

Not All (Brand) Changes Are Made Equal:  
Understanding Which Changes Impact Brand Loyalty

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## CONTRIBUTION STATEMENT

Although a wide range of changes to a brand can impact brand loyalty, most of the literature focuses on how direct consumer experiences and satisfaction influence loyalty. We propose a broad framework for understanding how to maintain brand loyalty that can explain how changes will influence brand loyalty, beyond those involving direct interactions with a brand. Our framework uses consumers' beliefs about the causal relationships that exist between a brand's features—any aspect of a brand that consumers perceive as notable—to predict which changes will influence their loyalty. We find that changes to *causally central* features—those that consumers perceived as causally related to many other features of the brand—more negatively impact brand loyalty than changes to *causally peripheral* features, which consumers perceived as having fewer causal relationships to other features. Further, we find that changes to causally central features are more harmful to brand loyalty because they disrupt the identity of the brand more than changes to causally peripheral features. Thus, our framework suggests that maintaining loyalty involves not only providing consumers with positive experiences, but also maintaining brand identity.

Our framework also explains the puzzle of why seemingly similar changes are harmful to one brand but not to another. We show that manipulating the exact same feature to appear more causally central or peripheral influences how harmful a change to that feature is on loyalty. Thus, changing the same feature can be more harmful to one brand than another because consumers' beliefs about the causal structure of the two brands differ—i.e., a feature may be perceived as causally central for one brand and causally peripheral for another. The questions that our framework addresses are

particularly important for brand and marketing managers as loyal consumers provide a variety of benefits to a firm.

Some changes that brands make seem to impact brand loyalty, while other seem to have little influence. We propose that when a consumer is loyal to a brand, the consumer's beliefs about the cause-effect relationships that exist among that brand's features influence which changes will negatively impact brand loyalty. Specifically, brand loyalty is more harmed by changes to features that are perceived as more causally connected to other important features of a brand (i.e., more *causally central*), compared to changes in more causally peripheral features. Across six studies, we demonstrate that changes to features impact brand loyalty to the extent that the feature is seen as causally central. We show that manipulations that make a feature more causally peripheral decrease the impact of a change to that feature on brand loyalty. Further, we demonstrate that the impact of causal centrality on the brand loyalty response to change is mediated by perceived disruption to brand identity. Our results provide a new perspective on consumer loyalty, suggesting that maintaining brand identity is key to maintaining brand loyalty.

*Keywords:* brand loyalty, causal reasoning, customer loyalty, identity

Maintaining consumer loyalty is crucial to the success of firms. Loyal consumers provide steady demand for the brand's offerings and help promote the brand to other consumers (D. Aaker 1991, Dick and Basu 1994). As a result, even small increases in consumer loyalty can lead to large increases in profits (Reichheld, Markey, and Hopton 2000). Furthermore, maintaining good relationships with consumers who are loyal to the brand is important because consumers who had a positive relationship with a brand have the potential to become the company's harshest critics when disappointed (Gregoire and Fisher 2008).

As brands must change in response to the evolving market, a major challenge for managers is predicting which changes will negatively impact brand loyalty. This is particularly difficult because seemingly similar rebranding efforts and changes to product lines have had very different impacts for different brands. For example, why was adding a low calorie alternative a success for Coke (i.e., Diet Coke) but not for Miller (i.e., Miller Lite) (D. Aaker 1991)? Additionally, negative unintentional changes (e.g., negative experiences with products or news about the company) can vary in how damaging they are to different brands (J. Aaker, Fournier, and Brasel 2004). Despite the importance of maintaining loyal customers in the face of change, the literature does not provide a broad account to explain which changes are more or less likely to damage brand loyalty.

We take a novel approach to this question, building on insights about causal reasoning to provide a broad framework that explains which changes are most likely to negatively impact brand loyalty among which consumers. While previous research on the determinants of brand loyalty has mainly focused on consumers' direct experiences with

the brand and the outcomes of these interactions—i.e., customer satisfaction and trust (Agustin and Singh 2005; Chandrashekran et al. 2007; Anderson and Sullivan 1993; Yim, Tse, and Chan 2008)—we instead focus on consumers’ beliefs about the causal relationships that exist between a brand’s feature. We propose that changes to *causally central* features—those that consumers perceived as causally related to many other features of the brand—more negatively impact brand loyalty than changes to *causally peripheral* features, which have fewer causal relationships to other features. We propose that this difference occurs because causally central features are perceived by consumers as being the most defining to the identity of a brand and necessary for maintaining the identity of the brand. As a result, changes in these features lead consumers to perceive the brand as having a different identity. That is, when a causally central feature is changed, the brand no longer seems to be the same brand that consumers felt loyal to.

We next review the prior research on how brand changes influence loyalty. We then incorporate theories of causal reasoning to develop our proposed framework and hypotheses. Finally, we test our hypotheses in a series of six studies and discuss the implications.

## **THEORETICAL BACKGROUND AND PROPOSED FRAMEWORK**

### Changing Brands and Changing Loyalties

Previous research has extensively explored how events influence the consumer-brand relationship. Perhaps the most attention has been paid to the effects of firm

transgressions, i.e., violations of the rules and norms that govern a relationship (Aaker et al. 2004). Most research on transgressions in the consumer-brand relationship literature has focused on service/product failures and violations of social codes. Not surprisingly, this line of research has found that transgressions can have serious implications for the consumer-brand relationship as well as significant financial consequences (J. Aaker et al. 2004; Gregorie and Fischer 2006; Folkes 1984; Folkes, Koletsky, and Graham 1987; Lin and Sung 2014; Maxham and Netemeyer 2002; Umashankar, Srinivasan, and Parker 2016). However, while transgressions might be expected to consistently decrease brand loyalty, the effects of transgressions vary. For example, Aaker et al. (2004) found that a service failure was more damaging to a brand's relationship with its consumers when the brand had an exciting personality than when it had a sincere personality. In the latter case, the transgression (a service failure) actually improved the consumer-firm relationship, compared to no transgression occurring.

Brands undergo many other types of changes, often made intentionally, that also have the potential to impact brand loyalty. Brands must change in response to the evolving competitive landscape, new consumer preferences, and technological advances. For example, in order to generate growth, brands often attempt to expand their consumer base which can harm loyalty among their original customer base, particularly among exclusive brands (Belezza and Keinan 2014; Kirmani, Sood, and Bridges 1999). Serial brands, which introduce new offerings that change between iterations (e.g., fashion collections, movie series, sports teams), are expected to change. However, even for serial brands, changes (e.g., introducing or removing characters or players) can negatively impact consumers' feelings towards the brand (Paramentier and Fischer 2014).

It can be difficult to predict what impact a change will have on brand loyalty. Seemingly similar changes can induce very different reactions from consumers. For example, as in the case of Diet Coke and Miller Lite, consumers of different brands can react quite differently to the introduction of similar offerings. Additionally, brand efforts to modernize their image or to participate in corporate social responsibility initiatives have led to mixed results for different firms (D. Aaker 1991; Chernev and Blair 2015; Torelli, Monga, and Kaikati 2012). In particular, corporate social responsibility efforts have been well-received by some consumers but not others depending on consumer beliefs about how these efforts interact with the firm's ability to produce their products (Sen and Bhattacharya 2001).

While some of the differential reactions to individual brand changes can be explained by consumer preferences or knowledge relevant to the specific outcome of that change, the broader question of when consumers will be more or less open to general change in a brand's feature remains unanswered. We propose a framework that aims to explain what changes are more likely to disrupt brand loyalty. Drawing on research from cognitive psychology, we propose that understanding how consumers think about the identity of brands that they have a relationship with provides insight into which aspects of the brand will disrupt brand loyalty when changed. More specifically, we propose that how much a change to a feature impacts brand identity and brand loyalty depends on consumers' perceptions of how causally connected to other features the changing feature is.

Causal Centrality



Causal reasoning is a fundamental process that underlies much of cognition. People's knowledge is typically represented as theories about the world that include beliefs about cause-effect relationships (Gopnik and Wellman 1994; Keil 2006; Murphy and Medin 1985) and decision-makers sometimes perceive their own decisions as causal interventions (Sloman and Hagmayer 2009). Research in consumer behavior has examined how attributing causal responsibility to different agents (e.g., whether the firm or consumer caused a product failure) impacts downstream actions and judgments (Botti and McGill 2011; Folkes 1984; Folkes, Koletsky, and Graham 1987; He and Bond 2015; Mizerski 1978). We focus on consumers' beliefs about the network of cause-effect relationships that exist among the features of a brand. For example, consumers may believe that Apple's stylish designs, hip personality, and engaging advertisements are all caused by Apple's focus on innovation.

These kinds of beliefs about causal relationships among features influence categorization decisions (e.g., Ahn 2000; Sloman, Love, and Ahn 1998; Rehder 2003; Rehder and Hastie 2001) and category learning (Rehder and Murphy 2003; Waldmann et al. 1995). In particular, this research has found that features of a concept are perceived as more defining of that concept to the extent that they are perceived as *causally central*, i.e., involved in more cause-effect relationships with other features of the concept (Rehder and Hastie 2001). Thus, people are less likely to continue to judge an item as belonging to a category when it is missing a causally central feature than when it is missing a causally peripheral feature. For example, if the firm that makes soap changes the products packaging, consumers will likely still think that the product is soap. If

instead it changes the soap so that it does not lather anymore, consumers may be less likely to categorize the product as soap. This is because lather is—in the minds of many consumers—causally connected to many of the other features of soap, particularly its function and the experience of using it. Further, as the perceived category of a product guides our expectations of it (Moreau, Markman, and Lehmann 2001; Murphy 2002), changing a causally central feature of a product can also change how we interact with it—e.g., if I am not sure this is soap, does it really clean, and do I want to keep using it?

Research in consumer behavior has found that causal beliefs about how a product's features relate to each other influence consumers' inferences about the product. Consumers make stronger inferences from causally central product features to the product as a whole than from causally peripheral products. For example, if an environmental benefit is connected to a more causally central feature of a product (e.g., a component of the product is made of environmentally-friendly materials), consumers evaluate that product to be more environmentally-friendly than when the same benefit is attached to a more causally peripheral feature of the product (Gershoff and Frels 2015).

### Causally Central Changes and Brand Loyalty

Given that brands facilitate inferences and guide our interactions with their products, changing causally central features of a brand may similarly inhibit consumer inferences. Consumers use brands to infer unobserved product characteristics, such as quality, and these inferences drive product use (Erdem 2004; Wernerfelt 1988). Consumers also use brand characteristics to make inferences about the brand as a

relationship partner, and these inferences are crucial for maintaining strong consumer loyalty (J. Aaker et al. 2004). We propose that when a causally central feature of a brand is changed, the consumer's basis of loyalty is also called into question.

**H1:** Changing features of a brand that a consumer perceives as causally central (vs. causally peripheral) will have greater negative effects on that consumer's brand loyalty.

