1987). More specifically, we argue that, like physical disgust, moral disgust can lead to reduced willingness to be proximal to or in physical contact with a (perceived) counterfeit item, distracting from and interfering with effective usage of the item.

To summarize, we offer the following hypotheses:

H1: Exposure to counterfeits can evoke moral disgust.
H2: Perceived counterfeiting can hurt product efficacy.
H3: Moral disgust evoked by perceived counterfeiting mediates the degraded product efficacy.

We tested these hypotheses in two studies. Using multiple measures of disgust, Study 1 probes whether perceived counterfeiting can engender disgust (H1). Study 2 explores whether such disgust can hurt product efficacy (H2 & H3). Next, we develop another prediction—exposure to a supposed counterfeit item can infect genuine products resembling it—and then present three corresponding empirical tests.

Study 1

Design and Procedure

Sixty-two students at a large university (47% female, average age 25) participated in the study in exchange for course credit, and were informed that they would complete two separate tasks. Both tasks were designed to assess participants' experience of disgust. The first was said to be a word completion task that assessed verbal ability. The other supposedly assessed participants' ability to balance objects—they would balance a pen on their head and keep it from falling off for as long as they could. Participants were randomly assigned to one of two conditions. Those in the counterfeit condition received a Parker fountain pen and were informed that the product was a counterfeit. Those in the control condition were handed the same pen but were not informed that the product was a counterfeit (see Appendix S1 for more details).

Participants in both conditions were asked to try out their assigned pen and use it to complete a word fragment task (Jones & Fitness, 2008; Zhong & Liljenquist, 2006) that unobtrusively assessed the extent to which disgust-related notions were salient in participants' mind. The task included items such as STIN__ and REVOL__ING which could be completed by filling in letters that either created words relating to disgust (e.g., STINK, REVOLTING) or not (e.g., STING, REVOLVING). Participants were then informed that they completed the first task.

Next, participants completed the second, ostensibly unrelated task, which supposedly assessed their ability to balance an item. Like the first task, this second task also assessed the extent to which participants in the counterfeit (vs. control) condition experience disgust toward the target item. Specifically, this task entailed placing the pen and balancing it on their head (without holding it). A bottle of disinfectant liquid and a box of facial tissues were placed on a table in the center of the experimental room, and participants were informed that they had the option of using those to clean the pen before the balancing task. Whether and how much participants cleaned their assigned pen (the number of tissues used, the number of times they pressed the pump of the bottle to squeeze out disinfectant liquid, and how many seconds they spent cleaning the pen), as well as how many seconds the pen remained on their head, were unobtrusively tracked. Participants were then debriefed, thanked, and dismissed.

Results

The number of words that participants wrote down in the word fragment task that related to disgust was assessed. Supporting H1, participants who received a supposedly fake Parker pen wrote down significantly more disgust-related words on the lexical task than participants in the control condition ($M_{control}$ = 2.19, $SD_{control}$ = 2.06; $M_{counterfeit}$ = 4.97, $SD_{counterfeit}$ = 2.48; $t = -4.79$, $p < .001$), suggesting that disgust was more mentally accessible to the former group.

As shown in Table 1, compared to those in the control condition, participants in the counterfeit condition used significantly more tissues ($M_{control}$ = 0.77, $SD_{control}$ = 0.76; $M_{counterfeit}$ = 1.29, $SD_{counterfeit}$ = 1.07; $t = -2.19$, $p = .033$), pumped marginally significantly more disinfectant liquid ($M_{control}$ = 0.19, $SD_{control}$ = 0.40; $M_{counterfeit}$ = 0.45, $SD_{counterfeit}$ = 0.62; $t = -1.94$, $p = .058$), spent significantly more time cleaning their pen ($M_{control}$ = 10.68, $SD_{control}$ = 13.79; $M_{counterfeit}$ = 24.65, $SD_{counterfeit}$ = 25.10; $t = -2.72$, $p = .009$), and kept the pen on their head for a significantly shorter duration ($M_{control}$ = 32.26, $SD_{control}$ = 12.34; $M_{counterfeit}$ = 25.23, $SD_{counterfeit}$ = 9.38; $t = 2.53$, $p = .014$). Note that while both the word completion and balancing task were meant to assess the same construct—the level of disgust experienced (as opposed to product efficacy), we explored if performance in the former task mediates that in the latter. This analysis did not yield a significant indirect effect, possibly due to the cleaning activities in between the two tasks, as cleaning is known to reduce disgust (e.g., Zhong & Liljenquist, 2006). In subsequent studies, the tasks were designed to measure product efficacy and did not entail cleaning, thus offering better tests of whether disgust mediates efficacy differences between perceived counterfeits and genuine products. To summarize, the results of Study 1 offer converging support for our proposition that counterfeiting can engender moral disgust (H1).

