Crazy-Funny-Cool Theory: Divergent Reactions to Unusual Product Designs

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ABSTRACT Consumer research suggests that cool products demonstrate autonomy by diverging from the norm. However, many products that diverge from the norm seem funny or simply bad rather than cool. What distinguishes products that look cool from those that look funny? We integrate prior research to propose a theory of how consumers respond to unusual product designs. Four experiments provide converging evidence that the design of cool products diverges from the norm in ways that make sense (i.e., seem appropriate), whereas the design of humorous products diverges in ways that do not make sense (i.e., seem violating). Results from a neuroimaging experiment support our psychometric findings by revealing that cool (vs. humorous) products are more likely to activate the anterior cingulate cortex. We discuss how coolness has the potential to transform society by rewarding products, brands, and people who figure out how to be different in a way that makes sense.

> Without deviation from the norm, progress is not possible.
> —Frank Zappa (American musician, 1940–93)

How can products stand out in an increasingly cluttered marketplace? The easy and well-supported answer is that they need to be different. Products that deviate from the norm are more likely to attract attention (Mandler 1982; Moore, Stammerjohan, and Coulter 2005), are better remembered (Heckler and Childers 1992), and are more widely discussed (Moldovan, Goldenberg, and Chattopadhyay 2011) compared to products that are perceived as normal. Consumers often perceive products that diverge from the norm as being cool (Warren and Campbell 2014), and cool products sell (Heath and Potter 2004; Kerner and Pressman 2007; Sundar, Tamul, and Wu 2014). The original iPhone, for example, was hugely successful in part because looking and working differently than other phones caused it to be perceived as cool.

However, designing a product that diverges from the norm is also risky. Consumers often dislike deviation: they are slower to adopt radically novel innovations (Alexander, Lynch, and Wang 2008; Rogers 2010; Grant, Campbell, and Jhang 2012), and they have less favorable evaluations of products that are highly incongruent with their expectations (Meyers-Levy and Tybout 1989; Campbell and Goodstein 2001). Moreover, consumers often think that products that diverge from the norm are a joke and thus fail to take them seriously (Warren and McGraw 2016a). For example, in 1999, Porsche changed the design of the headlights on its 911 model to an oval white light with a bulge at the bottom and an orange direction indicator. Rather than spark interest in the product, the unconventional design was met with ridicule, leading the car model to be known as the spilled fried egg (Wikipedia 2019).

Why does deviating from the norm sometimes result in success and other times result in failure? One answer to this question might be that consumers tend to have more favorable reactions toward incongruent products when they are able to resolve the incongruity stemming from norm deviation (Mandler 1982; Meyers-Levy and Tybout 1989; Grant et al. 2012). However, prior work also implies that making sense of a divergent stimulus could result both in perceived coolness (Warren and Campbell 2014) and in perceived

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humor (Suls 1972; Ludden et al. 2012). These findings illustrate that a clear conceptual differentiation of coolness and humor in product design is lacking.

Our research is the first to ask: What distinguishes product designs that are perceived to be cool from designs that are perceived to be funny? Understanding when something is cool rather than funny is important because cool products lead trends and can even change culture (Belk, Tian, and Paavola 2010; Warren and Campbell 2014; Thompson 2017). Consumers tend to prefer cool to uncool products (Runyan, Noh, and Mosier 2013; Sundar et al. 2014), and marketers regularly attempt to create cool products (Gladwell 1997; Kerner and Pressman 2007). While humor is seen as an effective communication tool (Gulas and Weinberger 2006; Eisend 2009), there is little evidence that consumers prefer to buy humorous products over nonhumorous products (the entertainment and whoopee cushion industries being exceptions). Although humor can help relieve tension, it is unlikely to inspire action or change, because it tends to give consumers the impression that everything is okay as it is (Moyer-Gusé, Mahood, and Brooks 2011; McGraw, Schiro, and Fernbach 2015; Warren, Barsky, and McGraw 2018).

We use product design as a domain to investigate the theoretical differences between coolness and humor. Three psychometric experiments and one neuroimaging experiment provide converging evidence that, although both cool and funny products deviate from the norm, cool products differ from funny products in that the deviation in the former seems appropriate (i.e., makes sense), whereas the deviation in the latter seems inappropriate (i.e., seems like a violation).

Our research offers four contributions. First, we contribute to consumer research by developing and testing a novel integrative framework—a crazy-funny-cool theory—to explain the different ways that consumers respond to norm divergence. Second, we contribute to the literature on coolness by identifying the process by which consumers perceive a product that deviates from the norm as being appropriate and, hence, cool. Although prior research has argued that objects become cool by showing appropriate autonomy (Warren and Campbell 2014), the psychological processes by which consumers appraise a behavior as appropriate, especially in the domain of product aesthetics, is unclear. Third, we contribute to the consumer neuroscience literature by examining neurophysiological patterns that are associated with perceived coolness. Fourth, we extend the literature on aesthetics by introducing the notion of coolness in product design.

COOL AND FUNNY RESEARCH

Some research has attempted to explain *what makes things cool* and other research has attempted to explain *what makes things funny*. Despite using different terms, these separate streams of research have arrived at a similar answer: being cool and being funny both require diverging from a norm without causing a serious problem.

