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What Makes It Green? The Role of Centrality of Green Attributes in Evaluations of the Greenness of Products

An increasing body of research addresses consumers' green product purchasing behavior, and yet little work has examined how consumers form perceptions of the greenness of products in the first place. Drawing on theories of attribute centrality (the degree to which an attribute is integral in defining an object), the authors argue that products with identical environmental benefits will be judged more or less green depending on whether the benefit stems from a central versus a peripheral attribute. They present four studies that support the hypotheses and explore factors that influence the effect of central attributes, including product category membership and integration of the green attribute with other elements of the product. They include controls for firm motivations and importance of the attribute to the individual consumer. The authors conclude the article with managerial and public policy implications, such as advice for firms on where to make green investments for maximum consumer impact and insight for public policy makers on the need for consumer assistance in objectively evaluating products with identical environmental benefits that achieve those benefits in different ways.

Keywords: environmental decisions, green product evaluations, product attributes, centrality, categorization

Imagine a consumer considering two computers. Both computers claim that by using recycled materials, they save 10,000 gallons of waste per year. However, one puts the recycled materials in its central processing unit (CPU) motherboard, whereas the other puts the recycled materials in its sound card. To what extent does a consumer's evaluation of the computers' greenness depend on whether the green benefit is associated with the motherboard or the sound card? In this research, we explore factors that influence how consumers evaluate the extent to which a product is green depending on the attribute of the product that offers the green benefit. Specifically, we show that environmental benefits associated with central attributes or features—that is, defining characteristics of the product concept or category—will lead to greater perception of the overall greenness of the product compared with identical environmental benefits associated with less central product attributes. This research contributes to literature streams in green decision making, concept and category definition, and feature centrality.

The greenness of a product has become increasingly important to consumers. Consumers increasingly say they are interested in products that cause less pollution, use fewer natural resources, and are less harmful to the environment overall (Luchs et al. 2010; Mackoy, Calantone, and Dröge 1995). In a recent worldwide survey of 17,000 people, 56% described themselves as green or "one who avoids environmentally harmful products, minimizes waste, tries to save energy, and chooses environmentally friendly products as often as possible." Another 30% expected to describe themselves as green within five years (*National Geographic* 2012).

One way that firms have responded to consumers' green preferences is by introducing products that include components made with materials that reduce environmental impact (Delmas and Burbano 2011). For example, Ford Motor Company has recently changed the fabric in its car seats to include at least 25% recycled yarns in most cars and 100% in its hybrid cars (Ford 2013). DisplayLink, a leading provider of USB graphics technology, recently introduced a family of energy-saving USB monitor chips (DisplayLink 2013). Simple Green cleaning products now use packaging that contains 25% postconsumer recycled plastic. The new bottle and trigger will save more than 19 tons of resin and 10 tons of steel per year (Simple Green 2013). It is important to note in these efforts that although one component or attribute of the product may be environmentally friendly, it does not mean that all of the components are environmentally friendly.

Consumers encountering such products in the marketplace might not be certain how to judge the environmental benefit that comes from the greening of these features. A European Commission (2013) study reports that 77% of European Union respondents are willing to pay more for environmental products if they are confident that the products are truly environmentally friendly, but only 55% of European Union citizens feel informed about the environ-

mental impact of the products they use and buy. A recent U.S. national poll indicates that only 12% of citizens believe that products with labels claiming to save energy actually do so (UT Energy Poll 2013). One reason for this uncertainty is that an increase in greenwashing, or false environmental claims, has led many consumers to doubt when marketers state that a product is green (Delmas and Burbano 2011; Friestad and Wright 1995). Another reason may be a lack of international industry standards and labels that help consumers digest the myriad of environmental claims firms and reviewers make. Yet even if consumers trust firms such as Ford, DisplayLink, and Simple Green when they claim that their products include an environmentally friendly attribute or feature, what determines the extent to which the overall product is perceived as green?

We propose that the way people think about the attributes and features that define a product concept or category can play a role in the extent to which a product is perceived as green. Specifically, we hypothesize that perceptions of product greenness are influenced by the extent to which green benefits come from attributes that are central to product concepts. The notion of centrality refers to the extent to which a feature or attribute of an object is a defining or immutable characteristic of the mental representation of that object (Sloman, Love, and Ahn 1998). We present four studies that provide empirical support for this notion while offering managerial implications for green investments. First, we test our main hypothesis that having a central attribute with an environmental benefit will imbue the entire product with greenness more so than when a peripheral attribute offers equivalent environmental benefits. We then explore several factors that can influence the perceived centrality of attributes. We examine how changing the category in which a product is sold also changes which of the product's attributes are central and investigate how this can influence judgments of greenness of what is otherwise the same product with the same green attribute. We then show that the extent to which a green attribute is integrated into a product design influences the perceived overall greenness of the product. Our final study distinguishes the effects of a green attribute that is *central* to the concept or the definition of the category from an attribute that is *important* to a consumer in his or her decision. We show that even when controlling for the importance placed on an attribute in a consumer's choice, there is still an effect of the centrality of the attribute on the consumer's evaluation of the product's greenness.

This research contributes to two important streams of literature. First, the literature on green product evaluations has explored whether consumers are interested in green products and their willingness to pay for them, but it has not examined the influences that drive whether a product will be perceived as more or less green in the first place. Second, prior work in marketing has shown several ways in which a product's categorization affects inferences about features, attributes, and expected benefits from a product. Here, we explore another aspect of categorization in product judgment: attribute centrality. We build on work in psychology showing that the presence or absence of central attributes and features drives a person's judgment of the definition of the object and his or her perception of the category to which the object belongs. We contribute to this

research by showing how imbuing or modifying a central versus peripheral attribute with a characteristic (in this case, an environmental benefit) can influence perceptions of the extent to which the entire object has that characteristic.

Background

Consumer Response to Green Products

The past decade has experienced an increase in consumer research related to green decision making, and researchers have explored this topic from numerous perspectives. Some have examined lay theories that consumers may have about the effectiveness of green products (Luchs et al. 2010). Others have explored identity-related aspects of consumers to determine who is more likely to choose a green product or comply with a request to behave in an environmentally friendly manner (Baca-Motes et al. 2013; Goldstein, Cialdini, and Griskevicius 2008; Grinstein and Nisan 2009; Haws, Winterich, and Naylor 2014). Still others have examined how contextual factors—such as the way information is accessed, how the choice is structured, and perceptions of whether the firm had intentionally set out to create a green product—may influence whether consumers choose environmentally friendly products (Ehrich and Irwin 2005; Irwin and Naylor 2009). More recently, researchers have examined how a brand's introduction of "green new products" may influence overall attitudes toward the brand depending on factors such as the number of green claims made, the brand's credibility, and whether the product is perceived to be a vice or a virtue (Olsen, Slotegraaf, and Chandukala 2014). Finally, research has explored subsequent moral decisions following exposure to and purchase of green products (Mazar and Zhong 2010).

This prior research is important, but it presumes that consumers perceive that products offer environmental benefits in the first place. It is likely that consumers perceive actual products as differing in their greenness, especially because, as we have noted, manufacturers often make investments to improve the environmental impact of one attribute while ignoring others. Thus, consumers are likely to judge some products as more green and others as less green. To date, no research has investigated how consumers form these evaluations. To address this research gap, we focus on understanding how imbuing or modifying a single feature or attribute of a product with a green benefit (e.g., being made with recycled materials) influences consumers' evaluations of the overall greenness of the product. We propose that a product's concept or category definition is a factor that influences the extent to which a given green attribute will lead to judgments of the product's greenness.