Replication Study

Results of Study 1 indicate that counterfeits can evoke disgust. This replication study sought further support for this, directly probing the extent to which consumers find counterfeits morally disgusting. One hundred and thirty participants (52% female, average age: 29 years) completed the study for course credit. They were informed that they would complete a product evaluation task and were randomly assigned to one of the two conditions. As in the main study, those in the counterfeit condition received a Parker fountain pen and were informed that the product was a counterfeit. Those in the control condition were handed the same pen but were not provided further information. Using the pen, participants responded to direct measures of moral disgust—the extent to which they felt the pen is morally repulsive (1 = *not at all*, 7 = *very*) and ethically vile (1 = *not at all*, 7 = *very*). We averaged the two items into a single measure for subsequent analysis (r = .52). Further supporting H1, a t-test revealed that compared to those in the control condition, participants in the counterfeit condition found the pen significantly more morally disgusting ($M_{control}$ = 2.28, $SD_{control}$ = 1.55; $M_{counterfeit}$ = 3.15, $SD_{counterfeit}$ = 1.89; $t = -2.86$, $p = .005$).

Study 2

Study 1 demonstrated, with a variety of measures of disgust, that perceived counterfeiting can trigger moral disgust. Study 2 sought to extend this finding by testing whether moral disgust induced by counterfeiting mediates the detrimental effect on product efficacy. Also, to probe generalizability, Study 2 utilized a different product—a computer mouse.

Design and Procedure

One hundred and sixteen individuals (40% female, average age: 29 years) were recruited on the campus of a large university, and received $10

Table 1
Key Results of Studies 1–5

Study 1

	Control condition (N = 31)	"Counterfeit" condition (N = 31)	*T*-test value	*p* value
Disgust salience (Word completion task)	2.19 (2.06)	4.97 (2.48)	$t = -4.79$	<.001
Number of tissues used for cleaning	0.77 (0.76)	1.29 (1.07)	$t = -2.19$	.033
Number of times pumped disinfection liquid	0.19 (0.40)	0.45 (0.62)	$t = -1.94$	.058
Time spent cleaning [in seconds]	10.68 (13.79)	24.62 (25.10)	$t = -2.72$	.009
Duration of physical contact [in seconds]	32.26 (12.34)	25.23 (9.38)	$t = 2.53$	.014

Replication Study

	Control condition (N = 63)	"Counterfeit" Condition (N = 67)	***T*-test value**	*p* value
Moral disgust	2.28 (1.55)	3.15 (1.89)	$t = -2.86$	.005

Study 2

	Control condition (N = 57)	"Counterfeit" condition (N = 59)	*T*-test value	*p* value
Game performance [in seconds]	8.58 (7.58)	5.17 (6.29)	$t = 2.64$	.009
Moral disgust	1.84 (1.32)	2.89 (1.96)	$t = -3.36$	.001

Study 3

	Control condition (N = 31)	"Counterfeit" condition (N = 31)	*T*-test value	*p* value
Errors made	38.88 (52.43)	82.48 (90.87)	$t = -2.35$	.022

Study 4

	Control condition (N = 33)	"Counterfeit" condition (N = 33)	*T*-test value	*p* value
Moral disgust	2.06 (1.26)	2.82 (1.45)	$t = -2.27$	.027
Game performance [number of cookies "eaten"]	89.52 (8.19)	84.67 (10.99)	$t = 2.03$	<.05

Study 5

	Control condition (N = 30)	"Counterfeit" condition (N = 30)	*T*-test value	*p* value
Errors made using the pen	19.87 (4.45)	23.03 (4.69)	$t = -2.69$	<.01
Moral disgust	2.50 (1.41)	3.97 (2.51)	$t = -2.79$	<.01
Errors made using the mechanical pencil	18.10 (4.07)	20.67 (4.71)	$t = -2.26$	.028

Note:. Standard deviations are displayed in parentheses next to the means.

as compensation for participating in this study. Participants were randomly assigned to one of the two conditions and used identical computer hardware and software (see MDA for more details). Those in the counterfeit condition were informed that the computer mouse was a counterfeit, and those in the control condition were not provided this information. Participants in both conditions played a game of virtual table tennis that required using the mouse to "hit" a digital ball. We expected that if perceived counterfeiting indeed engenders moral disgust, participants in the counterfeit condition would be less willing to be in physical contact with the mouse and hence more quickly commit an error—miss hitting a ball.

The game ended when the player missed the ball. An experimenter unobtrusively tracked how long (how many seconds) participants managed to play the game without missing the ball. The shorter this duration, the less well a participant performed. Participants then responded to measures regarding moral disgust. Specifically, they indicated the extent to which they found the mouse morally repulsive (1 = *not at all*, 7 = *very*) and ethically vile (1 = *not at all*, 7 = *very*). Responses on these two items were averaged into a single of measure of moral disgust

for subsequent analyses (r = .7). To account for potential differences in prior gaming experience, participants indicated how often they had played computer games using a mouse (1 = *never*, 7 = *very frequently*). Participants then completed basic demographic questions, were debriefed, thanked, and dismissed.