For example, consider Halley, who is loyal to two local restaurants, Johnny's and Tommy's, that are both known for the same set of characteristics: supporting a charity which promotes healthy eating, using sustainable ingredients, serving high-quality food, and being very popular. Although the two restaurants have the same features, Halley believes that the causal relationships among these features differ across the two restaurants. She believes that Johnny's relationship with the charity is what caused it to use sustainable foods, to serve high-quality food, and to be popular. In contrast, she believes that Tommy's use of sustainable foods caused it to serve high-quality food, to be popular, and to develop its relationship with the charity. Imagine now that both restaurants have a falling out with the charity. Our framework predicts that Halley's loyalty to Johnny's will be decreased more than her loyalty to Tommy's because the relationship was causally linked to more of Johnny's other features—i.e., the charitable relationship was more causally central.

This prediction is based on the idea that changing causally central features changes the perceived identity of a brand. Recent research suggests that causal beliefs can

play a role in determining what people perceive as defining for individual concepts—specifically, people’s self-concepts and concepts of other people. Chen, Urminsky, and Bartels (2016) found that changes in those features that are seen as causally central to a person’s identity led to greater perceived disruption of that person’s identity than changes to causally peripheral features, both for the self as well as for others. We propose that changes in causally central features of a brand have a similar effect on how consumers think about the brand’s identity.

**H2:** Changing features of a brand that a consumer believes are causally central (vs. causally peripheral) will lead to the consumer perceiving greater disruption to brand identity.

Research from a variety of areas suggests that perceived disruption to the identity of a person or an object has important consequences on our relationships with and judgments of them. Perceived disruption to one’s own identity has been shown to influence choices people make for themselves and for others (Bartels and Rips 2010; Bartels and Urminsky 2011, 2015) in ways that suggest a weaker affinity or relationship. Greater perceived disruption to identity is also associated with greater relationship deterioration between people over time (Strohmingner and Nichols 2015). Finally, disruption to identity has also been found to negatively impact judgments not only of people, but also of one-of-a-kind objects, such as the value of works of art (Newman and Bloom 2012; Newman, Bartels, and Smith 2016). Thus, we propose that when changing a causally central feature of a brand disrupts the brand’s perceived identity, this disruption

will reduce brand loyalty. For example, Halley's loyalty to Johnny's decreases because she just does not feel like Johnny's is the same restaurant after it lost its causally central relationship with the charitable organization.

**H3:** The impact of changing causally central features on brand loyalty will be mediated by perceived disruption to identity—the greater the disruption to identity, the more negative the effects on brand loyalty.

Our approach to identifying which changes will negatively impact brand loyalty provides a general framework that explains differences in the effects of change, both across brands and across consumers. As causal structure varies from brand to brand, our framework can explain why a given feature is important to the identity of one brand but not another—e.g., why did losing the charity relationship impact Halley's loyalty to Johnny's but not to Tommy's? Additionally, as each individual has their own representation of the casual structure of a brand, our framework can also explain why changing a given feature may impact brand loyalty for some consumers but not others.

We test the hypotheses in six studies. In studies 1A-1C, using real brands that participants are loyal to, we establish a relationship between the causal centrality of a feature and the impact of changing that feature on loyalty. Next, in study 2, we utilize scenarios about hypothetical brands to manipulate causal centrality. In study 3, we generalize our findings to serial brands, whose offerings regularly change. Finally, in study 4, we examine whether another aspect of consumers' causal beliefs, the strength of

the causal relationships between a brand's features, influences which changes harm brand loyalty.

**STUDY 1A: CHANGES TO CAUSALLY CENTRAL FEATURES DECREASE  
BRAND LOYALTY MORE THAN CHANGES TO CAUSALLY PERIPHERAL  
FEATURES**

As an initial test of hypothesis 1, we examine the relationship between a feature's causal centrality and the degree to which a change in that feature impacts brand loyalty. We test this relationship using real brands that consumers reported being loyal to.

We operationalized causal centrality as the number of causal links that a feature participates in with other features of the brand. The more central the feature is (the more causal links it has) in a consumer's representation of the brand, the larger the predicted negative impact on brand loyalty from a change in that feature. Although there are alternative theoretical accounts of causal centrality (see Rehder 2003), in this article we use the number of cause-effect relationships (Rehder and Hastie 2001) as prior studies have found that this model of causal centrality better fit identity judgments (Chen et al. 2016) than another prominent model of causal centrality which gives higher weight to causes than effects (Ahn et al. 2000; Sloman et al. 1998).

Method

Three hundred one U.S. Amazon Mechanical Turk participants completed the study. Data were dropped for thirty-four participants who either failed the attention check (11), or gave all the same answers for the number of links or change in loyalty questions (23), yielding 267 cases. Data were dropped from participants who gave all the same answers because in our analysis we calculated the correlation between the number of links and change in loyalty and we were unable to do so for participants who gave all the same answers. Results were similar when we ran a different analysis designed to include all participants (see Appendix C). Full data from all studies will be made available online. All stimuli and measures, and results from all relevant studies are provided in the appendix.

Participants specified a brand that they are loyal to and briefly described what products that brand makes. We asked participants to list a brand that they buy instead of any other brands that make the same product(s), when possible. Participants then reported how much they agreed with two statements from Carroll and Ahuvia's (2006) brand loyalty scale on a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*): 1) If this brand is sold out, I will postpone buying, and 2) This is the only brand of this product that I will buy.

Participants then generated eight features that they believed were important to their brand's identity and completed a version of the "listing causal relationships" task (Chen et al. 2016) adapted to be about brands. In each trial of the task, participants were asked which of the other seven features were caused by a target feature. Participants saw the target feature at the top of the screen (along with the question text) and the seven other features were listed under it along with the answer "none of these are caused by

[target feature]” (see figure 1). Participants clicked the check-box next to a feature to report that the target feature caused that feature. After a practice task with feedback, participants completed eight randomized trials of the listing causal relationships task—one for each of the features of the brand that they had previously generated.

### FIGURE 1

#### EXAMPLE TRIAL IN LISTING CAUSAL RELATIONSHIPS TASKS

Think about the following aspect of **Starbucks: good service**  
Which of the other features of Starbucks listed below, if any, are caused by this aspect: good service? By caused by, we simply mean that the feature was influenced or shaped by: good service.

You may select as many or as few features as you see fit. In the below list, please select all the feature that you believe are caused by the above feature.

- Convenient
- Flavorful
- Variety
- Community
- Dedication to product
- Humanitarian efforts
- Transparency
- None of these are caused by: good service

From this series of questions, we calculated the causal centrality of the target feature, the total number of causal relationships that the feature participated in as either a cause of another feature or as an effect of another feature, across the eight trials. Thus, a



feature could have high causal centrality because when it was the target feature it was selected as the cause of many other features, because it was selected as an outcome in many of the trials when other features were the target, or both.

To measure how much each change would impact brand loyalty, we had participants imagine that each of these eight features had changed, one at a time. For each change, participants then rated their agreement with the two brand loyalty statements used earlier in the study based on that feature having changed. For each of the eight changes, we calculated a post-change brand loyalty score for each participant, by averaging the agreement with the two brand loyalty statements. We then calculated the change in loyalty that resulted from a change to each feature by subtracting participants' original loyalty score (for the unchanged brand) from the post-change loyalty score corresponding to each feature. As higher loyalty scores indicated greater brand loyalty, negative change in loyalty scores indicated decreased brand loyalty. Features were presented in random order.

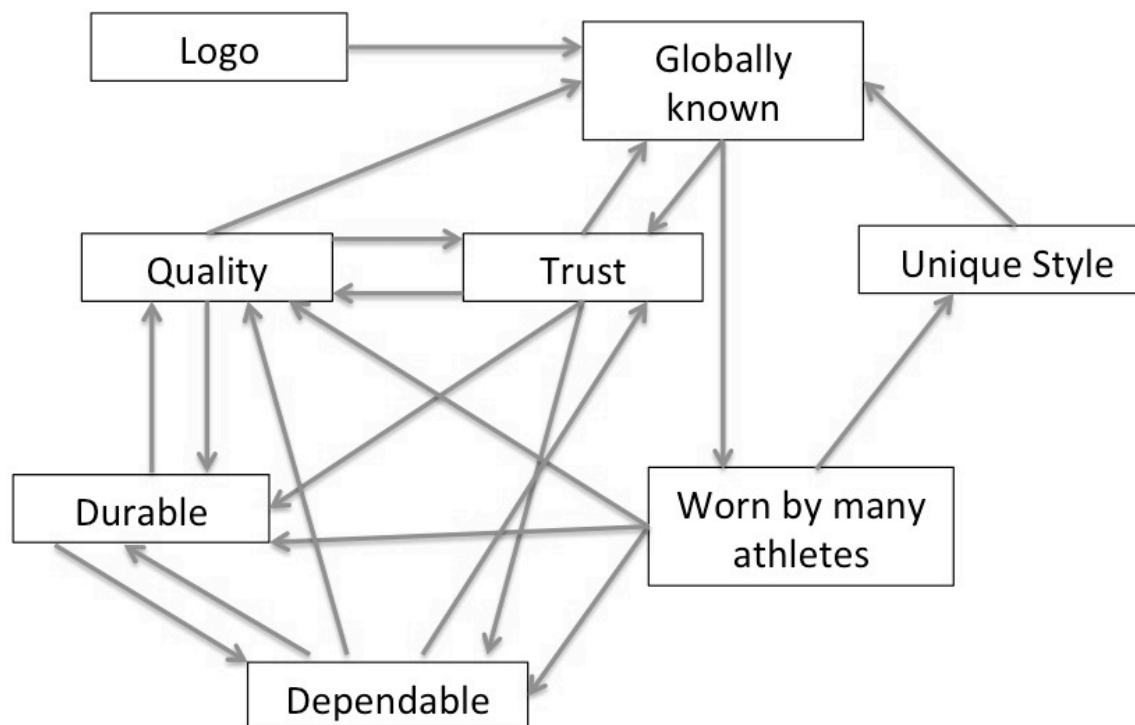
## Results

The most common brands that participants reported being loyalty to were Nike (10% of participants), Apple (8%), Samsung (5%), Coke (4%), and Sony (3%). Commonly reported features were price, quality, personality traits (e.g., fun, outgoing, friendly), specific attributes of the products (e.g., taste, colors), and personal experiences with the brand or its products (e.g., great service, product fits specific need). As an example, causally central features of Nike (i.e., the features with a high number of links)

included quality, price, stylish design, and popularity. Causally peripheral features (i.e., those with a low number of links) included the Nike logo, their labor practices, and their community service efforts. That is, consumers loyal to Nike often perceived the brand's popularity as being caused by its quality and stylish design but did not perceive Nike's logo as being causally connected to these other aspects of the brand. (see figure 2 for an example of the links reported by a participant.) On average, participants reported 13.49 causal links between the eight features of the brand.