The Effect of Categorization on Consumer Evaluations

Categories can be described as mental groupings of objects considered equivalent to one another but different from other objects (Rosch et al. 1976). From the perspective of consumer research, categories may include groupings of "products, services, brands or other marketing entities, states or events that appear, to the consumer, related in some way" (Loken, Barsalou, and Joiner 2008, p. 133).

Consumers hold representations of categories in memory in the form of stored information that defines the category, which is then used in evaluating objects (or products) for the purposes of identification, classification, and differentiation. Through categorization, people can identify what an object is or is not as well as the degree to which an object is or is not similar to other objects (see Alba and Hutchinson 1987; Cohen and Basu 1987; Rosch and Mervis 1975). Rich streams of research in psychology and marketing have examined the mechanisms, or rules, by which objects come to be categorized and their structure in memory (Cohen and Basu 1987; Ratneshwar et al. 2001; Rosch et al. 1976).

In addition to their role in identifying and classifying objects, categories also aid in forming inferences and evaluations about objects (Loken, Barsalou, and Joiner 2008). This area of inquiry has been particularly important for marketing researchers who have aimed to explore factors associated with categories that influence how consumers evaluate and make inferences about unobservable characteristics of products.

To date, such research has demonstrated effects associated with category salience (Rajagopal and Burnkrant 2009; Sujan and Bettman 1989), goals (Ratneshwar et al. 2001), expertise (Bettman and Sujan 1987; Czellar and Luna 2010; Sujan and Dekleva 1987), and the structure of categories in memory (Bettman and Sujan 1987; Meyers-Levy and Tybout 1989; Meyvis and Janiszewski 2004; Redden 2008; Rosch et al. 1976). With the present research, we contribute to this work by examining an additional aspect of categorization and concept formation that has not been explored in marketing research to date: feature centrality.

Feature Centrality in Categories and Concepts

As we have noted, a large body of research has explored how people form and define concepts and categories (Cohen and Basu 1987; Medin and Ortony 1989; Rips 1989; Sloman, Love, and Ahn 1998). Many researchers have theorized about how objects' attributes and features lead to identification of those objects. For example, how does an object with a screen, a keyboard, a CPU, and a hard drive come to be categorized as a computer? Building on notions of psychological essentialism, centrality theory suggests that some attributes and features are more important or influential than others in people's definitions of concepts and categories. The centrality of a feature represents "the degree to which the feature is integral to the mental representation of an object, the degree to which it lends conceptual coherence" (Sloman, Love, and Ahn 1998, p. 190). As such, the more central a feature or attribute is, the more important or diagnostic it is in categorizing the object.

Features that are central are said to be "immutable," or to resist mental transformation, while maintaining that the object to which they belong still fits the definition of the concept or is still a member of the same category. Therefore, the less an object's feature can be transformed or eliminated, the more central it is. A classic example involves features that describe a robin. In a study on mutability, Sloman, Love, and Ahn (1998) find that the features "has a beak" and "has wings" are most immutable (most central) for the concept of a robin, whereas the features "lays eggs" and "is

alive" are the most mutable (least central). Thus, although robins can be described as having beaks, wings, egg-laying ability, and life, people find it easier to imagine and to categorize an object as a robin if it does not lay eggs or it is dead than to imagine or categorize an object as a robin that does not have a beak or wings. Beaks and wings are more immutable than egg laying and being alive; thus, they are more central and essential to the concept of a robin.

To date, most research in this area has focused on what makes a feature central or peripheral because its aim has been to explore how concepts and categories are formed and defined. Researchers have explored the relationship between presence (or absence) of specific features in an object (e.g., beak vs. no beak) and identification of the object (e.g., robin vs. not a robin).

More recently, a handful of researchers have begun to expand on this research to examine how statements or descriptors that modify entire objects (e.g., "jungle" raven, "feathered" raven) influence inferences about characteristics of specific features in the object (e.g., What is this bird's color?) (Connolly et al. 2007). In this vein, Hampton, Passanisi, and Jonsson (2011) provide mixed support for the idea that modifications to an entire object are more likely to be related to central than to peripheral features of the object. For example, in one experiment, more participants judged the statement "Brazilian doves are white" to be less likely to be true than "Brazilian doves have wings" because being white is less central to the concept of doves than is having wings. Similarly, participants judged the statement "Handmade saxophones are made of brass" to be less likely to be true than "Handmade saxophones require air to produce sound" because requiring air to product sound is more central than being made of brass. Hampton, Passanisi, and Jonsson's study contributes to our understanding of centrality in categorization by using objects (e.g., saxophones) that are modified (e.g., described as handmade) and examining the role of this modification on inferences about central (requiring air) versus peripheral (made of brass) features. In other words, this previous work can be characterized as exploring object-level to attribute-level inferences.

In our research, we examine the opposite side of the coin: exploring attribute-level to object-level inferences. Specifically, we build on and contribute to this literature by examining circumstances under which modifying an object's central versus peripheral attributes (e.g., modifying a CPU vs. sound card so that it provides some green benefit) influences evaluations of the entire object (e.g., To what extent is the computer green?). We propose that because the presence of central (vs. peripheral) features is more important to the identification of an object (Sloman, Love, and Ahn 1998), modifying central (vs. peripheral) features to offer a green benefit will have a greater influence on perceptions of the greenness of the entire product.

If, as we argue, the centrality of a green attribute influences the overall perception of a product's greenness, manipulating factors that influence the perceived centrality of an attribute should influence the relationship between green features and overall green perception. Two methods of altering perceptions of centrality occur through category identification and through attribute dependency.

First, altering the category to which a product belongs has been shown to influence inferences about that product. For example, Moreau, Markman, and Lehmann (2001) presented the same digital camera to participants and cued the category of either a digital scanner or an SLR camera to explore differences in how consumers make inferences about new products. In our research, we expect that describing the same product as belonging to a different category will also alter the features that are central versus peripheral for that product. For example, a kitchen appliance that can cook both panini and waffles using interchangeable cooking griddles could be described as belonging to either the panini maker category or the waffle maker category. The category used to describe the product should influence the centrality of each of the cooking surfaces. Thus, the griddle that presses the panini is more central when the product is described as a panini maker, and the griddle that forms the waffles is more central when the product is described as a waffle maker. If the centrality of green attributes indeed influences evaluations of products' greenness, when the same dual-purpose product is described as a waffle maker, people will perceive it to be more green when its waffle cooking forms are made with recycled materials. Conversely, when described as a panini maker, people will perceive it as more green when its panini cooking griddles contain the recycled material.

A second way to modify the evaluations of products' greenness through centrality is by manipulating the dependency between the attribute with the green benefit and the rest of the product. Prior work has shown that dependency between features influences centrality. If altering a particular feature would change the status of other features, the altered feature is said to have dependency (Sloman, Love, and Ahn 1998). The more other features depend on a target feature, the more central it is perceived to be. For example, in one study, participants considered a rare animal and judged the centrality of a particular hormone in that animal. Two conditions varied the number of bodily functions in the animal that depended on the target hormone as either many or few. When the hormone was described as having many functions dependent on it, participants rated it as more central than when it was described as having few dependent functions (Hadjichristidis et al. 2004).