Coolness

Coolness is defined as a subjective, dynamic, and positive trait attributed to objects (people, products, behaviors, etc.) inferred to be appropriately autonomous (Warren and Campbell 2014; Warren, Pezzuti, and Koley 2018). Cool people and products show autonomy by diverging from the norm (Warren and Campbell 2014), although the literature has described norm divergence using different terms, including being rebellious, unique, creative, subversive, or unconventional (Frank 1997; Pountain and Robins 2000; Heath and Potter 2004). Harley Davidson, for example, became a cool brand in part by cultivating a rebellious image. Similarly, Apple became cool by developing innovative products, encouraging people to "think different" while contrasting itself from mainstream competitors like Microsoft. Importantly, deviating from the norm is not always cool. In order to be cool, stimuli must diverge from the norm in a way that seems appropriate given the situation (Warren and Campbell 2014). For example, companies are perceived to be more cool when they rebel (Bruun et al. 2016; Warren et al. 2019), but only when the rebellious company comes from a disadvantaged background (Biraglia and Brakus 2015) or the ruling establishment seems illegitimate (Warren and Campbell 2014).

HUMOR

Humor is a broad term used to describe both a psychological state, characterized by amusement, perceived funniness, and the tendency to laugh, and the stimuli that elicit it (Veatch 1998; Gulas and Weinberger 2006; Martin 2007). Consistent with recent literature (Warren, Barsky, and McGraw 2018), we refer to the psychological response associated with humor as *humor appreciation* or *perceived humor*, while we describe the stimuli that elicit this response as *humorous*, *comedic*, or *funny*. Scholars agree that humorous stimuli diverge from the norm, a condition typically referred to as "incongruity" (Suls 1972; Oring 1992; Martin 2007; Warren and McGraw 2016a). Most also agree that the deviation cannot be catastrophic, although scholars disagree about whether humorous stimuli are better or worse than the norm (Koestler 1964; Veatch 1998; Warren and McGraw 2016a), as well as whether

the deviation must also be resolvable (i.e., make sense; Suls 1972; Woltman Elpers et al. 2004), appropriate (Oring 1992), harmless (Rothbart 1973; Ramachandran 1998), or benign (Wilmann 1940; McGraw and Warren 2010).

A CRAZY-FUNNY-COOL THEORY OF RESPONSES TO NORM DIVERGENCE

What distinguishes product designs that seem cool from designs that seem funny? Both cool and humorous designs deviate from the norm without upsetting the consumer, but the literature does not make a clear prediction about how the psychological process that causes consumers to perceive a product as cool differs from the process that causes them to perceive a product as humorous. We integrate the literatures on coolness and humor to propose a framework describing when consumers perceive product designs to be cool, funny, or neither. The framework includes three sequential appraisals, which we describe as questions (see fig. 1): (*a*) Does the stimulus deviate from the norm? (*b*) If so, do consumers think the deviation is appropriate? (*c*) If not, does the deviation upset consumers?

Appraisal 1: Does the Design Deviate from the Norm?

First, in order for a product to seem either cool or funny, consumers must appraise it as being incongruent with, or diverging from, the norm. In the domain of aesthetics and product design, this means that products will need to look different (e.g., in shape, size, or color) from consumers' mental model of a prototypical design in the category. This first appraisal is well supported by research on both coolness (Frank 1997; Heath and Potter 2004; Warren and Campbell 2014) and humor (Schultz and Horibe 1974; Morreall 2009); thus, we will not discuss it in further detail.

Appraisal 2: Does the Design Seem Appropriate?

Our novel contribution is this second appraisal, which we hypothesize explains why some unusual designs seem cool while others seem funny. Designs that deviate from the norm can either threaten or expand consumers' beliefs about what a product should look like. Following Veatch (1998; see also McGraw and Warren 2010), we refer to designs that consumers think look nonsensible, ugly, or wrong as *violations*. Conversely, following research on creativity (e.g., Moreau and Dahl 2005), we refer to designs that deviate in a way that looks sensible or attractive as *appropriate*. A water bottle with an unconventional but slick new design would seem appropriate, whereas a bottle that looks like a turd would seem like a violation.

When do consumers perceive a design that diverges from the norm to be appropriate? Research on information processing and cognitive psychology offers a clue. When consumers encounter an incongruent stimulus, they try to make sense of it. If they can make sense of (i.e., resolve) the stimulus, the resulting experience of positive affect tends to make

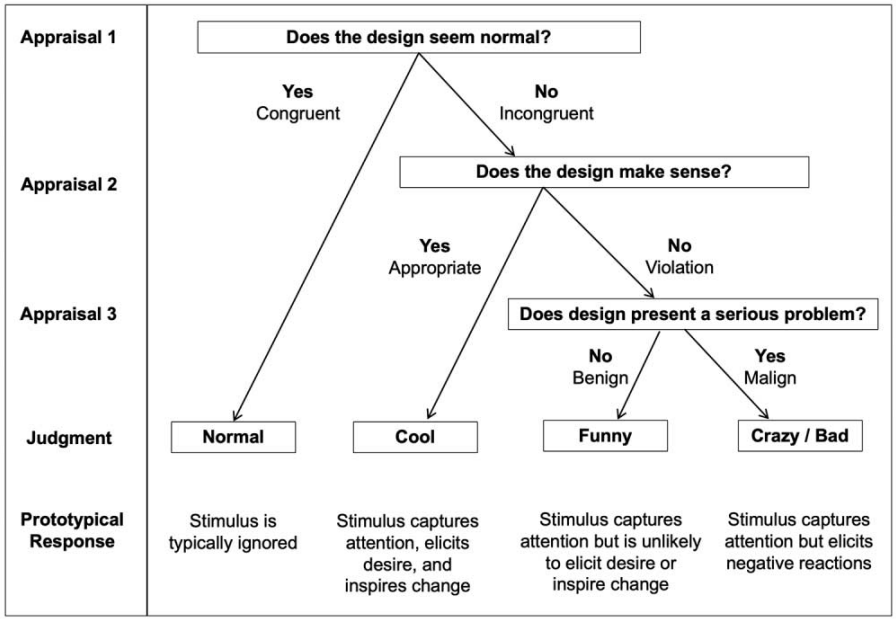

Figure 1. A crazy-funny-cool theory of how consumers respond to norm divergence.

them like it more (Mandler 1982; Grant et al. 2012). Being able to make sense of a design that diverges from the norm should similarly encourage consumers to appraise the design as being appropriate.