**FIGURE 2**

ILLUSTRATION OF THE FEATURES AND CAUSAL LINKS FOR NIKE  
REPORTED BY A PARTICIPANT



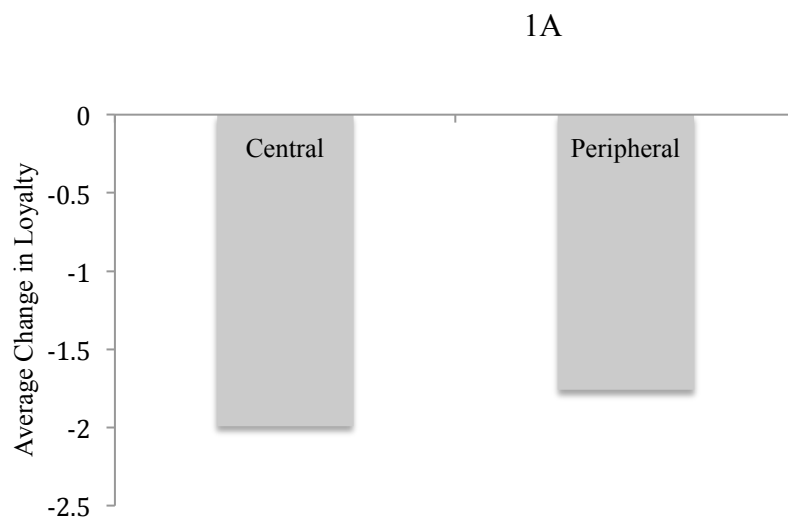
Notes: Each box contains a feature of Nike reported by the participant. The arrows represent causal relationships between features. The box at the arrow's origin is the cause and the box that the arrow points to is the effect. For example, based on this participant's responses, the feature *Unique style* causes the feature *Globally known*. The features *Quality*, *Trust*, and *Dependable* are causally central because they participate in many cause-effect relationships. The feature *Logo* is causally peripheral because it participates in relatively few cause-effect relationships (only one, with *Globally known*).

To test hypothesis 1, for each participant, we calculated the Spearman correlation between the number of causal links a feature had and the change in loyalty that resulted from a change in that feature (results were similar using a Pearson correlation, see Appendix 3). We then averaged the correlation coefficients (with a Fisher transformation). Consistent with hypothesis 1, we found a negative correlation between number of links and change in brand loyalty ( $M_{corr} = -.18$ ,  $t(266) = 5.73$ ,  $p < .001$ , 95% CI = [-.25 -.12]), on average. Changes to more causally central features were evaluated as more negatively impacting brand loyalty than changes to more peripheral features. The majority of participants (64%) had a negative individual-level correlation between the number of connections a feature had and their rated change in brand loyalty.

We also compared the average change in loyalty caused by changes to more causally central features vs. changes to more causally peripheral features. For each participant, the four features with the most links were classified as more causally central and the four features with the fewest links were classified as more causally peripheral. A paired t-test revealed that, consistent with the results of the correlational analysis, changes to more causally central features were significantly more harmful to brand loyalty than changes to more causally peripheral features ( $M_{central} = -1.99$ ,  $M_{peripheral} = -1.76$ ,  $t(266) = 3.60$ , 95% CI = [.11 .37],  $p < .01$ , see figure 3).

**FIGURE 3**

AVERAGE CHANGE IN LOYALTY RESULTING FROM CHANGES TO CAUSALLY CENTRAL AND CAUSALLY PERIPHERAL FEATURES IN STUDY



The results of study 1A demonstrate that consumers report greater decreases in brand loyalty when brand features that they perceive as causally central are changed. These results support our causal centrality approach to understanding brand loyalty and suggest that maintaining causally central features is important for maintaining brand loyalty.

**STUDY 1B: CHANGES TO CAUSALLY CENTRAL FEATURES DISRUPT BRAND IDENTITY MORE THAN CHANGES TO CAUSALLY PERIPHERAL FEATURES**

As discussed earlier, causally central features are perceived to be more defining of a concept and of people's identities than causally peripheral features. As such, changes to causally central features disrupt people's identities more than changes to causally peripheral features (Chen et al. 2016). In study 1B, we test hypothesis 2, examining whether changes to more causally central features of a brand disrupt brand identity more than changes to more causally peripheral features.

## Method

Ninety-nine U.S. Amazon Mechanical Turk participants completed the study. Data were dropped for six participants who either failed the attention check (2), gave all the same answers for the number of links, disruption to identity, or change in loyalty questions (4), yielding 93 cases. Results were similar when we included all participants (see Appendix C).

The procedure was identical to that of study 1A except that when considering a change to each of the brand's features, participants did not rate their agreement with the brand loyalty statements. They instead rated how much each change would disrupt the identity of the brand on a scale of 0 (*exact same brand*) to 100 (*completely different brand*). Features were presented in random order.

## Results

We hypothesized that changes to features with more causal connections would disrupt brand identity (hypothesis 2) more than changes to features with fewer causal connections. Similar to study 1A, for each participant, we calculated the Spearman correlation between the number of causal links a feature had and how much a change to that feature would disrupt brand identity (results were similar using a Pearson correlation, see Appendix 3). We then calculated the average correlation coefficient (with a Fisher transformation).

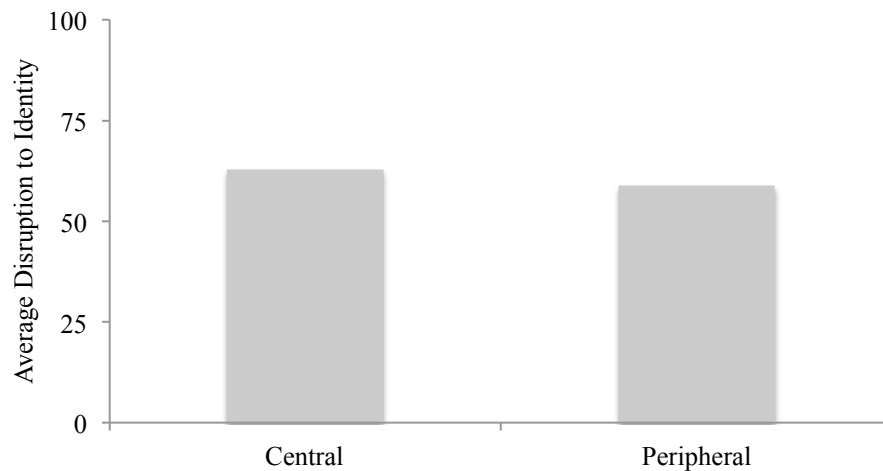
The results of the correlational analysis were consistent with hypothesis 2. The average correlation coefficient between number of links and disruption to identity, across participants, was positive ( $M_{corr} = 0.14$ ,  $t(92) = 2.78$ , 95% CI = [.04 .24],  $p < .01$ ). The majority of participants (63%) had a positive individual-level correlation between the number of connections a feature had and rated disruptiveness of change.

We also compared the average disruption to identity caused by changes to more causally central features vs. changes to more causally peripheral features. As in study 1A, relative causal centrality was calculated at the participant level. A paired t-test revealed that, consistent with the results of the correlational analysis, changes to causally central features were significantly more disruptive to brand identity than changes to causally peripheral features ( $M_{central} = 62.85$ ,  $M_{peripheral} = 58.85$ ,  $t(92) = 2.37$ , 95% CI = [.65 7.35],  $p = .02$ , see figure 4).

**FIGURE 4**

AVERAGE DISRUPTION TO IDENTITY RESULTING FROM CHANGES TO  
CAUSALLY CENTRAL AND CAUSALLY PERIPHERAL FEATURES IN STUDY

1B



The results of study 1B suggest that the features consumers believe are causally central are perceived as most defining of a brand's identity. Changes to causally central features were evaluated as more disruptive of brand identity than changes to causally peripheral features. In the next study, we integrate the results of study 1A and study 1B to examine how disruption to identity relates to the relationship between causal centrality of change and brand loyalty.



**STUDY 1C: CHANGES TO CAUSALLY CENTRAL FEATURES DECREASE  
BRAND LOYALTY BY DISRUPTING BRAND IDENTITY**

The previous studies separately demonstrated that changes to features that consumers perceive as causally central more negatively impact brand loyalty (study 1A) and disrupt brand identity (study 1B), compared to changes to causally peripheral features. In study 1C, we provide a replication of studies 1A and 1B, and test our proposal that perceived disruption to identity mediates the effect of causal centrality on brand loyalty (hypothesis 3). To do so, we have the participants provide measures of the causal centrality of brand features and report the effects of a change to each feature on both brand identity and brand loyalty.

Method

One hundred U.S. Amazon Mechanical Turk participants completed the study. Data were dropped for eleven participants who either failed the attention check (1), or gave all the same answers for the number of links, disruption to identity, or change in loyalty questions (10), yielding 89 cases.

The procedure was identical to that of studies 1A and 1B except that after completing the “listing causal relationships” task, participants reported how much a change to each feature would change their loyalty to the brand *and* how much each change would disrupt the identity of the brand.

## Results

As in studies 1A and 1B, for each participant, we calculated the Spearman correlation between the number of causal links a feature had and how much a change to that feature would 1) change the participant's loyalty to the brand and, 2) disrupt the identity of the brand (results were similar using a Pearson correlation, see Appendix 3). We then calculated the average correlation coefficient for both analyses (with a Fisher transformation).

The results of the correlational analyses replicated the results of studies 1A and 1B. Replicating study 1A, changes to causally central features more negatively impacted brand loyalty than changes to more causally peripheral features. The average correlation coefficient was significantly less than zero ( $M_{corr} = -.17$ ,  $t(88) = 3.49$ ,  $p < .01$ , 95% CI = [-.27 -.07]). The majority of participants (61%) demonstrated a negative individual-level correlation between the number of connections a feature had and change in loyalty.

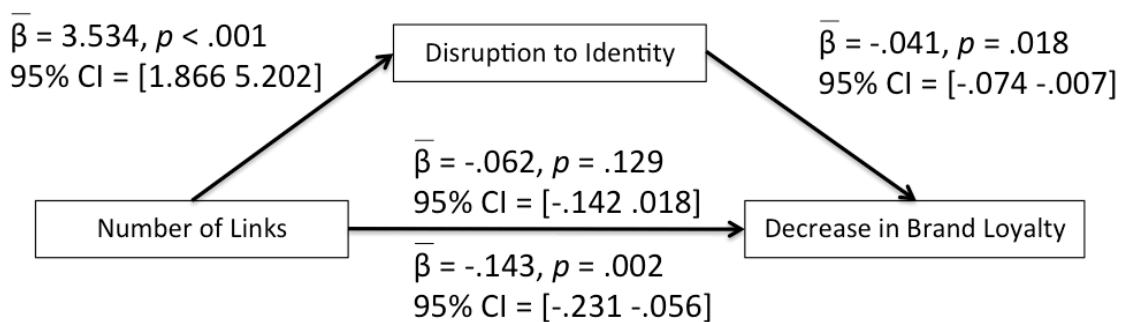
Replicating study 1B, changes to more causally central features were more disruptive to brand identity than changes to more causally peripheral features. The average correlation coefficient for number of links and disruption to identity was positive ( $M_{corr} = 0.19$ ,  $t(88) = 3.29$ ,  $p < .01$ , 95% CI = [.08 .30]). The majority of participants (67%) had a positive individual-level correlation between the number of connections a feature had and rated disruptiveness of change.

To test whether perceived disruption to identity mediates the relationship between the number of links a feature had and the change in loyalty that resulted from a change to that feature, we performed a mediation analysis for each participant (see figure 5). As

changes to more causally central features were evaluated as having a larger negative impact on brand loyalty than changes to more peripheral features, we expected that the indirect effect via disruption to identity would also be negative (i.e., changes to more central features lead to greater disruption to identity which leads to a more negative impact on brand loyalty). The mean indirect effect was significantly less than 0 ( $M = -.081$ ,  $t(88) = 2.554$ , 95% CI = [-.145 -.018],  $p = .012$ ). This mediation result confirms that, on average, there was a significant indirect effect of causal centrality on the change in loyalty that resulted from a change in that feature, via the anticipated disruption of brand identity (the mean correlation between the anticipated disruption to identity and change in loyalty was  $r_s = -.25$ ). The mediator accounted for more than half of the total effect of number of links on change in loyalty (mean indirect effect/mean total effect = .569).