Results

As shown in Table 1, *t*-tests revealed that, compared to those in the control condition, participants in the counterfeit condition performed significantly worse ($M_{control}$ = 8.58, $SD_{control}$ = 7.58; $M_{counterfeit}$ = 5.17, $SD_{counterfeit}$ = 6.29; t = 2.64, p = .009). This result thus supports H2. Participants in the counterfeit condition also expressed significantly more moral disgust ($M_{control}$ = 1.84, $SD_{control}$ = 1.32; $M_{counterfeit}$ = 2.89, $SD_{counterfeit}$ = 1.96; t = −3.36, p = .001), further supporting H1. Not surprisingly, we found no difference between the conditions in how frequently participants played computer games using a mouse (p > .12).

We ran a mediation analysis (Model 4, Hayes, 2013) with the experimental conditions as the independent variable, how long participants managed to play before missing the ball as the dependent variable, moral disgust as the mediator, and prior game playing frequency as a covariate. As shown in Figure 1, this analysis revealed a significant indirect effect of perceived counterfeiting through moral disgust on game performance (β = −.58, SE = 0.34, 95% CI [−1.45, −0.05]). When this indirect effect was accounted for, the direct effect of perceived counterfeiting became non-significant (β = −2.62, SE = 1.35, 95%CI [0.05, −5.30]). These results support H3.

Overall, Studies 1 and 2 illustrate that perceived counterfeiting can evoke moral disgust, degrading product efficacy. In the following sections, we explore the infectious nature of this detrimental effect of counterfeiting.

Counterfeits can Infect Genuine Products

Consistent with the Law of Contagion (Frazer, 1890/1959; Mauss, 1972/1903; see also Tylor, 1871), research shows that consumers often believe that positive or negative essence of one entity can be transferred to another entity through a process of contagion (Argo, Dahl, & Morales, 2006, 2008; Morales & Fitzsimons, 2007; Newman & Bloom, 2014; Newman, Diesendruck, & Bloom, 2011). Transfer can also occur via the Law of Similarity. According to this law (Frazer, 1890/1959; Mauss, 1972/1903; see also Tylor, 1871), when two entities resemble one another, they are often believed to share fundamental properties, and psychological contagion can occur—the second entity is believed to possess properties of the first. For example, many people are reluctant to drink a glass of orange juice with a realistic-looking sterilized plastic cockroach floating in it (although it clearly cannot physically infect the juice). This is because the plastic roach is thought to possess the "disgusting essence" of a real cockroach, and is thus perceived to infect the juice (cf. Rozin et al., 1986). Extending this Law of Similarity to our research context, we posit that genuine products can be infected by counterfeits that they resemble—genuine products in similar categories by the same brand, for example. That is, when consumers are exposed to a counterfeit, genuine products resembling the counterfeit can become tainted, triggering moral disgust and hence leading to degraded product efficacy. More formally:

H4: Moral disgust evoked by perceived counterfeiting can infect the efficacy of genuine products that resemble the counterfeit.

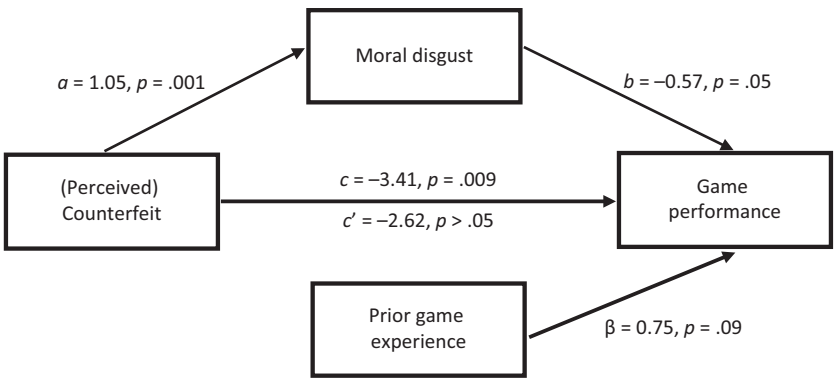

Figure 1. Moral Disgust Mediated the Participants' Computer Game Performance in Study 2.

Study 3

Study 3 tested H4, probing whether a counterfeit product can be infectious in a manner that is similar to physical contaminants and infect genuine items that resemble it (e.g., products in similar categories by the same brand). Study 3 also explored whether individual differences in moral attitudes can moderate the effect. Specifically, our conceptualization suggests that consumers who hold more stringent moral attitudes are likely to exhibit stronger moral disgust toward counterfeit goods. As such, these consumers should be more repulsed by goods that are perceived as counterfeits (see MDA for a test supporting this link). This thus degrades the effectiveness with which they use the goods. In other words, we expect consumers' moral attitudes to moderate the infectious effect of counterfeiting.