Building on these different streams of literature, we hypothesize that the key distinction between cool and humorous products is that the deviation detected in cool products is resolved, or appraised as appropriate, whereas the deviation in humorous products seems violating or inappropriate (appraisal 2 in fig. 1). Although prior research has not directly compared cool products with humorous products, research in both domains is consistent with the hypothesis that cool stimuli seem appropriate but humorous stimuli do not. Stimuli that diverge from the norm in ways that seems harmful (e.g., cartoon violence, slapstick), disrespectful (e.g., teasing, insults), or illogical (e.g., absurd behavior, clown play) often seem humorous (Veatch 1998; Purzycki 2011; Warren and McGraw 2015) but rarely seem cool (Dar-Nimrod et al. 2012; Warren and Campbell 2014). Moreover, because it is easier to make sense of stimuli that diverge a moderate rather than an extreme amount (Myers-Levy and Tybout 1989), we expect that humorous product designs will tend to diverge more from the norm than cool designs. Conceptually, however, it is possible for large deviations to seem appropriate and hence cool (e.g., the first iPhone) or for small deviations to seem inappropriate and hence uncool (e.g., a tiny scratch on a car).

Appraisal 3: Does the Design Bother the Consumer?

If a design that deviates from the norm seems inappropriate, a third appraisal determines whether the product seems humorous rather than bad or crazy. Specifically, if consumers are not personally bothered by the violating product (i.e., if they appraise it to be benign), then they will think the product is humorous. Conversely, if they believe the product presents a serious problem (i.e., if they do not appraise it to be benign), then they will have a strictly negative reaction to the product. Because the humor literature offers extensive evidence that a benign appraisal increases perceived humor (Rothbart 1973; Martin 2007; McGraw and Warren 2010; McGraw et al. 2012; Warren and McGraw 2016), and because the design of consumer products is unlikely to seem overly threatening, we do not test the framework's third appraisal in the current paper.

STUDY OVERVIEW

We conducted four experiments to test whether appropriateness (i.e., consumers' ability to make sense of a divergent product design) distinguishes products that look cool from products that look humorous. Experiment 1 manipulated the design of a consumer product (shoes) and measured the extent to which the product is perceived to be cool and humorous. We predicted that product designs that deviate from the norm in a way that makes sense or seems appropriate would be perceived as being more cool but less humorous compared to designs that deviate in an inappropriate manner. Experiments 2a, 2b, and 3 manipulated whether a product design seems cool, humorous, or normal and assessed consumers' appraisals of the products using psychometric scale measures (experiments 2a and 2b) and neuroimaging (experiment 3). We expected that participants would (*a*) be more likely to judge the cool products as making sense and offering a more attractive alternative to the norm than humorous products and (*b*) show more activation in the anterior cingulate cortex (ACC) when observing cool products than when observing humorous products.

EXPERIMENT 1

Experiment 1 tested our framework by asking participants to find and evaluate a pair of shoes. Participants were randomly assigned to find shoes with: (*a*) a normal design, (*b*) a design that is unusual but that makes sense (appropriate deviation), or (*c*) a design that is unusual and does not make sense (inappropriate deviation). We predicted that participants would rate the design that diverges from the norm in a way that makes sense as being more cool compared to normal and inappropriately diverging designs, whereas they would rate the design that diverges in a way that does not make sense as being more humorous but less desirable compared to normal and appropriately diverging designs.

Method

Participants were recruited from Amazon's Mechanical Turk (MTurk; $N = 240$, 51% female; all in the US) and completed the study for a small payment. Two participants did not pass a reading check (see the appendix, available online) and were directed out of the study before being assigned to a condition. The study used three between-subjects conditions: normal, appropriate deviation, inappropriate deviation. Participants were asked to find a picture of shoes using a Google Images search and to either paste a link to the image of the shoes or save and upload the image into the survey. The instructions regarding what type of shoes to search for varied by condition (see the appendix, available online for complete instructions). Participants were directed to find either "A picture of shoes that look similar to most other shoes" (normal),

"A picture of shoes that look different than most other shoes but the design makes sense to you" (appropriate deviation), or "A picture of shoes that look different than most other shoes and the design doesn't make sense to you" (inappropriate deviation). Next, participants rated the shoes that they found on the following dimensions: coolness (e.g., "The shoes look cool"), humor (e.g., "The shoes are humorous"), likelihood of attracting attention (e.g., "These shoes would capture my attention"), and desirability (e.g., "I would be interested in wearing these shoes"). Participants subsequently completed a manipulation check by rating the extent to which the design of the shoes deviated (e.g., "The shoes look unusual") and seemed appropriate (e.g., "The design of the shoes makes sense"). All of the measures used a 7-point scale ranging from "disagree" (1) to "agree" (7). Table A1 (tables A1–A3 are available online) provides a complete list of the measures in this and subsequent experiments. Finally, participants indicated which type of shoes they were asked to find in a multiple-choice question and reported their gender, age, native language, and education level. We report the results of the manipulation checks in the appendix.