**FIGURE 5**

DIAGRAM OF MEDIATION MODEL IN STUDY 1C



The results of studies 1A-1C demonstrate that changes to more causally central features of a brand have a more negative impact on brand loyalty. Further, the results of study 1C demonstrate that disruption to identity mediates the relationship between a

feature's causal centrality and the impact on brand loyalty that results from changing that feature. These studies highlight the benefit of understanding loyal consumers' perceptions of the structure of brand identities and demonstrate that maintaining brand identity by minimizing changes to causally central features can help preserve brand loyalty.

**STUDY 2: MANIPULATING THE CAUSAL CENTRALITY OF A FEATURE  
INFLUENCES HOW DAMAGING A CHANGE TO THAT FEATURE IS TO  
BRAND LOYALTY**

Studies 1A-1C demonstrated a relationship between the measured causal centrality of a feature and the impact of changing that feature on brand loyalty, using real brands and the features that participants specified as important to the brand. In study 2, we manipulate causal centrality, rather than measure it, using scenarios about hypothetical brands. We also use a more indirect measure of brand loyalty that does not involve directly asking participants about their brand loyalty.

#### Method

*Materials.* Participants read two short hypothetical scenarios, one describing the participants' favorite causal dining restaurant chain, and the other about their favorite automobile company. The scenarios described the structure of the brands as having one feature that was causally linked to either three other features in the restaurant scenario or two other features in the auto scenario. In addition to the story text, subjects also saw

visual diagrams of how the features of identity were connected with arrows. The arrows pointed to the effect feature and the cause feature was at the origin of the arrow (see figure 6).

For example, the restaurant scenario described a restaurant chain that had strong relationships with charities and health organizations. This restaurant had three other salient features that were caused by the relationships: being very popular, serving healthy, high quality food, and using sustainably-sourced foods. The scenario stated that because of its relationships with charities and health organizations the restaurant became very popular and started serving healthy, high-quality foods. Additionally, the relationships shaped the restaurant's values and it became committed to using sustainably-sourced foods. In this scenario, the restaurant's relationships with charities and health organizations was a causally central feature since it was linked to the three other features. Serving sustainably-sourced food was relatively more peripheral since it was linked to only one other feature (the relationships).

**FIGURE 6**

EXAMPLE DIAGRAM PRESENTED WITH SCENARIOS USED IN STUDY 2  
(VERSION A AND B OF EXAMPLE SCENARIO)



In order to manipulate which feature was causally central, we made two versions of each scenario (versions A and B). The only difference between the two scenarios was that the positions of two features were flipped, such that in one scenario a given feature was the causally central cause feature and in the other version it was the causally peripheral effect feature.

For example, the scenario described above was version A, while version B described the fact that the restaurant served sustainably-sourced food (which was peripheral in version A) as causally central—i.e., as causally linked to the three other features. Specifically, in version B the restaurant’s commitment to serving sustainably-sourced food was what caused it to become popular and to serve healthy, high quality food. Additionally, since the restaurant valued sustainably-sourced food, it was able to create strong relationships with charities and health organizations.

For generality, we used a second pair of scenarios in which an automobile company was described as having three key features: a strong CEO, extremely high quality products, and an excellent design team. In version A, the CEO was described as causally central while the design team was peripheral. In version B, the design team was described as causally central while the CEO was peripheral.

This design allows the exact same features to be counterbalanced as either causally central or causally peripheral, to control for any idiosyncratic beliefs about the features. Our prediction was that people would remain more loyal when a causally peripheral feature was changed than when a causally central feature was changed. That is, if the restaurant no longer had relationships with charitable organizations, loyalty would be decreased more among participants who read version A (in which the relationships were causally central) than those who read version B (in which the relationships were causally peripheral).

*Procedure.* Sixty U.S. Amazon Mechanical Turk participants read two scenarios that described the causal structure of a hypothetical brand. We presented the two scenarios in random order and randomly assigned participants to read either version A or version B of each scenario. After reading each scenario, on a separate screen, participants selected which of two statements they thought correctly described how the features of the brand related to one another. No feedback was provided.

On the next screen, we described (in random order) two different versions of the brand after a change and asked which changed brand the participant would rather purchase a product from. The scenario was again presented on this screen so the participants could reference it. Each of the two changed brands was now missing one of

the features described in the scenario—one brand was missing the causally central feature and the other was missing the causally peripheral feature. For example, after reading the restaurant scenario, participants chose between purchasing from the restaurant that no longer served sustainably-sourced food (missing the peripheral feature in version A and the central feature in version B) or from the restaurant that no longer had strong relationships with charities (missing the central feature in version A and the peripheral feature in version B). The scenario explicitly stated that each brand did possess the other features of the original brand. All participants chose between the same two changed restaurants, regardless of which version of the scenario they read (A or B).

Participants then rated how much each of the two changes disrupted the identity of the brand, on a scale of 0 (*exact same brand*) to 100 (*completely different brand*). Finally, participants reported how plausible they felt the scenario was, on a scale of 0 (*not at all plausible*) to 100 (*extremely plausible*).

## Results

According to hypothesis 1, changes to causally central features should have a larger negative impact on brand loyalty. Thus, we predicted that subjects should be more likely to choose to purchase from the brand missing the causally peripheral feature than the causally central feature. This is indeed what we found. For example, fewer participants chose to purchase from the restaurant that no longer had relationships with charitable organizations when this feature was causally central (52%, 16 out of 31 participants) than when these relationships were described as peripheral (86%, 25 out of



29 participants). Across all scenarios, participants chose to purchase from the brand missing the causally peripheral feature (65% of selections) over the brand missing the causally central feature (35% of selections, binomial sign test,  $p < .01$ ). Detailed results for each scenario are provided in Table 1.

**TABLE 1**

PROPORTION (NUMBER) OF CHOICES OF BRAND MISSING CENTRAL VS. PERIPHERAL FEATURES, BY SCENARIO VERSION IN STUDY 2

Scenario	Features	Version A	Version B
Scenario 1	Charitable	.52 (16) (central)	.86 (25) (peripheral)
	Sustainability	.48 (15) (peripheral)	.14 (4) (central)
Scenario 2	CEO	.57 (17) (central)	.83 (25) (peripheral)
	Design Team	.43 (13) (peripheral)	.17 (5) (central)

Hypothesis 2 predicts that changes to causally central features will disrupt brand identity more than changes to causally peripheral features. Consistent with this hypothesis, participants rated changes to causally central features of a brand as more disruptive to brand identity than changes to causally peripheral features, ( $M_{central} = 62.07$ ,  $M_{peripheral} = 45.77$ , 95% CI = [6.27 26.33],  $t(59) = 3.251$ ,  $p = .002$ ).

To examine whether disruption to identity predicted choice of the brand that was missing the peripheral feature (hypothesis 3), we regressed participants' choices on the difference in disruption scores (disruption rating for change in central feature – disruption rating for change in peripheral feature). Using logistic regression analysis with standard errors clustered by participant, we find that the difference in disruption scores strongly predicted participants' choices (Wald = 20.82, Odds Ratio = .98,  $z = -4.56$ ,  $p < .001$ ). Participants were more likely to choose the brand that was missing the causally

peripheral feature to the extent that they perceived that a change to the causally central feature disrupted brand identity more than a change to a causally peripheral one.

The plausibility of the scenarios was high ( $M = 75.63$ ). A logistic regression with standard errors clustered by participant revealed that participants were marginally more likely to choose the brand that was missing the causally peripheral feature to the extent that they felt that the scenario was plausible (Wald = 3.63, Odds Ratio = .98,  $z = 1.90$ ,  $p = .057$ ), suggesting that participants' use of the causal information in the scenarios was moderated by their own beliefs about what causal relationships were likely to occur. However, the difference in disruption to identity scores continued to moderate the effect of causal centrality of change on loyalty (Wald = 24.19, Odds Ratio = .98,  $z = 4.39$ ,  $p < .001$ ) even controlling for plausibility, and plausibility did not moderate the results (Wald = .35, Odds Ratio = .96,  $z = .59$ ,  $p > .05$ ).

## Discussion

The results of study 2 replicate the results of study 1, using a manipulation of causal centrality. When a feature was manipulated to be causally central, a change to that feature had a more negative impact on brand loyalty than when the exact same feature was manipulated to be causally peripheral. The manipulation also influenced perceived disruption to identity—a change to a feature was more disruptive to the brand's identity when the feature was presented as causally central than when it was presented as causally peripheral. Further, we found that perceived disruption to identity scores predicted the

preference for brands retaining causally central features, providing evidence for our proposed mechanism.

### **STUDY 3: MANIPULATION OF CAUSAL CENTRALITY IN SERIAL BRANDS**

Study 2 investigated brands that typically maintain a stable brand image over time (restaurants and automobiles), and for whom changes may be seen as violating expectations or generally undesirable. However, some brands operate in categories in which consumers expect ongoing changes. Study 3 expands our investigation into one type of serial brand, sports teams. Since sports teams constantly undergo changes to various features (e.g., lineup, ownership, strategy, win-loss record), understanding which changes will impact brand loyalty is particularly useful for these types of brands.

As in study 2, participants read two scenarios, each about hypothetical sports teams that were described as being their favorite team. The scenarios described the structure of the team as having one feature that was causally connected to three other features. For example, one scenario described a sports team, the Great Bay Foxes, that had four key features: a popular star player, a winning record, die-hard fans, and one of the nicest stadiums in the league. In version A, the star player was causally central, as his presence on the team was causally connected to the other three features. His talent was what allowed the team to gain its fans and accomplish their winning record, and his popularity led the owners to build a nice, new stadium for the team—a point of pride for fans. In version B, the winning record, which had been peripheral in version A, was instead described as being causally central, causally connected to all the other features. In

version B, the winning record attracted the team's die-hard fans and allowed the team to recruit their talented star player (who was causally peripheral in this version). It was also the team's success (winning record) that led the owners to build the team their nice, new stadium.

A second scenario described a team with four key features: location (city), owners, star player, and mascot. In version A, the location was described as causally central and the owners were described as peripheral. In version B, the owners were described as central and the location was described as peripheral.

*Procedure.* Sixty U.S. Amazon Mechanical Turk participants read two scenarios that described the causal structure of a hypothetical brand. Similar to study 2, participants chose which of two teams they would rather purchase a ticket to see play. Each of the two changed teams was missing one of the features described in the scenario—e.g., would they rather purchase a ticket to see the Great Bay Foxes who no longer had their star player or the Great Bay Foxes who no longer had a winning record? Participants then rated how much each of the two changes disrupted the identity of the team, on a scale of 0 (*exact same brand*) to 100 (*completely different brand*). Finally, participants reported how plausible they felt the scenario was, on a scale of 0 (*not at all plausible*) to 100 (*extremely plausible*).