Design and Procedure

Sixty-two students at a large university (42% female, average age: 27 years) participated in the study in exchange for course credit. Participants were randomly assigned to one of the two conditions (see MDA for more details). Those in the counterfeit condition were given a Parker fountain pen and were told that the product was a counterfeit. Those in the control condition were handed the same Parker fountain pen but were not given the additional information. Participants were first asked to complete a brief product assessment task—try out the pen and evaluate how well it writes (1 = *not at all*, 7 = *very well*). Participants were then informed that they completed the first task and were asked to proceed to an ostensibly unrelated second task.

In this second task, participants in both conditions were asked to use a genuine Parker ballpoint pen to complete a writing task. Specifically, participants in the counterfeit condition were informed that the Parker ballpoint pen was genuine. Those in the control condition were given the same genuine pen but did not receive information about the authenticity of the pen. After participants tried out the pen, they were asked to copy a paragraph of text (about molecular properties) on a sheet of paper with narrowly printed horizontal lines. They were told that their performance in this task depended on how well they could keep their writing between the lines, without writing across or touching these lines.

To probe individual differences in moral attitudes, we asked participants to respond to three questions assessing common mild moral violations: the extent to which they believed it is unacceptable to "take office supplies from work," "report somewhat inaccurately when filing taxes," and "use someone else's membership card to get into a gym or pool for free" (1 = *not at all*, 7 = *very*). A factor analysis with maximum likelihood extraction method yielded only one factor with an eigenvalue above 1 (eigenvalue = 1.83), suggesting that the three items reflected a single construct. These items were thus averaged into a single measure of individual differences in moral attitudes ($\alpha = .67$, $M = 5.13$, $SD = 1.39$). To probe other potential mechanisms, we also assessed malleability of self-efficacy (Levy, Stroessner, & Dweck, 1998), PANAS (Watson, Clark, & Tellegen, 1988), and performance motivation. As none of these measures yielded significant differences between conditions (see MDA for details), we do not discuss these items further. Participants were debriefed, thanked, and dismissed.

Results

The dependent measure was the number of times that participants touched or crossed the horizontal lines on the response sheet, using the second (ballpoint) pen. Although participants in both conditions used an identical pen, a *t*-test revealed that those in the counterfeit condition made significantly more errors than those in the control condition ($M_{control} = 38.88$, $SD_{control} = 52.43$; $M_{counterfeit} = 82.48$, $SD_{counterfeit} = 90.87$; $t = -2.35$, $p = .022$). That is, supporting H4, exposure in the first task of this study to a supposedly counterfeit Parker fountain pen, infected participants' performance using the genuine Parker ballpoint pen in the second task.

Next, to probe the potential moderating role of individual differences in moral attitudes, we ran a regression with a dummy variable representing the two experimental conditions (1 = counterfeit, 0 = control), the mean-centered moral attitudes measure, and their interaction term as independent variables, and the number of errors made on the text-copying task as the dependent variable. As shown in Figure 2, this analysis revealed a significant interaction effect between perceived counterfeiting and moral attitudes ($\beta = 29.81$, $SE = 13.31$, $t = 2.24$, $p = .029$), in addition to a significant main effect of exposure to a similar product that was a "counterfeit" in the first task ($\beta = 44.41$, $SE = 18.01$, $t = 2.47$, $p = .017$). A spotlight analysis of the interaction at one standard deviation above and below

Figure 2. Moral Attitudes Moderated the Infectious Effect of Perceived Counterfeiting on Performance in Study 3.
Note: Higher vs. lower moral attitudes groups created by median split to illustrate the interaction.

the mean of the moral attitudes measure revealed that exposure to a "counterfeit" item on the first task significantly increased the number of errors made on the second task for those with more stringent moral attitudes ($\beta = 86.09$, $SE = 26.01$, $t = 3.31$, $p = .002$) but not for those with weaker moral attitudes ($p > .9$).

To further dissect this significant interaction, we ran a Johnson–Neyman analysis to estimate the value of moral attitudes at which the effect of exposure to counterfeiting on product efficacy became significant (at $\alpha = .05$ level). This analysis yielded a Johnson–Neyman region of significance starting from the moral attitude value of 4.87, indicating that participants who scored at or above this value on the moral attitudes measure (61.29% of the sample) made significantly more errors on the writing task when they were exposed (vs. not exposed) to a "counterfeit" item on the first task. These results are consistent with our proposed mechanism—individual differences in moral attitudes moderated the infectious impact of perceived counterfeiting on product efficacy.