Results

Consistent with prior research (Mandler 1982; Moore, Stammerjohan, and Coulter 2005), designs that deviated from the norm were rated as being more likely to capture attention than normal designs, regardless of whether the design seemed appropriate ($F_{1,235} = 167.18$, $p < .001$) or inappropriate ($F_{1,235} = 191.27$, $p < .001$; see table 1 for descriptive statistics). However, the appropriate and inappropriate designs differed in the extent to which they were perceived to be cool, humorous, and desirable. As hypothesized, the shoes that diverged from the norm in an appropriate way seemed cooler than both the normal shoes ($F_{1,235} = 5.11$, $p = .025$) and the shoes that diverged in an inappropriate way ($F_{1,235} = 106.09$, $p < .001$). Conversely, the shoes seemed the most humorous when the design deviated in an inappropriate way compared to both the normal shoes ($F_{1,235} = 217.27$, $p < .001$) and the shoes that deviated in an appropriate way ($F_{1,235} = 22.92$, $p < .001$). Consistent with our assertion that cool is not the same as funny, perceptions of coolness were negatively correlated with perceptions of humor ($r = -.26$, $p < .001$).

Importantly, although inappropriate deviation was perceived to be funny, shoes with unusual and inappropriate designs seemed less desirable than both normal shoes ($F_{1,235} = 167.13$, $p < .001$) and shoes with unusual but appropriate designs ($F_{1,235} = 139.31$, $p < .001$). We tested whether perceived coolness or humor mediated the effect of appropriate (coded 1) versus inappropriate (coded 0) deviance on the extent to which the shoes seemed desirable (Hayes 2013, model 4). Shoes that participants perceived to be more cool were also rated as being more desirable ($b = .57$, $t = 13.84$, $p < .001$); in contrast, shoes that participants perceived to be funnier were rated as being less desirable ($b = -.12$, $t = -2.94$, $p = .004$). Consistent with research showing that consumers desire cool products (Sundar et al. 2014; Quartz and Asp 2015; Warren, Pezzuti, and Koley 2018), perceived coolness mediated the effect of appropriate (vs. inappropriate) divergence on desirability (indirect effect = 1.55, 95% confidence interval [CI] [1.21, 1.91]). Perceived humor also mediated the effect,

Table 1. Results from Experiment 1

Condition	Normal	Appropriate deviation	Inappropriate deviation
Design → Measure ↓	"Similar to most other shoes"	"Look different . . . but the design makes sense"	"Look different . . . and the design doesn't make sense"
Attention-Grabbing	3.81^{B} (1.72)	6.42^{A} (.84)	6.56^{A} (1.02)
Cool	5.19^{B} (1.54)	5.79^{A} (1.46)	3.06^{C} (1.90)
Humorous	1.66^{C} (1.22)	4.25^{B} (2.06)	5.55^{A} (1.71)
Desirable	4.84^{A} (1.28)	4.66^{A} (1.60)	1.99^{B} (1.34)
Divergent (MC)	1.73^{C} (1.19)	5.72^{B} (1.29)	6.63^{A} (.82)
Appropriate (MC)	6.39^{A} (.88)	5.43^{B} (1.16)	2.55^{C} (1.21)

Note.—Experiment 1 asked participants to find and evaluate a pair of shoes that they perceived to be either (a) normal, (b) different in a way that makes sense, or (c) different in a way that doesn't make sense, depending on condition. Different superscripts indicate the means (within row) are significantly different ($p < .05$).

indicating that appropriately divergent shoes were perceived as more desirable because they were less humorous (indirect effect = .15, 95% CI [.04, .30]). Although we did not predict the latter mediation, it is consistent with recent research showing that humorous advertisements can result in less favorable brand attitudes (Warren and McGraw 2016b).

Discussion

In sum, participants reported that unusual shoe designs captured their attention better than normal designs. However, whether the unusual design was perceived to be cool and desirable (vs. humorous and undesirable) depended on whether the deviation made sense to the participants. Designs that diverged in an appropriate way seemed cool and desirable, whereas designs that diverged in an inappropriate way seemed funny but less cool and, consequently, less desirable.

EXPERIMENTS 2A AND 2B

Experiments 2a and 2b tested whether consumers appraise products with a cool design differently than products with humorous and normal designs. We hypothesized that both the cool and the humorous products would be perceived as diverging from the norm but that this deviance would seem more appropriate for the cool products than for the humorous products. Experiment 2a tested our hypothesis using a set of computer speakers. Experiment 2b attempted to replicate the findings in two different product categories: vases and teapots.

Experiment 2a: Method

Undergraduate students at the University of Arizona (N = 194; 51% female) participated in the experiment for course credit. A series of pretests identified four computer speakers in each of three categories: cool, humorous, and normal. We provide images of the speakers and details about the pretest in the appendix. Participants viewed the speakers in random order and rated the extent to which each speaker diverged from the norm (e.g., "They look different from most speakers") and the extent to which the design of each speaker seemed appropriate (e.g., "The design makes sense"). The measures, listed in table A1, used a 7-point scale (1 = "strongly disagree;" 7 = "strongly agree"). After rating the speakers, participants reported their gender and whether or not English was their first language.

Experiment 2a: Results

Because we wanted to test whether the differences between the cool, humorous, and normal speakers would generalize across participants as well as across different possible examples of speakers, we analyzed the data using mixed linear modeling (Judd, Westfall, and Kenny 2017). *Speaker Type* was a fixed factor with three conditions (cool, humorous, normal); *Speaker Replicate* was a random factor nested within *Speaker Type*; and *Participant* was a random factor crossed with both *Speaker Type* and *Speaker Replicate*. We represented *Speaker Type* with two orthogonal contrast-coded variables. The first contrast compared the cool speakers (coded "1") with the humorous speakers (coded "−1"; normal speakers coded "0"). The second contrast compared the normal speakers (coded "−.667") with the average of the cool and the humorous speakers (both coded ".333").