## Results

The results replicated study 2 in the context of serial brands. Consistent with hypothesis 1, changing a feature of the team was more damaging to loyalty when that

feature was described as causally central than when it was described as causally peripheral. For example, fewer participants chose to purchase a ticket to see the team that no longer had the star player when this feature was causally central (48%, 14 out of 29 participants) than when the departing star player was described as peripheral (68%, 21 out of 31 participants). Across all scenarios, participants preferred to purchase tickets to see the team missing the causally peripheral feature (61.5%) than to see the team missing the causally central feature (38.5%, binomial sign test,  $p < .05$ ). Detailed results for each scenario are presented in Table 2.

**TABLE 2**

PROPORTION (NUMBER) OF CHOICES OF THE TEAM MISSING THE CENTRAL VS. PERIPHERAL FEATURE BY SCENARIO VERSION IN STUDY 3

Scenario	Features	Version A	Version B
Scenario 1	Star Player	.48 (14) (central)	.68 (21) (peripheral)
	Winning Record	.52 (15) (peripheral)	.32 (10) (central)
Scenario 2	Location	.03 (1) (central)	.29 (9) (peripheral)
	Ownership	.97 (28) (peripheral)	.71 (22) (central)

The results of the disruption to identity analyses also replicated those of study 2. Consistent with hypothesis 2, participants rated changes to causally central features of a team to be more disruptive to brand identity than changes to causally peripheral features, ( $M_{central} = 52.15$   $M_{peripheral} = 38.79$ , 95% CI = [4.08 22.64],  $t(59) = 2.88$ ,  $p < .01$ ). A logistic regression analysis with standard errors clustered by participant revealed that the difference in disruption scores predicted participants' choices (Wald = 5.63, Odds Ratio

= .99,  $z = -2.37$ ,  $p = .02$ ). Participants were more likely to choose the team that was missing the causally peripheral feature to the extent that they perceived that a change to a causally central feature disrupted team identity more than a change to a causally peripheral one.

The mean plausibility of the scenarios was high ( $M = 77.63$ ). A logistic regression with standard errors clustered by participant revealed that plausibility scores did not predict participants' choices (Wald = 2.38, Odds Ratio = 1.99,  $z = 1.54$ ,  $p > .05$ ).

Study 3 expands our findings to a type of serial brand, sports teams. Participants preferred to remain loyal to a team that was missing a causally peripheral feature but retained a causally central one than to a team that was missing a causally central feature but retained a causally peripheral one. These results provide further evidence for our framework and suggest that the effect of causal centrality on sensitivity to change extends to serial brands, which are expected to change over time.

#### **STUDY 4: MANIPULATING THE STRENGTH OF CAUSAL RELATIONSHIPS ALSO INFLUENCES BRAND LOYALTY**

Our approach to brand loyalty, thus far, has focused on beliefs about the number of causal relationships that exist between features of a brand. Some models of categorization as causal reasoning (e.g., Sloman et al. 1998) suggest that the strength of a feature's causal links also determine how defining it is to a concept. That is, if a feature has a strong influence on a set of other features, it will be more defining of a concept than a feature that only has a weak influence on the same set of other features. In study 4, we

examine whether beliefs about causal relationship strength influence how much a change to a feature harms brand loyalty.

To manipulate the causal strength of the links that a feature is attached to, holding constant the number of links, we leveraged two well-established phenomena in causal reasoning, causal discounting and causal augmentation. Causal discounting occurs when people know that a given cause is present, leading them to discount the presence of another alternative cause (Morris and Larrick 1995; Nisbett and Ross 1980; see Pearl 2000 for a normative account of causal discounting). For example, if a person observes an effect (e.g., someone squinting), knowing that one cause is present (e.g., it's sunny) will lead her to discount the presence of alternative causes (e.g., the person has bad eyesight) even when the causes are not mutually exclusive. Causal augmentation occurs when people know that a factor inhibits an observed effect, leading them to believe that a cause is stronger or more likely to be present (Olson 1992, note that this phenomenon is not the same Pearl's causal augmentation). For example, if a person observes an effect (e.g., someone has a fever), knowing that another factor is inhibiting that effect (e.g., that person took a fever reducer) will lead her to increase her estimate of the presence of the cause (e.g., the flu) or the strength of the causal relationship between the cause and effect.

## Method

*Materials.* In study 4, we presented participants with two scenarios that described one feature as the cause of two other features. For example, in one of the scenarios, the team's star play was responsible for their winning record, die-hard fans, and brand new

stadium. We manipulated the causal strength of the relationships that the cause feature participated in by introducing a new feature (the star's teammates) and relating it to the effect features either via causal discounting or causal augmentation. In the discounting version, we told participants that the feature also caused (or facilitated) the effect features. For example, the teammates were also good athletes who were popular with fans, and they contributed to causing the team's winning record, die-hard fans, and brand new stadium.

In the augmentation version, the feature inhibited the effect features. For example, the star's teammates were not very good athletes and were unpopular. So, the team had its winning record, die-hard fans, and new stadium *despite* the teammates. The introduction of the new feature decreases the strength of the original cause feature's relationship to the effects in the discounting version but increases the strength of the original cause feature's relationship to the effects in the augmentation version. Unlike studies 2 and 3, the two versions present the exact same relationships among the focal features. The only difference in the stimuli between versions is the description of the relationship of an alternative feature as either inhibiting (augmentation version) or facilitating (discounting version) the effects.

*Procedure.* Sixty-one U.S. Amazon Mechanical Turk participants read two short scenarios about teams similar to those used in study 3 in which one feature (the cause feature) was described as the cause of three other features (the effect features). As in studies 2 and 3 the scenarios were accompanied by a diagram of the causal structure. After reading the scenario, participants read about a new feature that either facilitated the effect features (discounting version) or inhibited the effect features (augmentation



version). Participants read the discounting version for one team and the augmentation version for the other team, with the identity of the teams counterbalanced and order randomized.

After reading each scenario, participants answered a question about what the causal relations were in that scenario, to test their comprehension. Then they evaluated how much a change to the cause feature would 1) disrupt their loyalty to the team, and 2) change the identity of the team. Participants reported change in loyalty on a scale of 1 (*would decrease loyalty*) to 7 (*would increase loyalty*).

## Results

We performed paired t-tests to compare the changes in loyalty and perceived disruption to identity between the discounting and augmentation versions. Consistent with hypothesis 1, changing the feature had a larger negative impact on loyalty (smaller numbers indicate less favorable outcomes) in the augmentation version ( $M = 2.66$ ) than in the discounting version ( $M = 3.33$ ,  $t(60) = 3.49$ ,  $p < .001$ , 95% CI = [.29 1.06]).

Consistent with hypothesis 2, the average perceived change in the team's identity after the change was significantly greater in the augmentation version ( $M = 75.30$ ) than in the discounting version ( $M = 64.28$ ,  $t(60) = 3.57$ ,  $p < .001$ , 95% CI = [4.85 17.19]).

We conducted a within-participant mediation analysis using the MEMORE macro in SPSS (Montoya and Hayes 2017) to test whether the effect of version (discounting vs. augmentation) on post-change loyalty was mediated by perceived disruption to identity. This analysis revealed a marginal indirect effect of the manipulation on loyalty through

perceived disruption to identity (standardized indirect effect = .209, Bootstrapped 95% CI = [.00 .57]). The indirect effect accounted for about one-third of the total effect (indirect effect/total effect = .312).

The results of study 4 suggest that the perceived strength of a feature's relationships with other features of a brand influence how harmful changing that feature will be on brand loyalty. We found that when the strength of a feature's causal links are manipulated to appear strong, changing that feature leads to more damage to brand loyalty and more disruption to brand identity than when the strength of that feature is manipulated to appear weak, holding constant the number of links to other features. This suggests that the causal centrality of a brand's feature is determined by both the number of relationships to other features and the strength of those relationships. This broader understanding of causal perceptions can provide insight into what consumers believe defines brand identity and see as the basis of their loyalty.

## **GENERAL DISCUSSION**

Why is consumers' loyalty to a brand unaffected by some changes but disrupted by other changes? Our findings suggest that the answer lies in consumers' beliefs about causal centrality, which underlie much of cognition. Prior research has neglected to account for the role of causal beliefs about brand features in studying consumer loyalty and responses to brand changes.

Across six studies, we found that changes to features that consumers perceive as causally central have a more negative impact on brand loyalty than changes to features perceived as more causally peripheral. These findings were replicated with both real and

hypothetical brands that spanned many product categories, using both measured and manipulated causal centrality. Further, we identified perceived disruption to the identity of the brand as the underlying mechanism for the effect. Studies 1B and 1C demonstrated that changes to causally central features were perceived as more disruptive to brand identity and that the greater the perceived disruption, the more negative the impact on brand loyalty. These findings were confirmed in studies 2 and 3 when we manipulated causal centrality and examined the impact of causal centrality on choice. In an internal meta-analysis incorporating all data that we have collected (including pilot studies reported in Appendix B), the effect of causal centrality on choice was highly significant (62% of selections of option missing causally peripheral feature vs. 38% of selections of option missing causally central feature, binomial sign test,  $p < .001$ ), as was the effect of causal centrality on disruption to identity ( $M_{central} = 55.12$ ,  $M_{peripheral} = 43.44$ ,  $t(479) = 5.18$ ,  $p < .001$ ).

In study 4, we demonstrated that another aspect of consumers' causal beliefs, beliefs about the strength of a feature's causal relationships, influences how harmful a change to that feature was to brand loyalty. Manipulations that strengthened a feature's causal links made changes to that feature more damaging than when the causal links were manipulated to appear weaker, holding the number of links constant.

#### Incorporating causal centrality into prior theories of brand loyalty

The proposed causal reasoning approach to brand identity provides a new perspective on prior findings about brand change. Prior research on consumer-brand

relationships has examined the impact of transgressions on these relationships. Our framework may provide a new perspective on some of these previous results. For example, Aaker et al. (2004) found that while a sincere brand's relationship with its customers is damaged by a service failure, an exciting brand's relationship may be strengthened after such a transgression. The transgression can be thought of as a change in the brand's perceived reliability. We suspect that, for a sincere brand, the brand's personality is causally connected to its reliability. On the other hand, for an exciting brand, brand personality would be less likely to be perceived as causally connected to its reliability, and could even be causally connected to variety and unpredictability, or other factors suggesting unreliability. As a result, reliability would be more causally peripheral for the exciting brand than the sincere brand. Thus, our framework would predict that a change in reliability would disrupt the identity of the sincere brand more than the exciting brand.

Research on audience dissipation of a serial brand (a television show) has proposed that removing and adding components in a way that diminishes the perceived coherence of the show is a key factor that leads fans to abandon the brand (Parmentier and Fischer 2014). In their study of America's Next Top Model, they suggest that the addition of components to the show that increase heterogeneity among the brand's components—e.g., inclusion of contestants who are not eligible according to the rules of the show—diminishes perceived coherence. According to our framework, coherence would be lost when new features are added that are not causally connected to existing features. Conversely, increasing heterogeneity would not reduce coherence when consumers are able to make causal connections between the new features and the existing

features of the brand. For example, if the ineligible contestant was introduced in a way that was explained by the show's mission to find America's Next Top Model, perceived coherence would be maintained and the brand identity could be preserved. In general, our account suggests that preserving identity or keeping a brand coherent involves maintaining central cause-effect relationships.