We conducted a post-test to examine whether participants' disbelief that the second pen was genuine (as opposed to our proposed infectious effect) might potentially account for the inferior performance observed. Sixty participants (58% female, average age of 25 years) from the same population as the main study completed in this post-test. They followed the same procedure as that of the main study, except that instead of responding to the dependent measures, they were asked to indicate whether the second pen was a counterfeit or a genuine product. A logistic regression with the experimental conditions as the independent variable and judgment of the pen as the dependent variable revealed no significant difference between the conditions ($\beta = -1.49$, $SE = 1.15$, Wald = 1.69, $p > .19$)—the large majority of participants in both conditions (29 out of 30 in the "counterfeit" condition and 26 out of 30 in the control condition) indicated that the second product was genuine. The results do not support the potential alternative account.

Study 4

Study 3 demonstrated the infectious nature of our proposed effect—using a genuine product resembling a supposedly counterfeit item degraded performance. Study 4 extended this by exploring whether moral disgust mediates this effect. To demonstrate generalizability, Study 4 also utilized a different category of product—a computer mouse.

Design and Procedure

Sixty-six individuals (51% female, average age of 25 years) were recruited on the campus of a large university, and received $10 as compensation for participating in the study. Participants were randomly assigned to one of the two conditions, and used identical computer hardware and software (see MDA for more details). In the first phase of the experiment, all participants completed a product description task. They were handed the same Microsoft mouse. Those in the counterfeit condition were informed that that mouse was a counterfeit. Those in the control condition were not provided further information. All participants were asked to write a description of the product (there was no difference between the conditions in the length of the description provided, $p > .4$) and were then informed that they had completed the first study.

In an ostensibly unrelated second study, all participants were asked to play a 15 s long computer game. This game required maneuvering and clicking on the mouse to "eat" virtual cookies. All participants were asked to use a genuine Microsoft mouse (a different color from the one they used in the first task) to play the game. The game score of each participant served as the dependent measure for this study. If our proposed infectious effect occurs, participants who were initially exposed to a "counterfeit" item would be more repulsed by the mouse and hence perform worse in the game.

Next, participants responded to measures regarding moral disgust toward the first mouse they examined at the beginning of the study.

Specifically, they indicated the extent to which they found the mouse morally repulsive, ethically vile, and ethically offensive (1 = *not at all*, 7 = *very*). A factor analysis with maximum likelihood extraction method yielded only one factor with an eigenvalue above 1 (eigenvalue = 1.81), suggesting that the three items reflected a single construct. Responses on these three items were averaged into a single of measure of moral disgust for subsequent analyses ($\alpha = .71$). To account for potential differences in prior gaming experience, participants also indicated how often they played computer games using a mouse (1 = *never*, 7 = *very frequently*). Participants then completed basic demographic questions, and were debriefed, thanked, and dismissed.

Results

Compared to those in the control condition, participants in the counterfeit condition experienced more moral disgust ($M_{control} = 2.06$, $SD_{control} = 1.26$; $M_{counterfeit} = 2.82$, $SD_{counterfeit} = 1.45$; $t = -2.27$, $p = .027$, see Table 1). Also, compared to those in the control condition, participants in the counterfeit condition performed worse in the game ($M_{control} = 89.52$, $SD_{control} = 8.19$; $M_{counterfeit} = 84.67$, $SD_{counterfeit} = 10.99$; $t = 2.03$, $p < .05$).

We ran a mediation analysis (Model 4, Hayes 2013) with a dummy variable representing the two experimental conditions as the independent variable, game performance as the dependent variable, moral disgust as the mediator, and prior game playing frequency as a covariate. The analysis revealed a significant indirect effect of counterfeiting through moral disgust on game performance ($\beta = -1.18$, $SE = .92$, 95%CI [−4.06, −0.06]). When this indirect effect was accounted for, the direct effect of counterfeiting became non-significant ($\beta = -3.64$, $SE = 2.46$, 95%CI [−8.57, 1.27]). These results thus further support H4.

As in Study 3, we conducted a post-test to examine whether the potential alternative account that the lower performance observed in Study 4 might be due to participants not believing that the second mouse was genuine, rather than due to our proposed infectious account. In total, 66 participants (48% female, average age of 24 years) from the same population as the main study completed in this post-test. They followed the same procedure as that of the main study, except that instead of responding to the dependent measures, they were asked to indicate whether the second mouse was a counterfeit or a genuine product. A logistic regression with the experimental conditions as the independent variable and judgment of the mouse as the dependent variable revealed no significant difference between the conditions ($\beta = -.76$, $SE = .90$, Wald = 0.71, $p = .4$)—the large majority of participants in both conditions (31 out of 33 in the "counterfeit" condition and 29 out of 33 in the control condition) indicated that the second product was genuine. This result thus does not support the potential alternative account.

Study 5

Studies 2–4 demonstrated infectious effects of perceived counterfeiting on product efficacy, and the underlying role of moral disgust. Study 5 sought to replicate these results, testing whether moral disgust mediates the lowered efficacy of supposed counterfeits as well as the infectious effect on similar products that are not counterfeits.