Consistent with the prediction that cool and humorous speakers both diverge from the norm, the normal speakers (M = 1.92) were perceived to deviate less than the cool (M = 5.18) and humorous (M = 6.12) speakers (contrast 2: $F_{1,12.99}$ = 91.02, p < .001). Participants also rated the cool speakers as deviating marginally less than the humorous speakers (contrast 1: $F_{1,10.15}$ = 4.29, p = .065). We did not predict this difference in perceived deviance between the cool and humorous speakers, but it is consistent with the finding that cool products tend to show a moderate rather than an extremely high level of autonomy (Warren and Campbell 2014).

Importantly, although both the cool and the humorous speakers were perceived to deviate from the norm, the design of the cool speakers (M = 4.60) seemed more appropriate than that of the humorous speakers (M = 3.42; contrast 1: $F_{1,9.91}$ = 35.14, p = .001). The normal speakers also seemed more appropriate (M = 5.07) than the average of the cool and humorous speakers (contrast 2: $F_{1,12.40}$ = 34.18, p < .001). Table A1 reports the detailed statistics for each of the 12 speakers.

Experiment 2b: Method

Participants recruited from MTurk (N = 191; 43% female; all in the US) participated in a study with a 3 (design: cool, humorous, normal) × 2 (product category: vases, teapots) within-subjects design. In random order, participants viewed and evaluated the six products pictured in table A3. The procedure and measures were the same as in experiment 2a, with the following exceptions. First, we dropped one of the items measuring appropriateness ("The design offers a better alternative to the norm"). Second, we measured the extent

to which the products seemed cool (uncool–cool), humorous (not humorous–humorous), and normal (atypical–normal) as manipulation checks (7-point scales).

Experiment 2b: Results

We tested our hypotheses by entering perceived norm divergence and appropriateness, respectively, as dependent measures in a 3 (design: cool, humorous, normal) × 2 (product category: vases, teapots) repeated-measures ANOVA. For both measures, the analyses revealed the predicted main effect of design (divergence: $F_{2,380} = 303.88$, $p < .001$, $\eta^2 = .62$; appropriate: $F_{2,380} = 132.34$, $p < .001$, $\eta^2 = .41$). However, the design-by-product-category interactions were also significant (divergence: $F_{2,380} = 14.05$, $p < .001$, $\eta^2 = .07$; appropriate: $F_{2,380} = 7.49$, $p = .001$, $\eta^2 = .04$). Because the interactions were significant, we analyzed the data for the two products separately.

Consistent with the prediction that cool and humorous products both diverge from the norm, paired-sample *t*-tests revealed that the normal vase ($M = 3.30$) was perceived to deviate less than the cool vase ($M = 5.62$; $t = -13.81$, $p < .001$) and the humorous vase ($M = 6.06$; $t = -15.51$, $p < .001$). Similarly, the normal teapot ($M = 2.44$) was perceived to deviate less than the cool teapot ($M = 5.16$; $t = -15.74$, $p < .001$) and the humorous teapot ($M = 5.97$; $t = -19.44$, $p < .001$). As in experiment 2a, the cool products were also perceived to deviate less than the humorous products (vases: $t = -5.07$, $p < .001$; teapots: $t = -8.65$, $p < .001$).

Importantly, although both cool and humorous products were perceived to deviate from the norm, the cool products seemed more appropriate than the humorous products (vases: $M = 4.96$ vs. 3.60, $t = 10.68$, $p < .001$; teapots: $M = 4.86$ vs. 3.94, $t = 7.40$, $p < .001$). Consistent with the prediction that humor requires a violation, the humorous products also seemed less appropriate than the normal products (vases: $M = 3.60$ vs. 5.25, $t = -11.25$, $p < .001$; teapots: $M = 3.94$ vs. 5.64, $t = -12.24$, $p < .001$; table A3 provides the complete descriptive statistics).

Discussion

Experiments 2a and 2b provide converging evidence that, although both cool and humorous products are perceived to deviate from the norm, the deviance in the cool products is perceived to be appropriate (i.e., to make sense), whereas the deviance in the humorous products is perceived to be inappropriate (i.e., violating). This pattern of results generalized across different product designs within the speaker category and replicated in two additional product categories, vases and teapots.

EXPERIMENT 3

Our fourth study contributes to the literature by providing one of the first attempts to investigate the neurophysiological activation associated with perceptions of coolness. To our knowledge, the only other work in this area is a book (Quartz and Asp 2015) that reports that cool products are associated with activation in the prefrontal cortex. However, this book describes neither the methodological details nor the precise statistical results of the study, making it difficult to draw clear conclusions.

Experiment 3 used functional magnetic resonance imaging (fMRI) to investigate whether cool speakers would elicit a different pattern of neurophysiological activation than humorous speakers. We hypothesized that if consumers are more likely to perceive the divergent designs in cool products as appropriate, then participants might also be more likely to reveal higher levels of ACC activation when viewing cool (vs. humorous) speakers. Appraising an incongruous design as appropriate requires both (*a*) detecting that the design deviates from the norm and (*b*) resolving or making sense of this deviation. The ACC has been associated with the processes of resolving conflict in the environment, error detection, and problem resolution (Berthier, Starkstein, and Leiguarda 1988; Eisenberger 2012). An automated reverse-inference meta-analysis based on the abstracts of published neuroimaging articles associated with voxels in and around the ACC found 337 studies containing the keyword "conflict" and 464 studies containing the keyword "error" (Yarkoni et al. 2011; meta-analytic database was accessed on January 12, 2019). Work on the ACC has argued that the ACC functions as a neurophysiological alarm system involved in the detection of discrepancies, followed by the recruitment of attentional and other cognitive resources aimed to fix the discrepancy (Eisenberger 2012). Although humorous products also diverge from the norm, our previous studies suggest that consumers are unlikely to resolve or make sense of the incongruity in humorous products. Upon detection of a humorous stimulus in its environment, the brain might lower its attempts or even entirely stop to resolve conflicts or detect errors. Thus, we predict that consumers will be less likely to show high ACC activation when viewing humorous (vs. cool) products.