#### Implications for future research

We provide a broad framework for identifying which changes are more likely to disrupt brand loyalty. Our findings suggest that two brands can undergo the same change to the same feature but experience very different results on brand loyalty because consumers' causal beliefs about features of the brands are different. This implies that some of the value of an aspect of a brand lies in its causal connections to other important features of a brand. How much consumers value a brand's relationships with charities does not only depend on the relationships themselves. The full value also depends on whether consumers see the relationships as resulting from or causing other features that make the company what it is as a brand.

While much of the brand loyalty literature has focused on direct consumer experiences and the resulting consumer satisfaction as the drivers of brand loyalty (Agustin and Singh 2005; Anderson and Sullivan 1993; Chandrashekran et al. 2007; Yim, Tse, and Chan 2008), we instead focus on consumers' beliefs about the cause-effect relationships that make up a brand's identity. This approach allowed us to identify novel factors that impact brand loyalty which are independent of consumers' direct experience

with the brand or its products and their evaluations of these experiences. Prior research has attempted to quantify brand value and identify the benefits to the firm of having higher brand value (e.g., Reichheld et al. 2000; Sullivan 1992). Our approach to brand loyalty suggests that maintaining the perceived identity of the brand, by preserving causally central features, may be crucial for maintaining brand value over time.

That said, we suspect that there may be several important boundary conditions. In product categories where brands are seen as purely commodities or among consumers who do not incorporate brand into their decisions, changes in even causally central features may have little impact. Furthermore, in some circumstances, even changes to causally central features of the brand could maintain or even enhance brand loyalty. If the change to the feature provides a sufficiently large benefit to the consumer, then it may outweigh the disruptive effects on brand identity. If the brand is seen negatively or as on the wrong track and facing a bleak future, then changes to more causally central features may be welcomed. Similar to people's openness to personal change when pessimistic about future outcomes (Yang and Urminsky 2015), even purely symbolic but causally central brand changes may signal that a declining brand is breaking with its past and therefore more likely to improve.

Our results also have implications for understanding to build brand identity. In contrast to approaches to brand identity that focus on associations to the brand as a whole (D. Aaker 1991; Keller 2001), our results suggest that consumers' perceptions of brand identity include beliefs about feature-feature relationships. In studies 2, 3, and 4, changing the exact same feature had different impacts on the brand's identity depending on consumers' beliefs about the feature's causal relationships with other brand features.

Investigating how marketing managers can use these (beliefs about) feature-feature relationships as a tool to build brand identity is an interesting avenue for future research.

## Conclusions

The current research provides a framework for understanding how to maintain brand loyalty. Our findings suggest that consumers' causal beliefs 1) have a systematic impact on which features they perceive as being most important to a brand's identity and, 2) can inform managers about what changes are most likely to negatively impact brand loyalty. Maintaining brand loyalty requires understanding the causal connections that make up the brand's identity in the minds of the consumers and preserving the causally central features that define the brand.

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## Appendix A: Study Stimuli

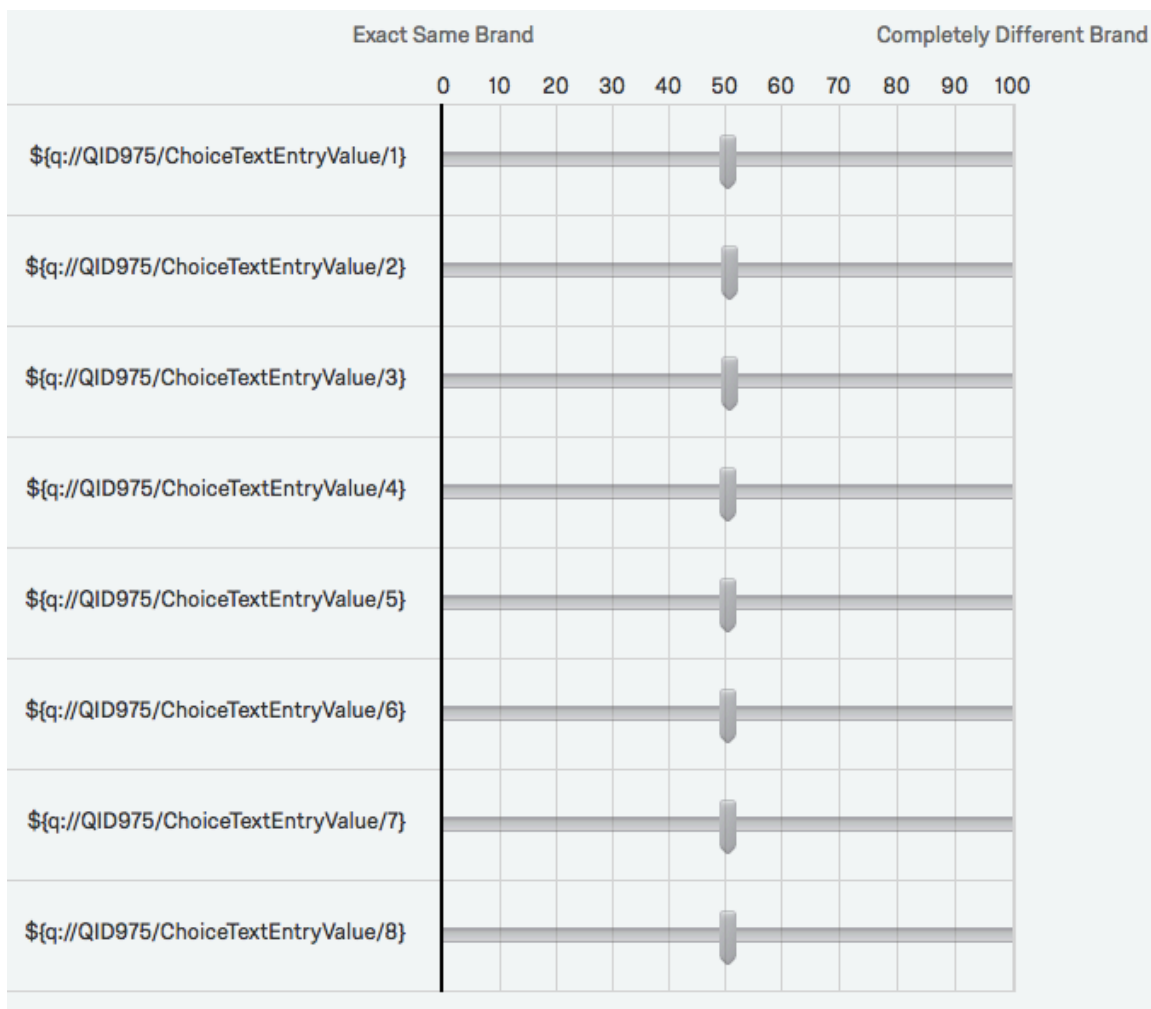
### Studies 1A-1C

Disruption to brand identity scale (Studies 1A and 1C)

*We would now like to understand how a change in each of the aspects you previously listed would change the identity of the brand.*

*That is, for each of the aspects below, imagine that [brand] is completely different on that dimension. Do you think that [brand] would be the same brand that it is now, or would it seem like a different brand?*

*Please indicate your answer with each of the sliders below where 0 means, "Exact same brand," and 100 means, "Completely different brand."*



### Brand loyalty scale (Studies 1B and 1C)

Original brand loyalty question (beginning of survey)

*We will now ask you some questions to get a better understanding of your level of loyalty to [brand]. Thinking of [brand], please tell us how much you agree or disagree with the following statements on a scale of 1 to 7 where 1 means, "strongly disagree," and 7 means, "strongly agree."*

Brand loyalty question for each change (end of survey)

*We would now like to understand how a change in each of the aspects you previously listed would change **your use of the brand**.*

*That is, for each of the aspects below, imagine that [brand] is completely different on that dimension and answer the two questions about your use of the brand given the change to that aspect only.*

*Think about this aspect of [brand]: [aspect]*

*Imagine that [brand] is no longer [aspect]. Please answer the following questions for this new version of the brand.*

	Strongly disagree		Neither agree or disagree			Strongly agree	
	1	2	3	4	5	6	7
This is the only brand of this product that I will buy.							
If this brand is sold out, I'll postpone buying rather than buying another brand.							

## Study 2

### Scenarios

Version A	Version B
<p data-bbox="235 380 781 436">Imagine that Farm Basics is your favorite chain for casual dining.</p> <p data-bbox="235 470 808 924">Farm Basics is a casual dining restaurant chain that is well-known for being committed to giving back to the community and working closely with charities and organizations. It has built a lot of strong relationships with local charities as well as organizations that are committed to protecting the environment and to improving the health of individuals. Because of its relationships with these charities and organizations, Farm Basics serves very high-quality, healthy food and has become very popular. In addition, the various charities and organizations that Farm Basics works closely with have shaped Farm Basics' values and the brand has become committed to serving sustainable, locally-sourced food.</p>	<p data-bbox="833 380 1380 436">Imagine that Farm Basics is your favorite chain for casual dining.</p> <p data-bbox="833 470 1417 863">Farm Basics is a casual dining restaurant chain that is committed to serving sustainable, locally-sourced food. Because of its use of sustainable and locally-sourced food, the chain serves very high-quality, healthy food and has become very popular. In addition, because of its use of sustainable, locally-sourced foods it has built a lot of strong relationships with local charities as well as organizations that are committed to protecting the environment and to improving the health of individuals. Farm Basics is well-known for being committed to giving back to the community and working closely with these charities and organizations.</p>
<p data-bbox="235 957 781 1045">Imagine that Arch Automotive is your favorite car company. You are extremely loyal to this brand of car.</p> <p data-bbox="235 1079 800 1434">Arch Automotive's CEO is Jill Pane. Pane is a very visible and popular public figure. When she took over the company, she instilled on the company an emphasis on making only the highest quality products--Arch Automotive's products are known to be extremely reliable and to have extremely long lives. The company is also known for its very powerful design team whose members are widely regarded as being the best in the business. This team was largely recruited and put together by the CEO; many team members have expressed how lucky they feel to work with Pane.</p>	<p data-bbox="833 957 1380 1045">Imagine that Arch Automotive is your favorite car company. You are extremely loyal to this brand of car.</p> <p data-bbox="833 1079 1417 1434">The company is known for its very powerful design team whose members are widely regarded as being the best in the business. This team was largely responsible for recruiting the company's current CEO, Jill Pane. Pane is a very visible and popular public figure who has expressed how lucky she feels to work with the team. The design team is also responsible for the company's high quality products. The team has instilled on the company an emphasis on making only the highest quality products--Arch Automotive's products are known to be extremely reliable and to have extremely long lives.</p>

Choice of brand to purchase from (Version A top scenario from above table)

Below is the information you previously read about your favorite restaurant chain, Farm Basics.

Imagine that Farm Basics is your favorite chain for casual dining.

Farm Basics is a casual dining restaurant chain that is well-known for being committed to giving back to the community and working closely with charities and organizations. It has built a lot of strong relationships with local charities as well as organizations that are committed to protecting the environment and to improving the health of individuals. Because of its relationships with these charities and organizations, Farm Basics serves very high-quality, healthy food and has become very popular. In addition, the various charities and organizations that Farm Basics works closely with have shaped Farm Basics' values and the brand has become committed to serving sustainable, locally-sourced food.