Design and Procedure

In all, 60 students from a large university (42% female, average age 25 years) participated in this study in exchange for course credit. These participants were randomly assigned to one of the two conditions (see MDA for more details). Those in the counterfeit condition were given a Parker fountain pen and were informed that the product was a counterfeit. Those in the control condition were handed the same Parker fountain pen (but were not given the [mis]information). After participants tried using the pen, they were handed a sheet of paper with a small maze on it. They were instructed to draw a line connecting the entrance and the exit of a maze, minimizing the number of times this line touched or crossed the "walls" of the maze.

Next, participants completed a supposedly unrelated task—a word fragment task that unobtrusively assessed the extent to which disgust-related notions were salient in participants' mind (the same as that used in Study 1). Once they completed the above tasks, in an ostensibly separate study, participants were asked to complete another task that examined the infectious effect of counterfeiting on a similar product: They were asked to use a genuine Parker mechanical pencil similar in its design to the fountain pen they had used and complete another maze task. Specifically, participants in the "counterfeit" condition were informed that the mechanical pencil was genuine. Those in the control condition were given the same genuine pen but did not receive information about the authenticity of the

pen. Finally, participants were debriefed, thanked, and dismissed.

Results

The dependent measure was the number of times that the line each participant drew using the pen or the pencil, touched or crossed the "walls" of the maze. The number of disgust-related words that participants provided on the word fragment task was counted. This measure of moral disgust served as the mediator in our analyses.

As shown in Table 1, although participants in both conditions used an identical fountain pen, those in the counterfeit condition erred—touched or crossed the walls of the maze—significantly more times ($M_{control}$ = 19.87, $SD_{control}$ = 4.45; $M_{counterfeit}$ = 23.03, $SD_{counterfeit}$ = 4.69; $t = -2.69$, $p < .01$) than those in the control condition, a result further supporting our basic prediction that using a genuine item perceived as a counterfeit can degrade its efficacy (H2). In addition, supporting H1, participants in the control condition wrote down fewer disgust-related words on the word fragment task than those in the counterfeit condition ($M_{control}$ = 2.50, $SD_{control}$ = 1.41; $M_{counterfeit}$ = 3.97, $SD_{counterfeit}$ = 2.51; $t = -2.79$, $p < .01$).

A mediation analysis established that the moral disgust that participants experienced mediated the effect of perceived counterfeiting on product efficacy. As shown in Figure 3a, the indirect effect of perceived counterfeiting on performance errors (instances in which the pen touched or crossed the walls of the maze), through moral disgust, was positive and significant ($a \times b = 1.26$, $Z = 2.11$, $p < .05$). Exposure to counterfeiting significantly increased moral disgust ($a = 1.47$, $t = 2.79$, $p < .01$). This significantly increased performance errors ($b = 0.86$, $t = 3.14$, $p < .005$). Furthermore, the direct effect of counterfeiting on performance errors was positive and significant (c = 3.17, $t = 2.68$, $p < .01$). However, when the indirect effect was accounted for, this direct effect became non-significant (c′ = 1.90, $t = 1.63$, $p > .10$). Finally, a bootstrap analysis with 5,000 resamples revealed that the 95% confidence intervals for the significant indirect effect excluded zero (from 0.28 to 2.82). These results thus offer additional support for H3.

Further supporting H4, prior exposure to the "counterfeit" pen significantly impacted participants' performance in the maze task using the genuine Parker mechanical pencil—those in the counterfeit (vs. control) condition touched or crossed the walls of the maze significantly more times ($M_{control}$ = 18.10, $SD_{control}$ = 4.07; $M_{counterfeit}$ = 20.67, $SD_{counterfeit}$ = 4.71; $t = -2.26$, $p = .028$). Note that an ANOVA with whether a supposedly counterfeit pen was used in the first task as the between-subject factor and whether a pen or pencil was used to complete the maze task as a repeated within-subject factor, revealed only two significant main effects. That is, participants made fewer mistakes on the maze task when they used the pencil than when they used the pen (M_{pen} = 21.45, SD_{pen} = 4.80;