In a product context, dependencies can be created by design. For example, some computer components can operate independently (e.g., having their own memory systems). Other components are considered integrated because they are specially designed to work with other components, making them dependent on one another (e.g., sharing memory or power sources). Given that dependencies lead to centrality, we expect that this will moderate the influence of green attributes on overall green evaluations. Specifically, we hypothesize that dependency will change the centrality of product features such that for otherwise less central features or attributes that offer a green benefit, increased dependency between the target feature and other product features will increase overall evaluations of product greenness.

In summary, previous research on green decision making has examined evaluations of and inferences about products that are already known to be green. Here, we explore characteristics of products that lead to green evaluations in the first place. In addition, previous centrality research has conceptualized attributes as being present or absent and has explored the influence of this presence or absence on definition of a concept or category. Researchers have also begun to examine how descriptions of overall objects affect inferences of attributes. In the current research, we explore how changes to characteristics of a central or peripheral attribute (making a component of the product green) influence overall product evaluations.

Next, we present four empirical studies that provide support for the proposed relationship between centrality of green attributes and evaluations of overall product greenness. Study 1 is a straightforward test of our basic question about centrality: When people are explicitly told that an attribute is green and also structurally important, do they infer that the entire product is more green than when they are told that the same attribute is green but not structurally important? In Study 1, we also test the theory that perceived centrality mediates the relationship between structural importance and perceived greenness of the overall product. In Study 2, we provide further evidence of the role of an attribute's centrality by manipulating the category to which the product belongs. We show that the same product with the same green attribute may be perceived as more or less green depending on whether the green attribute is central or peripheral for the product category in which it is presented. Study 3 relies on people's preconceptions of the centrality of product attributes and manipulates that centrality by describing dependencies associated with those attributes. We test whether a green peripheral attribute that might not lend greenness to the entire product can be made more central by describing dependencies. Finally, we present Study 4 to demonstrate that judgments of greenness are indeed due to attribute centrality (importance of an attribute to the definition of the category) and that this is distinct from attribute weighting (importance to the person making the decision).

Study 1

The purpose of Study 1 is to explore whether the centrality of a green component influences global evaluations of the environmental friendliness of the product and to provide a baseline proof of concept study for our hypotheses. In this study, participants evaluated the greenness of a mattress, a product frequently made using chemicals known to be harmful to users and the environment (Wallace 2008). We described a single component of the mattress (the side foam) as offering an environmental benefit. Then, we manipulated the extent to which the green component is central to the mattress through the description of its importance to structure and comfort. We measured both the perceived centrality of the green component and the perceived greenness of the entire mattress.

Method

Ninety-four people were recruited through Amazon.com's Mechanical Turk (MTurk) to participate in the study. All participants were asked to imagine that they were considering purchasing a new mattress. They were given an excerpt from a consumer magazine that described how most mattresses are made using synthetic materials that rely on

harmful chemicals. The excerpt went on to describe the side foam component of the Heliotex Mattress as being "made with materials and processes that use no harmful chemicals." To control for any assumptions participants might make about the size or degree of environmental benefit, the benefit was also quantified: "This reduces dangerous chemical use by 17,000 gallons per year." This statement mimics messaging commonly used by firms including Tide and Wal-Mart, which claim, for example, "If every Wal-Mart customer bought just one compact laundry detergent, we'd reduce packaging waste by as much as 50 million pounds" (Sustainableisgood.com 2007). Likewise, Nike claims that its recycled shoe box saves 200,000 trees annually (Oppenheim 2011). Note that drawing attention to a specific benefit provides a conservative test of our effects because there is no latitude for participants to infer differences in the amount of environmental benefit provided by more central versus less central attributes. We manipulated the structural importance of the side foam by telling participants in the high centrality (low centrality) condition that "the side foam is (is not) very central and important to a mattress. It is (is not) a structural component and it affects (does not affect) comfort."

To measure the extent to which participants evaluated the mattress as environmentally friendly, we asked for their level of agreement with the following three statements on a seven-point scale: "This mattress deserves to be labeled 'environmentally friendly,'" "Purchasing this mattress is a good environmental choice," and "A person who cares about the environment would be likely to buy this mattress." Participants were also asked to indicate "How environmentally friendly or green is this mattress?" using a seven-point scale anchored by "not at all" and "extremely" environmentally friendly.

We also collected measures of centrality of the side foam component. Following prior research (Sloman, Love, and Ahn 1998), participants used seven-point Likert-type scales to respond to the following items: "If they changed the side foam it would change the nature of this mattress," "If this mattress did not have this side foam, how similar would it be to an ideal version of this mattress?" "How important is the side foam to this mattress?" and "To what extent is the side foam a defining part of this mattress?" We note that these items measure how integral or important the attribute (side foam) is in defining the target concept (mattress) rather than the importance that the participant places on the attribute for his or her decision or evaluation of the product. We return to this issue in Study 4, when we directly test for the unique effect of attribute centrality (importance in defining the object) as distinct from attribute weight (importance to the person in choice).

Results

Green evaluation. We averaged the four green items to create a composite measure of greenness ($\alpha = .89$). As we predicted, when the component that provided the environmental benefit was described as a structurally important feature of the mattress, the participants rated the product as more environmentally friendly (M = 5.08, SD = 1.05) than when the component was described as not structurally important (M = 4.48, SD = 1.19; F(1, 92) = 6.82, $p = .011$).

Perceptions of centrality and mediation analysis. We averaged the four centrality measures to create a single measure ($\alpha = .90$). As we expected, in the high structural importance condition, participants rated the side foam component as more central (M = 4.71, SD = 1.26) than when it was described as less structurally important (M = 3.16, SD = 1.41; F(1, 92) = 32.12, $p < .001$).

To test whether the effect of the structural importance manipulation on green evaluations is indeed mediated by changes in perceived centrality, we conducted a mediation analysis (Preacher and Hayes 2008). The bootstrapping test (n iterations = 5,000) showed that, as we predicted, the indirect effect of structural importance on green evaluations through perceptions of centrality is positive and significant, with a 95% confidence interval excluding zero (.148, .380). The direct effect of structural importance on the green perceptions after the path through centrality was accounted for was no longer significant (b = –.0014, $p = .989$). Thus, as we expected, structural importance influenced perceptions of greenness, and this influence occurred through changes in perceptions of centrality.

Discussion

Study 1 confirms our primary proposal that the centrality of a green attribute can influence the degree to which the entire product is evaluated as green. We held constant the attribute of the product that offered the green benefit (the side foam). We also held constant the amount of environmental benefit ("reduces dangerous chemical use by 17,000 gallons per year"). Only the structural importance of the green attribute was manipulated. We find that this influences overall perceptions of product greenness and is mediated by perceptions of centrality.

In the next study, we further explore this relationship by examining an actual product for which consumers have preexisting perceptions of centrality. We show that the category to which a product belongs influences which attributes are central and, thus, which attributes are most likely to influence the perceived greenness of a product.

Study 2: Manipulating Centrality Through Product Category Membership

In Study 1, participants were explicitly told that a component of a product with an environmental benefit was either central to the product or not central. Despite offering the same environmental benefit in both situations, the evaluation of the greenness of the product increased when the component was central.