This information can be summarized as follows:



*Please tell us which brand you would rather purchase a meal from.*

<p>Farm Basics that:  <b>no longer has sustainable, locally-sourced food</b>          (but has the same high-quality, popularity, and relationships          with charities/organizations)</p>	<p>Farm Basics that:  <b>no longer has relationships with charities/organizations</b>          (but still has the same high quality, sustainable, locally-          sourced food, and popularity)</p>
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### Study 3

#### Scenarios

Version A	Version B
<p data-bbox="235 380 764 436">Imagine that the Great Bay Foxes is your favorite sports team.</p> <p data-bbox="235 470 808 741">The team's enormously popular star player, Jake Donnelly, is largely credited with attracting the team's die-hard fans and as the cause of the team's tremendous success—they have had a winning record for almost as long as anyone can remember. A few years ago, the owners built a new stadium because of Jake's popularity. This stadium has become a point of pride for fans of the Foxes—it's largely regarded as the nicest stadium in the league.</p>	<p data-bbox="834 380 1364 436">Imagine that the Great Bay Foxes is your favorite sports team.</p> <p data-bbox="834 470 1406 772">The team's tremendous success—they have had a winning record for almost as long as anyone can remember—is largely credited with attracting the team's die-hard fan base and ability to attract great players like the team's enormously popular star player, Jake Donnelly. A few years ago, because of the team's success, the owners built a new stadium. This stadium has become a point of pride for fans of the Foxes—it's largely regarded as the nicest stadium in the league.</p>
<p data-bbox="235 779 803 835">Imagine that the New City Canaries are your favorite sports team.</p> <p data-bbox="235 869 808 1050">The team's mascot is a canary because, as a former mining town, the canary has historical significance to the city. The owners of the Canaries always say that they bought the team because they love the New City. The Canary's beloved star player also started playing for the team because he loved the city.</p>	<p data-bbox="834 779 1401 835">Imagine that the New City Canaries are your favorite sports team.</p> <p data-bbox="834 869 1398 1075">The team's mascot is a canary because one of the owner's favorite birds is a canary. The owners of the Canaries selected New City as the home of the Canaries because they loved the city. The Canary's beloved star player started playing for the team because he formerly had a great relationship with a few of the owners and wanted to work with them.</p>

Choice of team to purchase ticket to watch (Version A top scenario from above table)

Below is the information you previously read about your favorite sports team, the Great Bay Foxes.

The team's enormously popular star player, Jake Donnelly, is largely credited with attracting the team's die-hard fans and as the cause of the team's tremendous success—they have had a winning record for almost as long as anyone can remember. A few years ago, the owners built a new stadium because of Jake's popularity. This stadium has become a point of pride for fans of the Foxes—it's largely regarded as the nicest stadium in the league.

This information can be summarized as follows:



Please tell us which team you would rather buy a ticket to watch.

The Great Bay Foxes that:  
**no longer has a winning record**  
 (but has the same die-hard fans, great stadium, and Jake Donnelly)

The Great Bay Foxes that:  
**Jake Donnelly no longer plays for**  
 (but has the same die-hard fans, great stadium, and winning record)

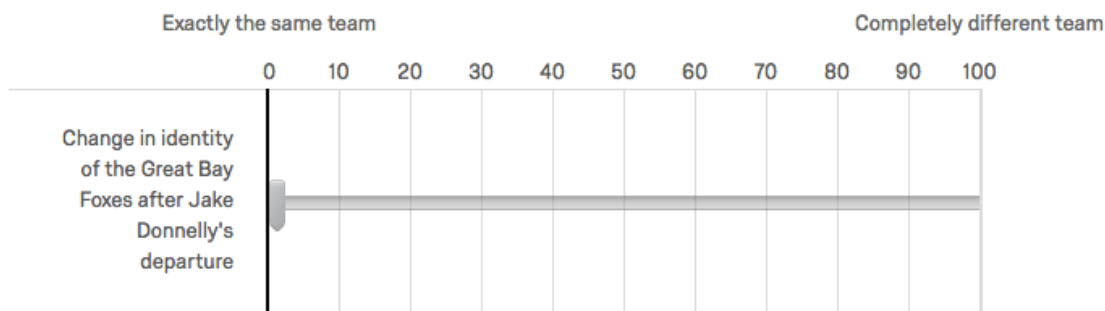
## Study 4

### Scenarios

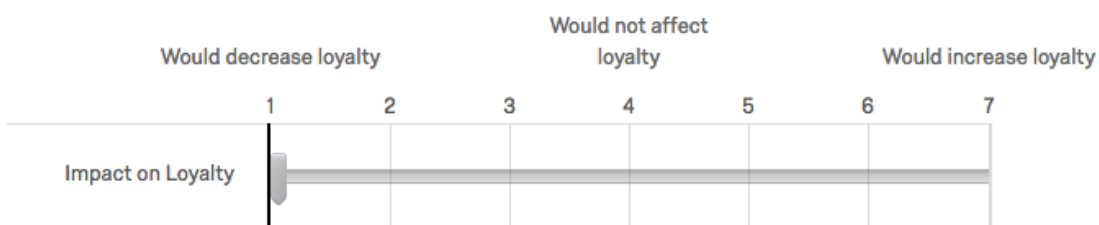
Scenario	Discounting and Augmentation Manipulation
<p data-bbox="253 390 781 449">Imagine that the Great Bay Foxes is your favorite sports team.</p> <p data-bbox="237 483 797 783">The team's very popular star player, Jake Donnelly, is an important part of who the team is. He is largely credited with attracting the team's die-hard fans and as the cause of the team's tremendous success—they have had a winning record for almost as long as anyone can remember. A few years ago, the owners built a new stadium because of Jake's popularity. This stadium has become a point of pride for fans of the Foxes—it's largely regarded as the nicest stadium in the league.</p>	<p data-bbox="824 346 1390 583"><b>Discounting</b> As you read on the previous screen, the Great Bay Foxes' star player is responsible for the team's stadium, die-hard fans, and success (winning record). The team also has its fans, stadium, and success because a number of Jake's teammates are quite good athletes--often heavily supporting Jake's efforts in the team's victories--and are very popular with the fans.</p> <p data-bbox="824 621 1414 856"><b>Augmentation</b> As you read on the previous screen, the Great Bay Foxes' star player is responsible for the team's stadium, die-hard fans, and success (winning record). The team has its fans, stadium, and success despite the fact that a number of Jake's teammates are quite poor athletes--often making Jake carry the team to victory himself--and are very unpopular with the fans.</p>
<p data-bbox="266 926 769 984">Imagine that the New City Hurricanes are your favorite sports team.</p> <p data-bbox="237 1047 797 1413">The beloved coach of the New City Hurricanes is an important part of who the team is. The Hurricanes are known for their creative and unusual game strategy which their coach is known for. The Hurricanes are known to be an especially tight-knit team. This is largely attributed to the coach who has always had a philosophy of treating the members of the New City Hurricanes community as family. Hurricanes games are known to be very fun and lively. This is also attributed to the coach's great enthusiasm for the sport and his team which is always obvious to anyone who sees him at a game.</p>	<p data-bbox="824 865 1414 1165"><b>Discounting</b> As you read on the previous screen, the New City Hurricane's coach is responsible for their creative game strategy, the tight-knit nature of the team, and the lively atmosphere of their games. The owners of the New City Hurricanes share a similar perspective on the sport and encouraged the coach to be creative and take risks with strategy. The owners are very passionate about the Hurricanes and also contribute to the tight-knit nature of the team and the lively atmosphere of the games.</p> <p data-bbox="824 1173 1414 1493"><b>Augmentation</b> As you read on the previous screen, the New City Hurricane's coach is responsible for their creative game strategy, the tight-knit nature of the team, and the lively atmosphere of their games. The team has its creative strategy, tight-knit nature, and lively atmosphere despite the fact that the owners of the team are largely detached from and unenthusiastic about the team, seeing their ownership as purely a business venture and not cultivating real relationships with anyone on the team. They also discouraged the coach's creativity, pushing for less risky strategies.</p>

Change in loyalty and disruption to team identity questions (top scenario in above table, these questions are identical for the discounting and augmentation versions)

*Now please tell us how much you think the departure of Jake Donnelly would affect the Great Bay Foxes' identity as a team. Please answer on a scale of 0 to 100 where 0 means that the team would remain "exactly the same team" after the move, and 100 means that the team would be a "completely different team" after the move.*



*Imagine now that the Great Bay Foxes' star player, Jake Donnelly, is moving to play for another team. How much do you think that this change would affect your loyalty to the team? Please answer on a scale of 1 to 7 where 1 means that the change "would decrease your loyalty" and 7 means that the change would "increase your loyalty."*



## Appendix B: Additional Studies

### Causal Centrality of Brand Features and Change in Loyalty (Study 1A) Pilot Study

As an initial test of our hypothesis that changes to features perceived as more causally central would be more harmful to brand loyalty than changes to features perceived as more causally peripheral, we ran a study identical to study 1A (N = 100). Data from 14 participants were dropped for failing an attention check (6) and giving all the same answer for the change in loyalty question (8), yielding 86 cases. As in study 1A, participants reported the eight features of a brand that they are loyal to and the causal centrality of each of these features. They then considered a change to each feature separately and indicated how much a change to that feature would change their loyalty to the brand. We calculated the Spearman correlation between the causal centrality of a feature and how much a change to that feature would change brand loyalty for each participant. Since greater disruption to identity was indicated by larger numbers and more harm to brand loyalty was indicated by smaller numbers, we expected an average correlation coefficient that was significantly less than zero. The average correlation coefficient was directionally but not significantly less than zero ( $M = -.06$ ,  $t(85) = -1.24$ , 95% CI =  $[-.15 .03]$ ,  $p = .22$ ). Based on this pre-test, we determined that a sample size of 100 provided insufficient statistical power, and ran study 1A, with a larger sample size (N=300). When the pre-test data are merged with the data from study 1A, the relationship between the causal centrality of a feature and the impact a change to that feature had on brand loyalty is highly significant. The average correlation coefficient was significantly less than zero ( $M = -.13$ ,  $t(352) = -5.65$ , 95% CI =  $[-.17 -.08]$ ,  $p < .001$ ).

## Manipulating the Causal Centrality of Brand and Team Features (Studies 2 and 3) Pilot Study

Sixty U.S. Amazon Mechanical Turk participants completed the pilot study. The procedure of the pilot study was identical to that of studies 2 and 3 except that participants read four scenarios, two about brands and two about teams. The scenarios about teams were identical to those used in study 3 (see Appendix A). The scenarios about brands were different than those used in study 2 (see below table).