We also investigated whether viewing cool products activated different areas in the brain compared to viewing humorous products. Because consumers like cool products

(Quartz and Asp 2015; Bruun et al. 2016), exposure to cool products could potentially increase activation in brain regions associated with reward value, including the nucleus accumbens, ventromedial prefrontal cortex, and/or orbitofrontal cortex (e.g., Reimann et al. 2010; Pegors et al. 2015). However, the neuroimaging literature on humor finds that exposure to humorous stimuli also tends to activate reward areas in the brain (Goel and Dolen 2001; Mobbs et al. 2003; Vrticka, Black, and Reiss 2013). Therefore, cool and humorous products may lead to similar activation in these areas.

Method

Participants recruited from the subject pool at the University of Arizona ($N = 31$) participated in the experiment. As a cover story, participants were informed that they would be asked to rate their feelings about different product designs in a "product evaluation task." However, we did not actually analyze these behavioral responses; instead, we analyzed participants' neurophysiological response—specifically, their blood-oxygen-level-dependent (BOLD) response—while they viewed the cool, humorous, and normal speakers from experiment 2a.

Before entering the scanner, participants completed a short training session to learn the experimental procedure. Once inside the scanner, participants viewed the same computer speakers used in experiment 2a in pseudo-randomized order. Each of 12 trials (four speakers × three categories) followed the trial phase shown in figure 2: After reading instructions (variable timing between 4 and 20 seconds), participants were shown a fixation cross (2 seconds) and were then presented with a speaker (6 seconds). We used the data from the "view phase" to analyze the neurophysiological responses to the speakers (see phase highlighted in gray in fig. 2). Next, participants rated how strongly they felt about the speaker on a response box they held in both hands (4 seconds). Finally, participants received a confirmation before the next trial started (2 seconds). The appendix provides a detailed report on both the neuroimaging data collection and data preprocessing and analyses.

Results and Discussion

We compared differences in BOLD responses between speakers categorized as cool, humorous, and normal. Our analysis focused on participants' neurophysiological response in the

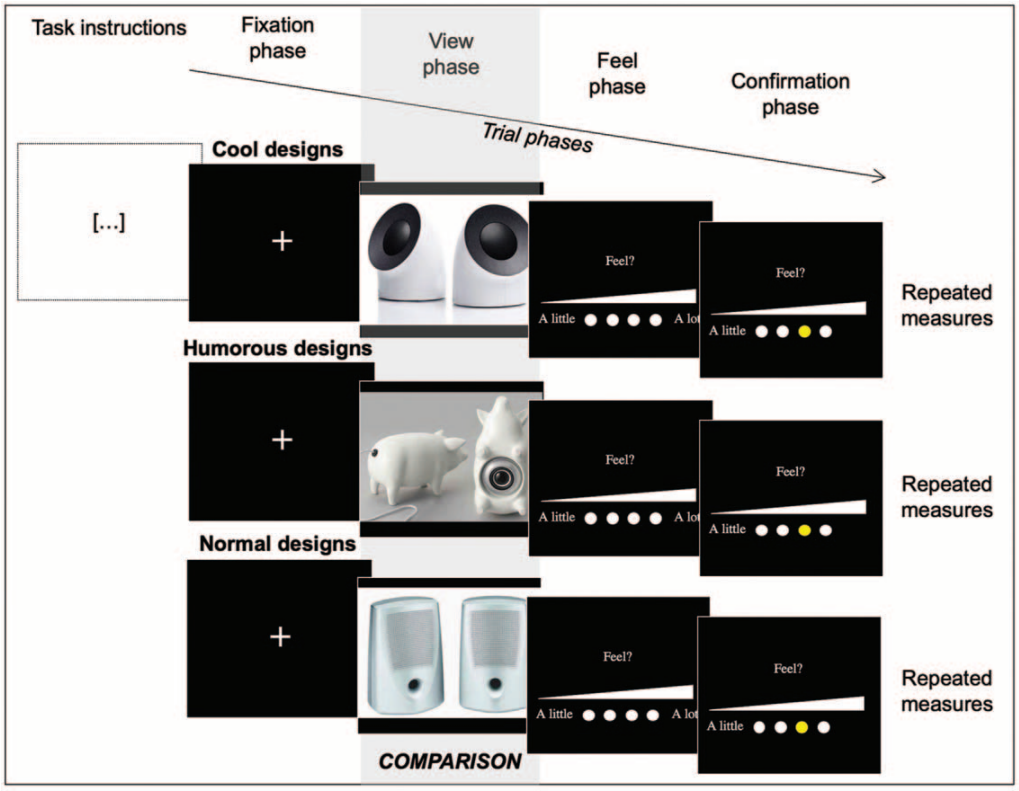

Figure 2. Product evaluation task shown during neuroimaging in experiment 3.