In Study 2, we hold constant the product to be evaluated and manipulate only the category to which it belongs. As a result of the product being a member of a different category, we expect the same feature to be judged as more or less central. Then, as in Study 1, we expect the product to be perceived as more green when the feature that provides the environmental benefit is viewed as more central. Specifically, we employ a kitchen appliance that is capable of making waffles and panini sandwiches and manipulate whether it is presented as belonging to either the waffle iron cate-

gory or panini maker category. We expect that when presented as a waffle iron, the waffle cooking plates are more central than the panini cooking plates, and vice versa. We manipulate whether the waffle plates or the panini plates are made with environmentally friendly materials and measure judgments of overall product greenness.

Although we do not expect this to be case, one might argue that inferences regarding the firm's motives might influence estimates of overall greenness if participants infer that green investments in central attributes are more indicative of the firm's commitment to the environment. Recent research has found that when a product offers a green benefit because of a firm's intentions, as opposed to as an unintended outcome, consumers are more likely to think that resources may have been diverted from other attributes, which reduces product quality inferences and purchase intent (Newman, Gorlin, and Dhar 2014). To control for this possibility, in this study, participants were told that the target component is green as the result of a supplier's action that was unknown to the manufacturing firm (an unintended green enhancement). To determine whether this statement had the desired control effect, we also collected measures of perceived firm motivation to examine whether participants drew different inferences about the manufacturer's motives depending on whether the green component is central or peripheral.

Method

One hundred eighty-seven participants were recruited from MTurk to participate in the 2 (target category: waffle maker vs. panini maker) × 2 (green feature: waffle plates vs. panini plates) design. Depending on the target category condition, participants were told that they were looking at products from an online store dedicated to either panini makers or waffle makers. Three photographs of actual electric countertop panini makers (waffle makers) helped cue the category on this page. On the following page, participants were given a consumer report about the target product, referred to as the Majordome T3A Panini Maker (Waffle Maker). Participants in both conditions saw two photographs of the product: one in which the device was closed and one in which it was open (see Figure 1). An actual dual-purpose appliance was pictured so that all participants saw the same image of the product in its closed position. When the product was pictured as open, the same product was shown, but it had either the panini cooking plates or the waffle cooking plates installed, depending on condition. The product descriptions were identical, listing such features as a UL Rated power cord and brushed stainless steel housing. Below this, the report stated that Majordome also provides a set of optional panini plates (or waffle plates, depending on condition) that are the same size and weight and are capable of being snapped in and out to use the product.

Depending on the green feature condition, participants were told that either the panini plates or the waffle plates were made with 90% recycled aluminum but that the other plates contained no recycled material. As a control for firm motivation, participants were also told that the company outsources the manufacturing of all the cooking plates, and "although they didn't plan this, they recently learned about [the recycled material]."

We collected measures of greenness next using measures identical to those used in Study 1, adapted to reference the target product. After the greenness measures, participants were asked about the centrality of both the waffle and panini components to the product they evaluated. Items were rated on seven-point scales and included the questions "How surprising would it be to find a waffle maker (panini maker) that did not have waffle plates (panini plates)?" "How easily can you imagine a waffle maker (panini maker) that does not have waffle plates (panini plates)?" "How good of an example of waffle maker (panini maker) would you consider one that does not have waffle plates (panini plates)?" "How similar to an ideal waffle maker (panini maker) is one that does not have waffle plates (panini plates)?"

Finally, we collected measures of the firm's motivation (Ellen, Webb, and Mohr 2006). First, participants used a seven-point scale to answer "How motivated is Majordome to create environmentally friendly products?" This was fol-

FIGURE 1
Study 2: Example of Panini and Waffle Maker Stimuli

The Majordome T3A Waffle Maker.

The Majordome T3A is a fine choice for waffles every weekend. We give it 3.5 out of 4 stars.

It features:
· Sturdy handle with hinged floating adjustable cover.
· Dishwasher-safe nonstick cooking plates.
· Brushed stainless steel housing.
· Triple controlled for perfect heat adjustment
· UL rated power cord.

The Majordome T3A Panini Maker.

The Majordome T3A is a fine choice for paninis every weekend. We give it 3.5 out of 4 stars.

It features:
· Sturdy handle with hinged floating adjustable cover.
· Dishwasher-safe nonstick cooking plates.
· Brushed stainless steel housing.
· Triple controlled for perfect heat adjustment
· UL rated power cord.

lowed by four seven-point "agree/disagree" items: "The company (Majordome) feels morally obligated to help the environment," "The company believes that their stakeholders expect them to help the environment," "Majordome is buying these environmentally friendly parts to get publicity," and "Majordome hopes to get more customers by including environmentally friendly parts in their products."

Results

Manipulation check. We created measures of centrality for the waffle plates and panini plates by taking the average of the four associated items (after appropriate reverse coding) for each component ($\alpha_{waffle} = .903$, $\alpha_{panini} = .938$). A repeated-measures analysis of variance (ANOVA) with the target category as a between-subjects variable and the centrality score for the waffle plates versus the panini plates as a within-subject variable revealed an expected interaction ($F(1, 185) = 451.86$, $p < .001$). A follow-up analysis showed that when the product was described as a waffle maker, the waffle cooking plates were viewed as more central (M = 5.90) than the panini cooking plates (M = 2.42; $F(1, 93) = 252.09$, $p < .001$). Conversely, when the product was described as a panini maker, the panini plates were viewed as more central (M = 6.02) than the waffle plates (M = 3.26; $F(1, 92) = 200.36$, $p < .001$). Thus, as we expected, the cooking plates associated with the category that was cued were perceived as more central than the plates that were not associated with the cued category.

Green evaluation. We combined the four green evaluation items to form a single measure of greenness ($\alpha = .939$) and used this measure as a dependent variable in an ANOVA that included the target product category (waffle vs. panini) and the green component (waffle cooking plate vs. panini cooking plate) as between-subjects independent variables. The results showed only a significant interaction ($F(1, 183) = 14.35$, $p < .001$; see Figure 2). A follow-up analysis revealed that when the target product was described as a waffle maker, participants judged it to be more green when the recycled material was included in the waffle cooking plates (M = 4.84) than when the recycled material was included in the panini cooking plates (M = 4.17; $F(1, 92) = 4.392$, $p = .039$). Conversely, when the target product was described as the panini maker, participants judged it to be more green when the recycled material was in the panini plates (M = 4.82) than when it was in the waffle plates (M = 3.82; $F(1, 91) = 10.84$, $p < .001$).

Firm motivation. We averaged the five motivation items to form a single measure of firm motivation ($\alpha = .916$). We ran an ANOVA with firm motivation as a dependent variable and product category (waffle maker vs. panini maker) and green component (waffle cooking plates vs. panini cooking plates) as independent variables. There were no main effects, and the interaction was not significant (all $ps > .3$). Thus, the green component had no influence on participants' perceptions of the firm's motivation to make its products green.