### Brand Scenarios Used in Pilot Study

Version A	Version B
<p>Imagine that Cooper Soles is your favorite brand of shoes.</p> <p>Cooper Soles' CEO is Jill Pane. Jill is a very visible and popular public figure. When she took over the company, she instilled on the company an emphasis of giving back, particularly to educational foundations—a cause that Jill is passionate about. The company is known for generously donating to a wide variety of charities and supporting the creation of a new school in an under-served area for every new store that they build. The company known for its trendy personality which is largely considered a reflection of Jill's own personality.</p>	<p>Imagine that Cooper Soles is your favorite brand of shoes.</p> <p>Cooper Soles' CEO is Jill Pane. Jill is a very visible and popular public figure. When she took over the company as CEO, she said she took the job because of the company's dedication to giving back, particularly to educational foundations—a cause that Jill is passionate about. The company is known for generously donating to a wide variety of charities and supporting the creation of a new school in an under-served area for every new store that they build. The company has a trendy personality which is largely attributed as a reflection of the current trendiness of companies that are partnered with charities.</p>
<p>Imagine that SonicWear is your favorite athletic clothing company.</p> <p>SonicWear is known for producing very high quality athletic clothing. Because of the high quality of all the materials (which are highly durable) the clothing always looks great for a long time. Because SonicWear is known for being such a high quality brand, it has been able to attract some of the best designers in the business into its design team as well as some of your favorite athletes as spokespeople for the company.</p>	<p>Imagine that SonicWear is your favorite athletic clothing company.</p> <p>SonicWear is known for producing very high quality athletic clothing. The high quality is attributed to their design team who believes high quality materials (which are highly durable) are a must. Because SonicWear's designers are some of the best designers in the business, the brand is known for making clothing that looks great for a long time and has been able to attract some of your favorite athletes to be spokespeople for the company.</p>

*Overall Analysis.* Overall, participants were more likely to purchase from the team or brand that was missing the causally peripheral feature (but retained the causally central feature, 61.67% of selections) than the team or brand that was missing the causally central feature (but retained the causally peripheral feature, 38.33% of selections, binomial sign test,  $p < .01$ ). A change in a causally central feature was perceived to cause more disruption to a brand or team's identity ( $M = 53.29$ ) than a change in a peripheral feature ( $M = 44.73$ ,  $t(60) = 2.56$ ,  $p = .012$ , 95% CI = [1.97 15.16]).

*Brand Analysis.* Analysis of data from the brand scenarios revealed that participants were directionally but not significantly more likely to purchase from the brand that was missing a causally peripheral feature (but retained the causally central feature, 55.00% of selections) than the brand that was missing a causally central feature (but retained the causally peripheral feature, 45.00% of selections, binomial sign test,  $p = .16$ ). Changes in causally central features were perceived as marginally more disruptive to a brand's identity ( $M = 55.17$ ) than changes in peripheral features ( $M = 47.12$ ,  $t(60) = 1.76$ ,  $p = .083$ , 95% CI = [-1.08 17.18]).

Given that these data were inconclusive and underpowered, in designing the materials for study 2, we created different scenarios that had different pairs of target features. The results from the scenario about SonicWear (in the above table) revealed that participants reacted more strongly to changes to the quality of the brand, regardless of that feature's centrality—i.e., participants almost always chose to purchase from the brand that retained high quality (and had a different CEO) whether or not quality was causally central or peripheral (approximately 90% of selections in both versions). This

indicated to us that the effect of our causal centrality manipulation may have been limited because consumers' perceived the cost of a change in quality as large relative to the cost of changing the CEO (see General Discussion for discussion of a similar boundary condition). So, when designing scenarios for study 2, we tried to match the target features more evenly.

When these pilot data were merged with those from study 2, the influence of causal centrality on both choice and disruption to identity was highly significant. Participants were significantly more likely to purchase from the brand that was missing a causally peripheral feature (but retained the causally central feature, 60.00% of selections) than the brand that was missing a causally central feature (but retained the causally peripheral feature, 40.00% of selections, binomial sign test,  $p < .001$ ). The proportion of choices of the brand that was missing the causally peripheral feature vs. the brand that was missing the causally central feature did not differ significantly across studies (pilot vs. study 2,  $\chi^2(1) = 2.50$ ,  $p > .05$ ). Additionally, changes in causally central features were perceived as significantly more disruptive to a brand's identity ( $M = 58.13$ ) than changes in causally peripheral features ( $M = 46.06$ ,  $t(119) = 3.58$ ,  $p = < .001$ , 95% CI = [5.40 18.75]). A repeated-measures ANOVA revealed that this effect did not differ by study (pilot vs. study 2), the study by centrality interaction was not significant ( $F(1,118) = 1.48$ ,  $p > .05$ ).

*Team Analysis.* Analysis of data from only the team scenarios revealed that participants were significantly more likely to purchase from the team that was missing the causally peripheral feature (but retained the causally central feature, 68.33% of selections) than the brand that was missing the causally central feature (but retained the causally



peripheral feature, 31.67% of selections, binomial sign test,  $p < .001$ ). Change in causally central features were perceived as marginally more disruptive to a team's identity ( $M = 51.42$ ) than changes in causally peripheral features ( $M = 42.33$ ,  $t(60) = 1.76$ ,  $p = .069$ , 95% CI = [-.73 18.89]).

When these pilot data were merged with those from study 3, the influence of causal centrality on both choice and disruption to identity was highly significant. Participants were significantly more likely to purchase from the team that was missing a causally peripheral feature (but retained the causally central feature, 64.58% of selections) than the team that was missing a causally central feature (but retained the causally peripheral feature, 35.42% of selections, binomial sign test,  $p < .001$ ). Additionally, changes in causally central features were perceived as significantly more disruptive to a brand's identity ( $M = 51.63$ ) than changes in causally peripheral features ( $M = 40.43$ ,  $t(119) = 3.33$ ,  $p < .01$ , 95% CI = [4.53 17.86]).

#### Manipulating the Strength of Causal Relationships (Study 4) Pilot Study

Sixty-one U.S. Amazon Mechanical Turk participants completed the pilot study. The procedure of the pilot study was identical to that of study 4 except that the scenario about the New City Hurricanes (see Appendix A) had different features. In the pilot study the Hurricanes' location was described as being responsible for the team mascot and (recruiting the) star player. The new cause, the owners, was described as either also being responsible for the two effect features (discounting version) or inhibiting the two effect

features (augmentation version). The scenario about the Great Bay Foxes was identical to the one used in study 4 (see Appendix A).

We performed paired t-tests to compare the change in loyalty and perceived disruption to identity that resulted from changing the cause feature for the discounting and augmentation versions. Changing the feature had a larger negative impact on loyalty (smaller numbers indicate less favorable outcomes) in the augmentation version ( $M = 2.72$ ) than in the discounting version ( $M = 3.20$ ,  $t(60) = 2.47$ ,  $p = .016$ , 95% CI = [.09 .86]). The average perceived disruption to the team's identity after the change was marginally greater in the augmentation version ( $M = 66.40$ ) than in the discounting version ( $M = 59.16$ ,  $t(60) = 4.054$ ,  $p = .101$ , 95% CI = [-1.45 15.88]).

When these pilot data were merged with the data from study 4, the difference between both impact on loyalty and perceived disruption were highly significant between the discounting and augmentation versions. Changing the feature had a larger negative impact on loyalty in the augmentation version ( $M = 2.69$ ) than in the discounting version ( $M = 3.26$ ,  $t(121) = 4.23$ ,  $p < .001$ , 95% CI = [.31 .84]). A repeated-measures ANOVA revealed that this effect did not differ by study (pilot vs. study 4), the study by version (discounting vs. augmentation) interaction was not significant ( $F(1,120) = .523$ ,  $p > .05$ ). Similarly, the average perceived change in the team's identity after the change to the cause feature was greater in the augmentation version ( $M = 70.84$ ) than in the discounting version ( $M = 61.72$ ,  $t(121) = 2.44$ ,  $p < .001$ , 95% CI = [3.86 14.37]) and this effect did not differ by study ( $F(1,120) = .512$ ,  $p > .05$ ).

## Appendix C: Additional Analyses

### Study 1A

#### Pearson correlation

We performed the correlational analysis from study 1A with a Pearson correlation instead of a Spearman correlation. The results are similar to those presented in the main manuscript. We found a negative correlation between number of links and change in brand loyalty ( $M_{corr} = -.18$ ,  $t(266) = 5.89$   $p < .001$ , 95% CI = [-.24 -.12]), on average.

#### Analysis with all participants

We performed the correlational analysis from study 1A with all participants—i.e., we included participants who failed the attention checks and gave all the same answers to the change loyalty questions or the number of causal links question. As the correlations cannot be calculated for participants who gave all the same answers, we assigned these participants a correlation of 0 (as would be expected if there were no relationship between causal centrality and disruption to identity). The results are similar to those presented in the main manuscript. We found a negative correlation between number of links and change in brand loyalty ( $M_{corr} = -.18$ ,  $t(300) = 5.88$   $p < .001$ , 95% CI = [-.24 -.12]), on average. Changes to more causally central features were evaluated as more negatively impacting brand loyalty than changes to more peripheral features. The majority of participants (58%) had a negative individual-level correlation between the number of connections a feature had and their rated change in brand loyalty.

### Study 1B

### Pearson correlation

We performed the correlational analysis from study 1B with a Pearson correlation instead of a Spearman correlation. The results are similar to those presented in the main manuscript. We found a positive correlation between number of links and disruption to brand identity ( $M_{corr} = .13$ ,  $t(92) = 2.28$   $p < .05$ , 95% CI = [.02 .24]), on average.

### Analysis with all participants

We performed the correlational analysis from study 1B with all participants—i.e., we included participants who failed the attention checks and gave all the same answers to the disruption to identity questions or the number of causal links question (as described above, participants who gave all the same answers were assigned a correlation coefficient of 0). The results are similar to those presented in the main manuscript. We found a positive correlation between number of links and disruption to brand identity ( $M_{corr} = .13$ ,  $t(98) = 2.45$ ,  $p < .01$ , 95% CI = [.02 .23]), on average. Changes to more causally central features were evaluated as more disruptive to brand identity than changes to more peripheral features. The majority of participants (62%) had a positive individual-level correlation between the number of connections a feature had and how disruptive a change to that feature would be to the brand's identity.

## **Study 1C**

### Pearson correlation

We performed the correlational analysis from study 1C with a Pearson correlation instead of a Spearman correlation. The results are similar to those presented in the main

manuscript. We found a negative correlation between number of links and change in brand loyalty ( $M_{corr} = -.18$ ,  $t(88) = 3.42$   $p < .01$ , 95% CI = [-.28 -.07]), on average. We also found a positive correlation between number of links and disruption to brand identity ( $M_{corr} = .21$ ,  $t(88) = 3.41$   $p < .01$ , 95% CI = [.09 .33]), on average.

#### Analysis with all participants

We performed the correlational analysis from study 1C with all participants—i.e., we included participants who failed the attention checks and gave all the same answers to the disruption to identity questions or the number of causal links question (as described above, participants who gave all the same answers were assigned a correlation coefficient of 0). The results are similar to those presented in the main manuscript.

Changes to causally central features more negatively impacted brand loyalty than changes to more causally peripheral features. The average correlation coefficient was significantly less than zero ( $M_{corr} = -.15$ ,  $t(99) = 3.17$ ,  $p < .01$ , 95% CI = [-.24 -.05]). The majority of participants (54%) demonstrated a negative individual-level correlation between the number of connections a feature had and change in loyalty.

Changes to more causally central features were more disruptive to brand identity than changes to more causally peripheral features. The average correlation coefficient for number of links and disruption to identity was positive ( $M_{corr} = 0.19$ ,  $t(99) = 3.55$ ,  $p < .001$ , 95% CI = [.08 .29]). The majority of participants (66%) had a positive individual-level correlation between the number of connections a feature had and rated disruptiveness of change.