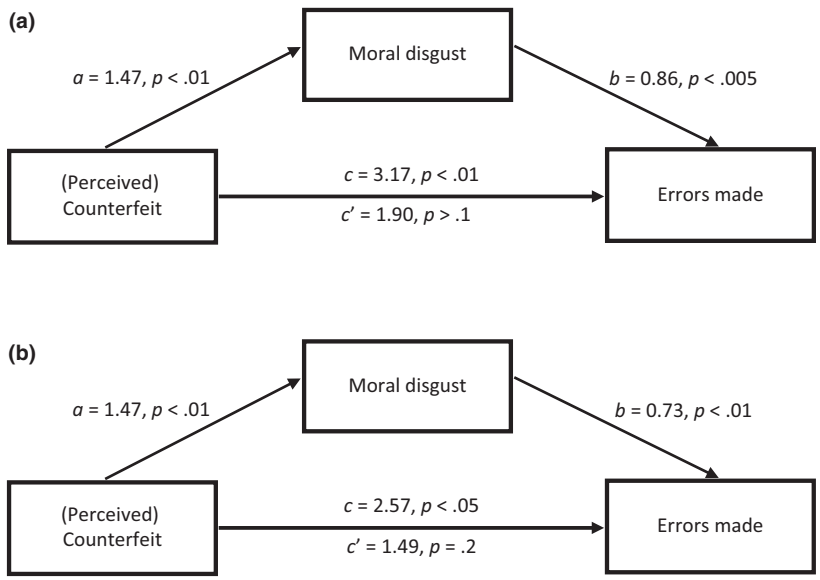

Figure 3. (a) Moral Disgust Mediated Participants' Performance using the Pen in the First Task of Study 5. (b) Moral Disgust Mediated Participants' Performance using the Mechanical Pencil in the Second Task of Study 5.

M_{pencil} = 19.38. SD_{pencil} = 4.55; $F(58, 1) = 27.82$, $p < .01$). More importantly, this analysis also showed that participants in the counterfeit condition performed significantly worse than those in the control condition ($F(58, 1) = 6.92$, $p = .01$).

A mediation analysis established that the moral disgust that participants experienced due to the first product (the fountain pen) also mediated the effect of perceived counterfeiting on the efficacy of the second product (the mechanical pencil). The indirect effect of perceived counterfeiting on performance errors (when the pencil touched or crossed the walls of the maze), through moral disgust, was positive and significant ($a \times b = 1.07$, $z = 1.97$, $p < .05$). Prior exposure to counterfeiting had a significant effect on moral disgust ($a = 1.47$, $t = 2.79$, $p < .01$). This significantly increased performance errors when participants used the pencil ($b = 0.73$, $t = 2.72$, $p < .01$). Furthermore, the direct effect of prior exposure to a "counterfeit" on performance errors was positive and significant ($c = 2.57$, $t = 2.26$, $p = .028$). However, when the indirect effect was accounted for, this direct effect became non-significant ($c' = 1.49$, $t = 1.29$, $p = .2$). Finally, a bootstrap analysis with 5,000 resamples revealed that the 95% confidence intervals for the significant indirect effect excluded zero (from 0.16 to 2.62). In conclusion, while Study 5 had potential limitations such as the mediator being measured after the use of the first product and before the second, results of this study provided converging support for H4—the degraded efficacy of a second genuine product was mediated by moral disgust engendered by the first (supposedly counterfeit) product. These results thus further highlight the infectious impact of perceived counterfeiting on genuine products.

General Discussion

Counterfeiting is a rampant immoral market phenomenon that affects numerous consumers, firms, and industries around the world. While prior research uncovered important insights regarding the impact of counterfeiting such as the evaluation of fake goods and preferences for genuine products (e.g., Amaral & Loken, 2016; Commuri, 2009; Grossman & Shapiro, 1988a,b; Van Horen & Pieters, 2012; Wilcox et al., 2009), the consequences of this widespread phenomenon are not yet well understood. Our research helps address this gap in the literature, investigating how and why counterfeiting can infect the efficacy of genuine products.

We argue that counterfeiting can engender moral disgust that manifests in repulsive reactions, which can distract from and interfere with effective product usage. Such moral disgust can thus degrade the efficacy of products that are perceived to be counterfeits, and also infect the efficacy of genuine products resembling the counterfeits. We tested our propositions in a series of experiments. Study 1 showed that perceiving a product to be a counterfeit increased mental accessibility of disgust, drove participants to disinfect the item more, and reduced how long they remained in physical contact with the item. A follow-up study that directly measured moral disgust replicated this pattern of results. In Study 2, participants who perceived a computer mouse to be a counterfeit indicated a higher level of moral disgust. This disgust mediated the degraded performance by those using the "counterfeit" (vs. genuine) mouse in a computer game. Study 3 showed that exposure to a supposedly counterfeit fountain pen in one task, infected participants' performance in an unrelated subsequent text-copying task using a genuine product resembling the first item (a ballpoint pen by the same brand); individual differences in moral attitudes moderated this effect. In Study 4, exposure to a supposedly counterfeit mouse infected participants' performance using a genuine mouse of the same brand in a subsequent task, and moral disgust mediated this effect. Further illustrating the infectious nature of counterfeiting via moral disgust, in Study 5, moral disgust toward counterfeiting mediated the detrimental effect of counterfeiting on product efficacy with a supposedly counterfeit pen as well as that with a genuine mechanical pencil resembling the supposedly counterfeit item.