As an additional check, we reran the ANOVA with the green evaluation as the dependent variable and the manipulations of product categories and centrality as independent variables, but this time we included the motivation measure as a covariate. Although the covariate was significant ($F(1,$

FIGURE 2
Study 2: Greenness of Product by Recycled Component
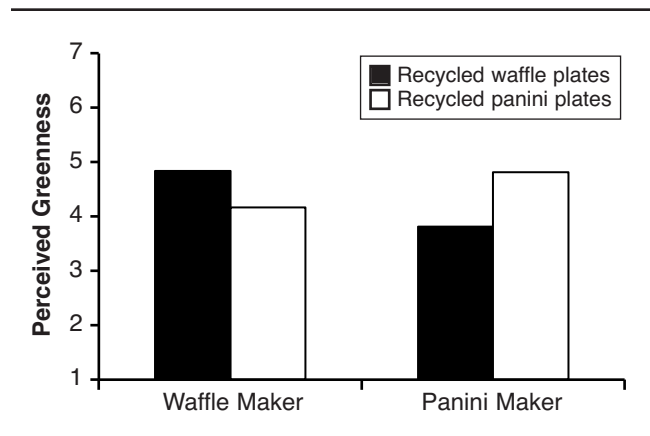
$182) = 94.47$, $p < .001$), indicating that participants who believed that the firm was more motivated also perceived the overall product to be more green, this did not influence the relationship between product category and centrality on green evaluations. We still found a significant effect for the interaction between the category and the green component ($F(1, 182) = 17.31$, $p < .001$), and both main effects remained below significance ($p > .1$). Including the covariate did not influence the simple effects in each product category (waffle maker: $F(1, 91) = 6.53$, $p = .012$; panini maker $F(1, 90) = 10.94$, $p < .001$).

Discussion. The results of Study 2 provide further support for the role of centrality in judgments of greenness. In Study 1, we manipulated the same component such that it was described as more versus less central, which led participants to perceive the product as more versus less green. In Study 2, participants perceived the same component in the same product as more or less central depending on the category to which it belonged. Consistent with Study 1, participants judged the product to be more green when the same environmental benefit was associated with the more central component. This occurred both when the product was categorized as a waffle maker and when categorized as a panini maker. We controlled for the possibility of perceived motivations of the firm by (1) describing the green benefit as being an unintended green enhancement (Newman, Gorlin, and Dhar 2014), (2) showing that the manipulations of product category and centrality did not influence perceived motivation, and (3) including measures of motivation as a covariate in our analysis. In the next study, we build on these findings related to centrality by including an additional manipulation consistent with prior research on factors that affect centrality. In Study 4, we rule out an alternative explanation related to perceptions of attribute importance.

Study 3: Centrality and Dependency

In Study 3, we employ the product category of laptop computers. We describe the green benefit as recycled materials included in either the computer's CPU motherboard (expected to be a more central component) or its sound card (expected

to be less central). If the centrality of the green component indeed influences overall environmental evaluations, providing additional information that further manipulates the centrality of these attributes should moderate the effect.

As we noted previously, research has shown that dependency influences the extent to which a feature of an object is perceived as central to that object (Sloman, Love, and Ahn 1998). Thus, in this study, we manipulate the extent to which the green component is described as being specially designed to be integrated into the computer versus being a standard, nonspecialized part. We hypothesize that the effect of centrality will be moderated such that evaluations of greenness will increase when a less central component (the sound card) that offers a green benefit is also described as integrated into the overall design. However, we do not expect an increase in greenness when a more central component (the CPU) is integrated, because this component is already viewed as central.

Method

Two hundred forty-six participants were recruited from MTurk to participate in the 2 (preexisting centrality: high vs. low) × 2 (dependency: high vs. low) design. All participants were given what was described as an excerpt from a consumer magazine about a laptop computer from a well-known brand. In the high-centrality (low-centrality) condition, the excerpt stated that the CPU motherboard (sound card) was "made from recycled materials, and this reduces dangerous waste by 10,000 gallons per year."

To ensure that a CPU motherboard is indeed perceived as more central than a sound card, 53 people recruited from MTurk (who were not included in the main experiment) participated in a pretest to measure centrality of each of these components in a computer. Each participant answered four questions for each component using seven-point scales (Sloman, Love, and Ahn 1998): "How surprising would it be to find a computer without a Central Processing Unit motherboard [sound card]?" "How good of an example of a computer would be one without a Central Processing Unit [sound card]?" "How easily can you imagine a real computer without a Central Processing Unit [sound card]? and "How similar is a computer without a Central Processing Unit motherboard [sound card] to an ideal computer?" We averaged the four responses for each component (with the last three items reverse-coded) to form measures of centrality. As we expected, participants perceived the CPU motherboard as more central to a computer (M = 6.16) than a sound card (M = 4.94; t(52) = 6.04, p < .001).

For the main study, in the high-dependency conditions, the target component was also described as being a special-purpose component because it was "specially designed to work with the other components in the laptop." In the low-dependency conditions, participants were told the component was a general purpose component that was "not specially designed to work with other components in the laptop." In addition, although a sound card and a CPU motherboard are approximately the same size and weight, to ensure that participants would perceive these components as representing the same amount of overall material in the laptop, we told them that the target component was "15% of the material in the computer" and that "there are no recy-

cled materials in the other 85%." Such a claim is similar to industry practices: for example, Keetsa (a mattress manufacturer) claims that 12% of the memory foam in its mattresses is plant-based rather than petroleum-based (Keetsa 2014). Finally, we measured perceptions of the greenness of the product using the same four items as in Studies 1 and 2 (altered to reference the laptop).

Results

We combined the four greenness items to form a single measure (α = .87). An ANOVA revealed a significant main effect for attribute centrality such that participants considered the laptop more green if the CPU motherboard was made with recycled materials (M = 4.86) compared with when the sound card was made of recycled materials (M = 3.94; F(1, 242) = 35.68, p < .001). For details, see Figure 3.

In addition, there was a significant main effect of dependency such that participants rated the product as more green if the component was described as integrated into the system (M = 4.61) compared with when it was not (M = 4.07; F(1, 242) = 7.41, p = .007). Finally, there was a significant interaction of attribute centrality and integrated design (F(1, 242) = 5.39, p = .021), with the effect of integration being stronger when associated with the less central versus the more central attribute. Follow-up analysis showed that when the green component was the less central sound card, the green evaluation of the overall product was greater when it was integrated (M = 4.38) versus not integrated into the system (M = 3.68; F(1, 148) = 14.93, p < .001). When the green component was the more central CPU, there was no significant difference in green evaluations of the product by integration condition (F(1, 94) = .073, p = .787).

Discussion

This study builds on the results of Studies 1 and 2. In addition to replicating the influence of centrality on green evaluations, we provide further evidence for our account of this effect by showing that the extent of dependency between the target component and other features of the product moderates the effect. Thus, a less central green component's influence on the overall greenness of the product increased when it was "specially designed" to work with other components. This is consistent with prior work on the role of dependency in centrality evaluations (Sloman, Love, and Ahn 1998). In the next study, we shift our focus to examining the distinction between effects of attribute centrality (importance to the category or concept) and effects of attribute weight (importance to the consumer in his or her choice).