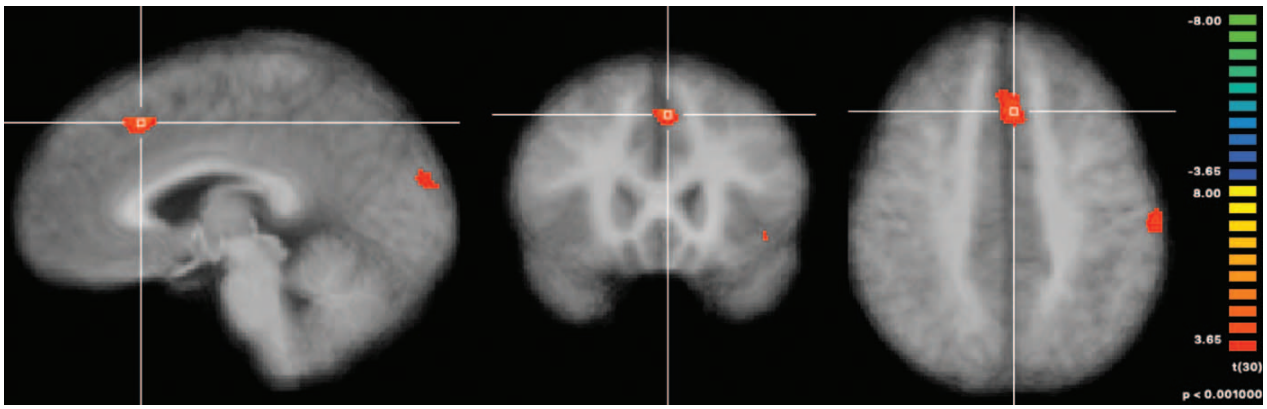

Figure 3. Results from experiment 3. Increased BOLD activation in parts of the anterior cingulate cortex for coolness compared to humor. The contrast of coolness > humor during the 6-second "view" phase is shown.

six-second phase during which participants viewed each speaker (see fig. 2). Data were submitted to three *t*-tests, comparing (1) cool versus humorous, (2) cool versus baseline (i.e., the average brain activation across all other phases of the task), and (3) cool versus normal. Results revealed significantly greater BOLD activation for cool compared to humorous products in the ACC at and around the peak activation voxel of *x*: −3, *y*: 20, *z*: 42 (Brodmann area 32, $t = 4.45$, $p = .000108$, Monte Carlo-corrected). Figure 3 shows the BOLD activation differences in the ACC for the cool compared to the humorous products. The ACC is marked with crosshairs and shows greater BOLD activation for cool compared to humorous products. Table 2 summarizes all of the results, including the *x*-*y*-*z* coordinates associated with each peak activation voxel, the corresponding brain region at the nearest gray matter, and the *t*- and *p*-values.

In sum, experiment 3 revealed that consumers show stronger ACC activation when viewing cool products than when viewing humorous products. Together with our previous findings, this difference in ACC activation suggests consumers are more likely to resolve (i.e., make sense of) incongruent cool designs than incongruent humorous designs.

GENERAL DISCUSSION

Marketers and product designers want to design products that stand out, especially in markets in which core product features have become homogenous across competitors. One way to achieve this goal is to make a product look cool, but of course that is easier said than done.

Our research provides a new clue into how product designers can get closer to reaching this goal: they need to deviate from the norm in a way that makes sense or seems appropriate to consumers. Three experiments consistently find that consumers' ability to make sense of a design helps explain why some norm-deviating products seem cool while others seem funny. Specifically, consumers tend to appraise the design of cool products as making sense and being appropriate, whereas they are more likely to appraise the design of humorous products as being inappropriate. Distinguishing between cool and humorous products is important because, as experiment 1 shows, although both cool and humorous products capture attention, consumers are more likely to desire and want to purchase cool products than humorous products.

Our paper also tests a neurophysiological mechanism associated with perceiving products as being cool. Adding to recent exploratory work on the neurophysiological correlates of coolness (Quartz and Asp 2015), the present work is the first to test and confirm the involvement of a specific brain region, the ACC, which was found to be active for cool (vs. funny) product designs. Together with the results of experiments 1, 2a, and 2b, the neuroimaging experiment provides novel insights into a possible underlying mechanism that drives perceptions of coolness: that is, making sense of a norm-deviating stimulus. This finding converges with earlier neuroscientific research associating ACC activation with the resolution of conflict in the environment, error detection, and problem resolution (Berthier, Starkstein, and Leiguarda 1988; Eisenberger 2012). As a word of caution, however, because neuroimaging does not directly observe these cognitive processes, the finding is subject to a reverse-inference bias (Poldrack 2006). Only together with the findings of our psychometric experiments as well as the results of a reverse-inference meta-analysis (Yarkoni et al.

Table 2. Results from Experiment 3

Talairach coordinates of peak activation voxel							
x	*y*	*z*	Hemisphere	Brain region label generated by automated Talairach client (Lancaster et al. 2000)	*t*	*p*	Cluster size (number of voxels)
				Coolness > Humor			
−27	−95	7	Left	Middle occipital gyrus	6.36	.00	1,460
3	−91	19	Right	Cuneus	5.78	.00	4,012
−57	−19	40	Left	Postcentral gyrus	5.02	.00	667
0	20	44	Left	Medial frontal gyrus	4.71	.00	502
−45	5	1	Left	Insula	4.12	.00	379
				Coolness > Baseline (i.e., average of all other phases)			
−33	−91	4	Left	Middle occipital gyrus	9.30	.00	19,285
21	−91	7	Right	Middle occipital gyrus	9.23	.00	22,208
−39	−34	37	Left	Inferior parietal lobule	6.24	.00	4,684
−6	20	40	Left	Cingulate gyrus	6.13	.00	1,814
−57	−49	7	Left	Middle temporal gyrus	−6.70	.00	8,114
48	−52	22	Right	Superior temporal gyrus	−5.99	.00	8,900
6	−46	31	Right	Precuneus	−5.58	.00	8,615
51	−13	−8	Right	Superior temporal gyrus	−4.80	.00	1,191
				Coolness > Normal			
15	−91	7	Right	Cuneus	6.69	.00	16,720
−27	−88	1	Left	Middle occipital gyrus	5.66	.00	7,950
30	−28	−17	Right	Parahippocampal gyrus	4.96	.00	402
−36	−43	−14	Left	Fusiform gyrus	4.79	.00	629

Note.—Differential BOLD activation for coolness compared to humor, baseline, and normal conditions. The contrast of coolness > humor during the 6-second "view" phase is shown.