The current research contributes to the understanding of the consequences of counterfeiting, demonstrating infectious outcomes that counterfeits can have on genuine products. Specifically, we show that counterfeiting can engender moral disgust, which can degrade the efficacy of products that are perceived to be counterfeits as well as that of genuine products resembling the counterfeits. Note that the proposed moral disgust account is intended to complement rather than compete with an account based on performance expectations, whereby such factors as pricing, promotions, and possibly perceived counterfeiting, can affect the benefits that consumers derive from consumption by altering performance expectations (e.g., Plassmann & Weber, 2015; Plassmann et al., 2008; Shiv et al., 2005; Waber, Shiv, Carmon, & Ariely, 2008). In other words, the moral disgust account

that we propose highlights one route through which counterfeiting can hurt product efficacy. This moral disgust-based explanation offers additional predictions such as that items that are perceived as counterfeits evoke disgust-related responses, that the impact of counterfeiting on product efficacy is moderated by individual differences in moral attitudes and mediated by the moral disgust they experience, and that prior exposure to a counterfeit can subsequently infect the efficacy of genuine products that resemble it.

Our findings also complement extant work demonstrating that brands can impact product efficacy by affecting consumers' self-efficacy (e.g., Fitzsimons, Chartrand, & Fitzsimons, 2008; Garvey, Germann, & Bolton, 2016; Park & John, 2014). Our work identifies an additional mechanism—branded goods that are perceived to be counterfeits can engender moral disgust, which can interfere with product usage and thus degrade product efficacy. Our findings also add to research on spillover effects (e.g., Ahluwalia, Unnava, & Burnkrant, 2001; Balachander & Ghose, 2003; Roehm & Tybout, 2006) by demonstrating that prior exposure to a supposedly counterfeit can subsequently degrade the efficacy of a genuine product resembling the former.

Our research suggests that the damages caused by counterfeiting can extend well beyond what firms, regulators, and courts have been considering (Europol, 2015; OECD, 2008). Our findings may have implications for legal battles in which damages caused by counterfeiting are assessed to impose corresponding fines or restitutions, for instance. Specifically, this research suggests that the damage can be broader than the lost sales and reduced exclusivity, on which courts tend to focus. Our work suggests another type of potential damage—degraded consumption experiences with genuine items that resemble the counterfeits. Legislators, attorneys, and law enforcement agencies may thus want to take counterfeiting even more seriously than they currently do. Future research can explore how law enforcement efforts could perhaps be supplemented by psychologically informed nudges designed to lower the likelihood that consumers acquire counterfeit products (cf. Amir & Lobel, 2012; Sunstein, 2014).

Our findings suggest several directions for future research. First, the degraded product efficacy due to moral disgust engendered by counterfeiting might operate through different types of disgust-related repulsion. For instance, moral disgust can reduce consumers' willingness to engage in physical contact, which can hurt the effectiveness of the product use. Moral disgust can also trigger desire to dissociate the self from the target by, for example, shifting focus away from the target, or mentally distancing oneself from the target. Such forms of repulsive reactions are all consistent with our conceptualization, but may be associated with different mental reactions such as distraction, disruption, or rumination that may yield unique downstream effects. Thus, it would be useful for future research to further explore the specific types of repulsive reactions.

Moreover, Studies 3–5 showed that prior exposure to a (supposedly) counterfeit item can infect the efficacy of genuine products resembling it. Future research can investigate factors that may moderate such consequences. Results of a preliminary study (see MDA) suggest that whether the products are by the same brand may be one such factor. Future research can explore other moderating factors such as the extent to which products are tangible (e.g., software vs. hardware). Furthermore, in Study 3, individual differences in moral attitudes moderated the infectious effect of counterfeiting, suggesting that aspects of consumers' identity may play a role. Future research could probe how aspects of consumers' identity impact the effects documented in this paper. For example, consumers with a salient ethical identity (e.g., activated by environmental cues) may experience lower product efficacy due to perceived counterfeiting.

Firms often go to significant lengths to draw the public's attention to how unethical it is to sell or buy counterfeit versions of their goods, in an attempt to dissuade consumers from buying such products. Our work suggests that such actions may unintentionally backfire, hurting the efficacy of these firms' genuine products by making the ethical violation more salient and possibly also perceived as more substantial than it would otherwise be. More broadly, businesses sometimes behave unethically, and many of such digressions receive substantial public exposure in the age of social media and mobile technologies. An interesting and important possibility that future research could explore is that the impact of such digressions may be broader and more severe than is currently recognized, as they may detract from the benefits that consumers derive from using genuine products. For example, it seems interesting for future research to consider such violations as damage to the environment (e.g., oilrig accident), flawed products (e.g., faulty ignition switch), deceptive product claims (e.g., misrepresenting exhaust gas emission levels), financial infractions (e.g., tax dodging), unethical labor

practices (e.g., "sweatshop" conditions at factories), or business executives' criminal offenses (e.g., fraud, corruption). Such unethical acts may well engender moral disgust, which in turn may harm product efficacy. By exploring potential research directions such as those speculated earlier, we believe that future research can help advance our understanding of the consequences of unethical behaviors, and help motivate businesses and consumers to behave more ethically.

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

Appendix S1. Methodological Detail Appendix.