Study 4: Attribute Centrality and Attribute Importance

We have argued that an environmental benefit associated with a central feature leads to judgments that the overall product is more green than when the same benefit is associated with a less central feature. In Studies 1–3, we replicate this finding in four product categories (mattresses, panini makers, waffle makers, and computers). Because central features are important to defining a product, they are also likely to be important to consumers in their evaluation of the product. So, the engine of a car is central, but because it

FIGURE 3

Study 3: Greenness of Computer by Centrality of Green Component and Integration into Product
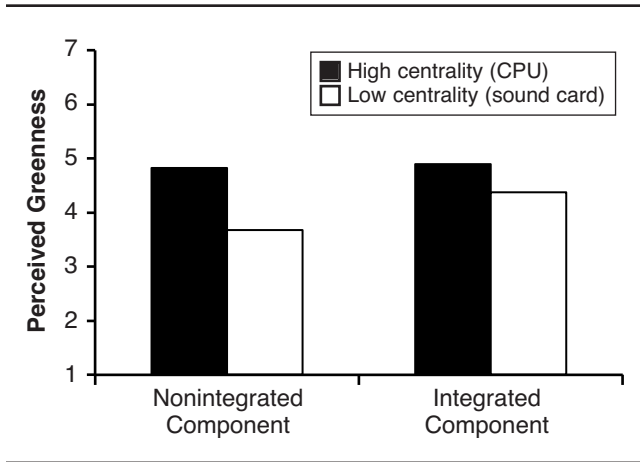
is central, it may also be important as a determinant attribute in consumers' choices. However, this is not always the case. For example, when consumers choose a beverage to consume over multiple occasions, they may place an unusually high weight on the packaging because they consider whether it can be easily resealed. Although packaging is unlikely to be a central feature of a soft drink, it may be the determinant attribute in selecting a drink for some consumers on some occasions, and it may receive the most weight in their evaluations. Placing greater importance on noncentral features may also be common in mature product categories in which options on central features differ very little (e.g., all budget hotels have beds and showers, all airlines offer flights from one city to another), so consumers are more likely to choose on the basis of peripheral features (e.g., free breakfast, seat-back televisions). Although these situations are probably less common, to generalize about the influence of central features, it is important to distinguish the effects of importance (weight placed on an attribute in a person's choice) from the effects of centrality (importance in defining the object). Thus, we designed Study 4 to examine centrality and importance as separate independent variables in the design and to measure attribute importance and include it as a covariate in analysis. To control for preexisting attribute preferences, the study uses a fictitious industrial product (a plastic mixing [PM] monitor). Participants learned about which of two described product attributes is central and were told which of the two attributes to weight more heavily in their evaluation. The green benefit was then described as being associated with one of the features. In addition, as in Study 2, we control for the firm's motivation by describing the green benefit as an unintended consequence and by including a measure of perceived firm motivation as a covariate in the analysis.

Method

One hundred twenty-five people were recruited through MTurk to participate in Study 4. The study used a 2 (centrality of the attribute with the environmental benefit: high vs. low) × 2 (consumer importance of the attribute with environmental benefit: high vs. low) design. In the first stage of the study, all participants learned about the (ficti-

tious) PM monitor, a tool used in the plastic molding industry. It was described as having two main components of roughly equal size: a reaction probe and an operator box. We established centrality for the reaction probe component by describing it as follows: "The Reaction Probe is the part that goes into the melting plastic and does the hard work. *The Reaction Probe is the heart and brains of a PM monitor*. Every PM monitor has a reaction probe. The reaction probe collects all of the information about the plastic. When this part fails, the whole machine must be replaced." We intended the operator box to be perceived as noncentral, describing it as "the part that the operator usually holds. It is the user interface. This part has the power supply, some readouts, and some monitors. The operator box is not entirely necessary for a PM monitor. In fact, not every PM monitor has one; in some cases, a PM monitor is just the reaction probe part, attached by the cable to a local computer." To enforce and check this manipulation of centrality, we asked participants to provide responses to four centrality measure questions (Sloman, Love, and Ahn 1998), each about the reaction probe and the operator box components: "How surprising would it be to find a PM monitor without a Reaction Probe (an Operator Box)?" "How easily can you imagine a PM monitor without a Reaction Probe (an Operator Box)?" "How good an example of a PM monitor would you consider one that does not have a Reaction Probe (an Operator Box) to be?" and "How similar is a PM monitor that does not have a Reaction Probe (an Operator Box) to an ideal PM monitor?"

Next, participants were told to imagine that in their job they were required to purchase a new PM monitor and that in a few moments they would evaluate a PM monitor made by the Malpert company. We then manipulated importance of the operator box versus the reaction probe by telling participants either "For your company, reducing human error is the most important goal. It is your job to choose a PM monitor with the best Operator Box," or "For your company, measuring the exact state of melting plastic is the most important goal. It is your job to choose a PM monitor with the best Reaction Probe." We next enforced the importance manipulation by asking participants to answer three questions (see Sujan and Bettman 1989) about each of the components: "How important is the *Reaction Probe* (*Operator Box*) for your evaluation of and decision for or against the Malpert PM monitor?" "To what extent is the *Reaction Probe* (*Operator Box*) a feature that you would consider in your evaluation of and decision for or against the Malpert PM monitor?" and "How relevant or irrelevant is the *Reaction Probe* (*Operator Box*) in your choice of a PM monitor?" Afterward, participants were given an excerpt purported to be from an industry sales magazine. Depending on the condition, they were told that "to make the PM Monitor, Malpert buys parts from many manufacturers. Recently, some of Malpert's parts suppliers have introduced green initiatives, including recycling programs and better raw materials sourcing. Because of this, 90% of the parts in this year's model of the Reaction Probe (but none of the parts in the Operator Box) are made using environmentally friendly materials." In addition, to control for any inferences of firm motivation, we told participants that Malpert was unaware of the environmental benefit when they purchased the parts.

Participants then rated the environmental friendliness of the PM monitor using the same four items used in the previous studies. Last, as a control, participants provided ratings of the firm's motivation to be environmentally friendly by responding to a seven-point scale to answer "How motivated is Malpert to create environmentally friendly products?" and then to rate agreement with the statements "The company (Malpert) feels morally obligated to help the environment," "The company (Malpert) believes that their stakeholders expect them to help the environment," "Malpert is buying these environmentally friendly parts to get publicity," and "Malpert hopes to get more customers by including environmentally friendly parts in their products" (Ellen, Webb, and Mohr 2006).

Results

Manipulation checks. We combined the four centrality measures for the reaction probe ($\alpha = .884$) and the operator box ($\alpha = .842$) to form a centrality measure for each component. As intended, participants rated the reaction probe as more central ($M = 6.19$) than the operator box ($M = 3.44$; $t(126) = 14.33$, $p < .001$).

We combined the three importance in choice items for the reaction probe ($\alpha = .924$) and the operator box ($\alpha = .936$) to form an importance in choice measure for each component. As we intended, participants perceived the reactor probe as more important for the choice when it was described as important ($M = 6.49$) than when it was not ($M = 5.56$; $t(123) = 3.70$, $p < .001$). Likewise, participants perceived the operator box as more important when it was described as important ($M = 5.56$) than when it was not ($M = 4.26$; $t(123) = 4.57$, $p < .001$).

Green evaluations. We combined the four evaluations of environmental friendliness of the PM monitor to form a single measure ($\alpha = .950$). We used this as a dependent measure in an ANOVA with independent variables for whether the green component was central and whether the green component was important (see Figure 4).

Replicating prior results, we found a main effect for centrality ($F(1, 121) = 13.53$, $p < .001$), with the overall green evaluation being higher when the green component was described as central ($M = 5.28$) than when it was not ($M = 4.33$). There was also an unexpected separate main effect for the importance variable ($F(1, 121) = 10.94$, $p < .001$), with participants rating the overall product as more green when the green component was important to the choice ($M = 5.24$) than when it was not ($M = 4.39$). The interaction term was not significant ($F(1, 121) = 1.50$, $p = .223$). However, for robustness, we performed a follow-up analysis of simple effects, which shows that centrality contributes to perceptions of greenness beyond the influence of importance to the consumer when the green component was both not important ($F(1, 61) = 10.55$, $p = .002$) and important for choice ($F(1, 60) = 3.515$, $p = .066$).