2011; see reported above) does a bigger picture emerge that hints at the likely occurrence of specific cognitive processes (also cf. methods primers of Reimann et al. 2011, 2018; Reimann, MacInnis, and Bechara 2016; Wiggin, Reimann, and Jain 2019).

Limitations and Future Research

Our research raises a number of questions that future research will need to address. One limitation of our work is that only the first study directly manipulates the way in which a product design deviates from the norm, and this study asks participants to identify products that deviate in an appropriate or inappropriate way. The field would benefit from future studies that investigate the effects of appropriate and inappropriate norm deviation using more carefully controlled and calibrated manipulations. Another limitation of our article is that it tests only some of the hypothesized paths in the crazy-funny-cool model and conducts these tests using a limited range of stimuli. Future research could test the remaining paths in the model as well as examining whether the effects of deviating from the norm generalize to a wider range of behaviors, brands, and people.

The field would also benefit from future research that explores how coolness and humor relate to other aspects of product design, including cuteness (Schnurr 2019) and dynamism (Mourey and Elder 2019). Cute and humorous designs are both fun, which suggests cute and funny designs might have similar effects. Given that cuteness can increase indulgence (Nenkov and Scott 2014), might eating off a goofy plate make a dieter more likely to wolf down a chocolate peanut butter banana split instead of nibbling on a stalk of broccoli? Given that humor can increase creativity (Warren et al. 2018), might wearing "Hello Kitty" mittens make a research subject more likely to support a candle by tacking a box against the wall (Duncker 1945)? It would also be helpful to know more about how dynamic design elements, which

increase state arousal (Mourey and Elder 2019), influence perceptions of coolness and humor. Combining our theory with Mourey and Elder's research (this issue), we predict that whether dynamism makes designs seem cool, funny, or crazy will depend on whether consumers interpret the arousal they experience as appropriate, wrong but benign, or simply annoying.

The Bigger Picture: Coolness, Aesthetics, and Transformative Consumer Research

How does the design and pursuit of cool products influence the wellbeing of consumers and society? Some critics decry the pursuit of coolness as a superficial endeavor leading to waste and runaway consumerism (Frank 1997; Heath and Potter 2004). This criticism, however, overlooks other ways in which coolness helps improve both individual and societal welfare.

At an individual level, being cool gives consumers who might otherwise be excluded from traditional status hierarchies a way to earn respect and esteem (Heath and Potter 2004; Quartz and Asp 2015). Social status, which comes from being respected and esteemed by others, is a universally desired quality associated with happiness, health, and even expected lifespan (Sapolsky 2004). Historically, having the "wrong" parents, race, gender, sexual preference, or other signs of being an outsider could prevent a person from acquiring social status. However, being an outsider does not prevent someone from becoming cool (Frank 1997; Belk et al. 2010). The act of owning and using cool products, and by extension the status that they bring, could therefore help a wide range of consumers earn respect and esteem (Quartz and Asp 2015). Consistent with this assertion, merely being in the presence of a cool product can make consumers feel better about themselves (Quartz and Asp 2015).

At a societal level, the desire to be cool may motivate people to change culture for the better. Because people want respect and esteem, they are motivated to become cool (Heath and Potter 2004). In order to become cool, however, they will need to part from the norm in a way that makes sense or seems appropriate to others. From this perspective, coolness offers a social reward (i.e., status) to people (and firms) who figure out how to change things—from broad social norms to the design of kitchenware—for the better. Product designs represent a tangible domain in which coolness and the pursuit of coolness help shape social and cultural norms.

Two examples highlight how cool designs can help transform consumption patterns and foster positive societal change. First, the German electronics brand Braun changed society by developing its "less is better" design philosophy from the 1950s to the 1990s. This philosophy is closely tied to Dieter Rams, an industrial designer who helped design a majority of Braun's iconic household electronics (De Jong et al. 2017). In addition to making Braun a global household name and influencing the product design of other brands such as Apple (Dembach 2012), Rams also saw how cool design could possibly foster societal change. Good design, he argued, is like a good democratic leader; it should remain in the background and serve the user rather than attempt to overpower them (Kietzmann 2017).

A second example comes from collaborative art (see Bublitz et al. 2019; Butler 2019) and architecture projects, which involve designing products on a physically grand scale. The cool design of buildings such as Frank Gehry's Walt Disney Music Hall in Los Angeles or The Shard in London not only provide individual benefits to awe-struck visitors but may also help transform neighborhoods and even entire countries (Mayhew 2019). For example, in the late 1950s, in an attempt to help transform Brazil into a modern democracy, architect Oscar Niemeyer and then-President Juscelino Kubitschek built the new, planned capital city of Brasília, with concrete and glass civic buildings set among wide open passageways. The project generated an uplifting atmosphere and attracted tens of thousands of enthused citizens who participated in building the new city with the promise of a better society (Niemeyer 2000).

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