As an additional analysis, we removed the variable for manipulated importance from the 2×2 ANOVA and instead included participants' self-reported ratings of importance of the reaction probe and the operator box as covariates in the analysis. Even with these measured importance variables included, the effect of centrality remained significant ($F(1,$

$121) = 11.73$, $p < .001$). Together, these results suggest that the effect of centrality on greenness of the product is independent of the effect of the attribute's importance in consumer choice.

Motivation of the firm. In addition to controlling for the firm's motivation to seem environmentally friendly by telling participants that the firm was unaware of the green benefit when the product was built, we also measured participants' perceptions of the firm's motivation. A 2×2 ANOVA examined whether the manipulations of centrality or importance influenced participants' perceptions of the firm's motivation. We combined the five motivation items into a single measure ($\alpha = .846$) that we used in the analysis. As we observed in Study 2, there was no effect on perceptions of the firm's motivation from the manipulations of centrality or importance; there was no significant main effect for either variable or for the interaction (all ps > .1).

To further control for perceptions of the firm's motivations, we reran the 2×2 ANOVA with the manipulated independent variables of centrality and importance on the dependent variable of perceived greenness of the product. We included the motivation measure as a covariate. The motivation covariate was significant ($F(1, 120) = 6.03$, $p < .05$), suggesting that those who view the firm as more motivated to seem green rate the product as more green. However, as we expected, controlling for motivation did not influence either the main effect of centrality ($F(1, 120) = 14.08$, $p < .001$) or the main effect of importance ($F(1, 120) = 8.134$, $p < .01$). Consistent with the analysis containing no covariate, there was no significant interaction ($F(1, 120) = 1.56$, $p > .2$).

Discussion

Study 4 tests whether the effect of a green component's centrality is independent of a green component's importance in a consumer's choice. The results support this notion. Including both manipulated and measured importance of the green attribute in our analysis did not eliminate the effect of centrality of a green component on evaluations of greenness. In addition, Study 4 also controlled for possible inferences about firm motivation. Manipulations of cen-

FIGURE 4
Study 4: Greenness of Plastic Monitor by Centrality of Green Component and Importance in Choice
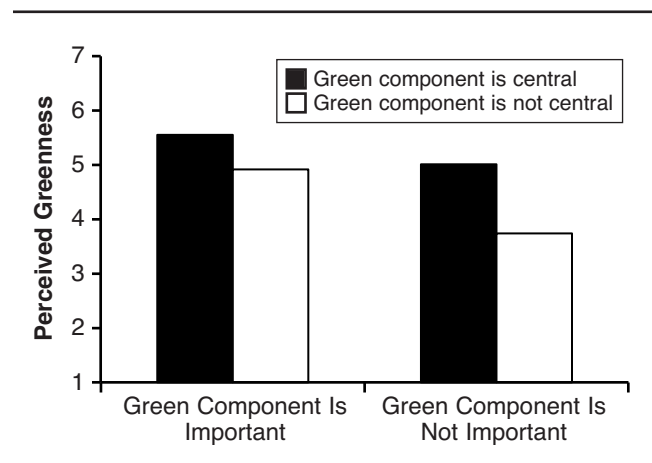
trality did not influence evaluations of firm motivation. Furthermore, the effect of centrality on evaluations of greenness remained even after controlling for motivation.

We did not predict the observed unique effect of attribute importance on evaluations of greenness. It is possible that this finding is due to salience or attention: focusing on one attribute may have led to increased consideration of its benefit, which led to increased evaluations of the greenness of the product. Alternatively, attribute importance could signal different goals for the product, which potentially could influence ad hoc categorization of the product and the centrality of its features. We return to this idea in the next section.

General Discussion

In this research, we investigate what leads a product to be perceived as more or less environmentally friendly. We focus on the centrality of green attributes and features and their influence on evaluations of the overall greenness of a product. We find that if a central attribute offers a green benefit, the product is perceived as more environmentally friendly compared with when a peripheral attribute provides an identical environmental benefit. We find support for this hypothesis by directly manipulating the centrality of an attribute (Studies 1 and 4) and by relying on consumers' inherent understanding of categories, product attributes, and their centrality (Studies 2 and 3). More importantly, we find support for our proposed mechanism by testing for the mediating role of perceived centrality (Study 1) and by manipulating factors that influence centrality of given attributes, either through categorization of the product (Study 2) or through integration in the product design (Study 3). Furthermore, we show that centrality contributes to perceptions of environmental benefit beyond the importance of an attribute to an individual decision maker (Study 4). We also demonstrate that attributions about a firm's motivation are not the mechanism behind our results (Study 2 and 4).

Theoretical Contributions

Our findings contribute to several areas of research. First, we contribute to research on green consumer behavior. We note that prior research in the area of environmental consumer decisions takes the perception of the environmental benefits of a product or behavior as a given and then focuses on factors that influence how people evaluate and choose those products (Baca-Motes et al. 2013; Goldstein, Cialdini, and Griskevicius 2008; Grinstein and Nisan 2009; Irwin and Naylor 2009; Luchs et al. 2010). Our research contributes to this area by providing insight into the process by which consumers evaluate of the greenness of the product in the first place. Specifically, we show that the degree of centrality of the attributes that offer specific features or benefits may influence product evaluation. Although our findings focus on green evaluations, we subsequently discuss other areas to which these findings might apply.

Our findings also contribute to categorization and concept identification literature. Prior work in this area has shown that aspects of categorization (e.g., category salience, goals, expertise, hierarchical structure) influence inferences and product evaluation. Here, we demonstrate that feature centrality also plays a role. More importantly,

we contribute directly to the understanding of how centrality influences evaluations. As we have noted, prior work has largely addressed understanding whether a feature or attribute is central in a category or concept (Sloman, Love, and Ahn 1998). More recently, researchers have explored how modifications to a concept or category influence beliefs about features of members of that category (Hampton, Passanisi, and Jonsson 2011). Our research contributes to this literature by exploring the opposite side of that question: How do modifications of a feature of an object (that is always present, modified or not) lead to modified perceptions of the overall object?

In addition, our findings contribute to the literature on centrality by exploring two specific moderators on the role that centrality plays in overall product evaluations. First, we show that cuing a particular category moderates whether an attribute is perceived as central to a product and, thus, drives how that attribute influences the perception of the product overall. Second, we show that having other attributes that are dependent on the target attribute will increase the centrality of the target attribute. A green attribute that is initially perceived as peripheral (and thus does not imbue the entire product with greenness) can be made more central by describing other attributes that depend on the target attribute. When the green attribute becomes more central, the overall product evaluation becomes more green.

Finally, in addition to providing support for centrality as the mechanism in our studies, we also rule out two other mechanisms: attributions about the firm's motivations and the importance of the attribute to the consumer. Thus, these studies lend additional credence to the strong role of central attributes in driving overall product assessment.

Managerial and Policy Implications

Understanding how consumers perceive and evaluate products with environmental benefits is important for marketers. Consumers' efforts to "go green" are challenged by the perceived effectiveness of green products (Luchs et al. 2010), the consumer's distrust in many products' green claims (Delmas and Burbano 2011), and consumers' lack of confidence in interpreting the information provided (European Commission 2013). However, even if these challenges are overcome, the firms' investments cannot have substantial impact on choice if the consumer does not actually perceive a product to be green.

Few products are 100% green. In most cases, firms must make choices about where to invest to capture the greatest green benefit and the greatest competitive advantage. Our studies suggest that where those investments are made—in terms of central or peripheral product attributes—can have a significant influence on the extent to which the product is perceived as green. Studies 2 and 3 support the supposition that consumers have preconceptions of attribute centrality in some products and that these preconceptions can be used to guide a firm's green investment dollars toward central attributes, particularly when the firm's options have similar environmental payoffs. Such efforts are likely to result in consumers evaluating a product as more green.

Firms and policy makers can also choose how to communicate environmental benefits, and our research has several implications for these efforts. As Studies 1 and 4 show,

merely telling consumers that a green attribute is central to the definition of the product may make them more likely to judge the entire product as green. Thus, information about green attributes such as "structurally important" or "important for comfort" can help consumers understand the essential role of the green attribute in the product's functionality. We also find that attributes that are important to the individual consumer can also influence the consumer's perception of the greenness of the product. However, centrality still has an influence beyond the role of importance.

In other situations, as Study 3 demonstrates, firms may invest in an attribute that is made central by the dependencies of other features on that attribute. Communication strategies can help that investment imbue the entire product with greenness. For example, one can imagine that in an electric car, the battery itself might not be considered inherently central, but it is certainly made central by the fact that many other features of the car would have to change if the car did not have a battery. Therefore, in cases in which a green attribute is not preconceived by consumers as central but has many dependencies within the product, communicating this dependency structure to consumers can help them place the attribute in a more central or "essential-to-the-product" light, giving the greenness of this feature an opportunity to bathe the entire product in green.

Further Research

There are several areas in which our findings might be extended through further research. First, research on the sustainability liability suggests that under some conditions people believe that environmentally friendly products are less effective and therefore less desirable (Luchs et al. 2010). In our research, we measured and found that a more central CPU motherboard made from recycled materials led to greater perceptions of a computer's greenness compared with when the less central sound card was made from recycled materials. However, we did not measure whether the green computer would be evaluated as a somewhat less effective computer. If making a component green diminishes perceptions of the component's intended performance, it is possible that making a central versus a peripheral component green may have greater effect on performance expectations for the entire product and, therefore, implications for purchase intentions and behavior. Further research should explore this potential trade-off because it could shed light on how modifications to central and peripheral attributes influence product evaluation more generally.

Second, for products for which there is likely to be a sustainability liability, it may be better to invest in making a peripheral, rather than a central, feature green. For example, as we noted previously, Simple Green cleaning products benefit the environment in part by using recycled plastic in the packaging (Simple Green 2013). Although this may result in the product being perceived as less green compared with an equal benefit from a more central attribute, it may be that perceptions of product effectiveness are less likely to be diminished when the green benefit comes from a peripheral attribute. The net result could be a product that is perceived as both strong and green.

Third, it would be beneficial to conduct a deeper exploration of the role of the many attributions and inferences that consumers make in evaluating green products and the firms that produce them. In particular, a broader understanding of how actions of the firm influence the unique dependent variables explored by green researchers, including greenness of the product, expectations of the product on other dimensions (Luchs et al. 2010), greenness of the firm, and overall brand evaluations (Olsen, Slotegraaf, and Chandukala 2014). For example, recent work has shown that consumers give lower ratings of overall product quality and are less likely to purchase a product when a firm has intentionally made it green, as opposed to when it is incidentally green from other efforts (Newman, Gorlin, and Dhar 2014). The authors do not provide a measure of greenness of the product; however, we suspect that although their participants gave lower ratings of overall product quality when the firm was perceived to be motivated to make the product green, those participants would have also rated the products themselves as more green. Indeed, although this subject was not the focus of our work, we observe in Studies 2 and 4 that perceptions of motivation were correlated with the product's perceived greenness, independent of the centrality of the green attribute. Thus, researchers should further explore the role of firm motivation to develop a deeper understanding of when people will perceive a product as green.

The role of an attribute's centrality to the definition of the product versus its importance to consumer choice should also be investigated further. In Study 4, in addition to whether the attribute that offered the green benefit was central, we observed an independent effect of whether that attribute was important in the consumer's evaluation. We did not predict this effect, and future work might explore its robustness and its mechanism. For example, it is possible that the role of attribute importance on green evaluations is due to increased attention. Prior research has shown that consumers attend to and put more thought into attributes when they are important, which can lead to more extreme evaluations based on those attributes (Mackenzie 1986). Alternatively, prior work has shown how, depending on a person's goals, the same objects may be categorized and conceptualized differently (Barsalou 1983; Ratneshwar et al. 2001). We predict that this would also influence which attributes are considered central in that object in much the same way as the waffle and panini cooking plates differed in centrality depending on the product category cued in Study 2. Thus, when an attribute is more important, it may imply that an associated goal has been activated in which that attribute is more central for the product in achieving that goal. As such, when that attribute also offers a green benefit, the overall product is perceived as more green.

Beyond the environmental benefits studied here, there are many ways in which product components may be modified or have characteristics that lend themselves to influencing evaluation of the entire product. For example, many products are designed and built using components and processes from numerous countries. The new Boeing 787 Dreamliner includes parts from the United States, Japan, Italy, Korea, Germany, Sweden, France, and the United Kingdom, and Apple's iPod is reported to be made using

parts from at least seven countries (Kavilanz 2013; Varian 2007). Research has shown that consumer evaluations of products may be influenced by a product's country of origin; if so, what is the country of origin of the Boeing 787? Of the iPod? Country-of-origin research tends to focus on factors that influence consumers' judgments of those products, such as consumer motivation and type of information (Gürhan-Canli and Maheswaran 2000), consumer expertise (Maheswaran 1994), incidental emotions (Maheswaran and Chen 2006), and the timing of when country-of-origin information is revealed (Hong and Wyer 1990), but the centrality of the components from different countries has not been explored. Our research suggests that central components will be most influential in judgments of country of origin. Similar effects could be explored with respect to cobranded products: Evaluation of cobranded products has been examined, but researchers have not explored whether people perceive cobranded products to belong to one brand or the other (Park, Jun, and Shocker 1996). Future studies should explore this issue as well as the boundary conditions of these effects.

We note that there are many other potential drivers of consumer perceptions of greenness that we did not explore here. For example, the source of the green claim (Iyer and Banerjee 1993) and credibility of green claims (Mayer, Scammon, and Zick 1993) are variables worthy of further study. Iyer and Banerjee (1993) suggest that consumers view claims from manufacturers with more skepticism than claims from third parties, and yet firms' advertising and packaging are likely to be the primary source of information for most consumers. How can firms offering truly green products effectively communicate these products and avoid claims of greenwashing? Are there particular tactics that make their claims more effective? Future studies might incorporate these research questions into understanding consumers' perception of firm's green efforts.

Conclusion

An increasing body of research points out the paradox in which consumers say that they want green products and yet often do not purchase them (Gershoff and Irwin 2011). Although there are likely to be many factors contributing to this phenomenon, the present research suggests another potential reason: although the products have components that offer environmental benefits, consumers do not perceive the products as green. As issues related to environmental protection become more important for environmental health, it is also important that policy makers and marketers understand not only the environmental impact of their decisions but also the way in which consumers will interpret these decisions.

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