**Dissociation from beloved unhealthy brands decreases preference for and consumption of vegetables**

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**Abstract**

Many people form strong bonds with brands, including those for unhealthy foods. Thus, prompting people to dissociate from beloved but unhealthy food brands is an intuitively appealing means to shift consumption away from unhealthy options and toward healthy options. Contrary to this position, we demonstrate that dissociating from unhealthy but beloved brands diminishes people’s interest in consuming vegetables because the dissociation depletes self–regulatory resources. Across three experimental studies, we manipulate dissociation from two beloved brands both implicitly (studies 1–2) and explicitly (study 3) and observe effects on both preference for vegetables (studies 2–3) and actual vegetable consumption (study 1). In study 1, participants consumed fewer vegetables following dissociation from (vs. association with) a beloved candy brand. Study 2 demonstrates that the effect of depletion on preference for vegetables is more pronounced for those who strongly identify with the brand, as these individuals are most depleted by the dissociation attempt. Finally, study 3 illustrates that the difficulty experienced when trying to dissociate from beloved brands drives the observed effects on vegetable preference and consumption for those who strongly (vs. weakly) identify with the brand.

*Keywords:* Branding, Dissociation, Identity, Self–concept, Self–regulation, Vegetable consumption

**Introduction**

Obesity rates continue to climb worldwide, leading to costly associated public health problems, such as type 2 diabetes and heart disease. A large body of research has converged on the conclusion that an obesogenic environment, in which inexpensive and palatable calorie–dense foods are ubiquitous and food marketing is pervasive for unhealthy foods, plays a key role (e.g., Mokdad et al., 2003; Wadden, Brownell, & Foster, 2002). However, in many countries, policy makers face significant legal and political barriers to curbing unhealthy food marketing (Mello, Studdert, & Brennan, 2006).

One approach public health advocates might apply to improve people’s eating habits is to prompt them to dissociate from unhealthy food and drink brands. Many people form strong bonds with brands (e.g., Fournier, 1998; Russell, Norman, & Heckler, 2004), to the degree that some brands become linked to their self–concept (e.g., Escalas & Bettman, 2003). For example, someone who identifies as Italian might identify with an Italian food brand that allows him or her to make authentic, traditional Italian food at home (Fournier, 1998). If a person has a strong connection with an unhealthy food brand (e.g., McDonald’s, Pepsi, M&M’s), that connection may perpetuate unhealthy eating. Thus, prompting identity–based dissociation (e.g., Berger & Rand, 2008) with beloved unhealthy food brands as a way to curb consumption of these foods is an intuitively appealing strategy. However, we argue that this strategy can backfire, with dissociation from beloved food brands actually decreasing people’s preferences for and consumption of vegetables, one of the healthiest food options.

In this research, we demonstrate that when people dissociate from unhealthy but beloved brands, their interest in consuming vegetables diminishes. This is because dissociating from these brands depletes self–regulatory resources (e.g., Muraven & Baumeister, 2000), which are required to make healthy food choices (Lisjak, Bonezzi, Kim, & Rucker, 2015; Vohs & Heatherton, 2000). We argue that vegetables in particular require available self–regulatory resources because the preference for them is not innate and must be learned (e.g., Ahern et al., 2013; Ahern, Caton, Blundell, & Heatherington, 2014; Birch, 1999; Wertz & Wynn, 2014; Zeinstra, Koelen, Kok, & de Graaf, 2009). Thus, after people dissociate from beloved unhealthy food brands, we observe (1) reduced preference for vegetables (studies 2–3) and (2) an actual decrease in vegetable consumption (study 1). To elucidate the adverse effect of prompting people to dissociate from beloved unhealthy food brands, we begin with a discussion of people’s relationships with brands, then discuss why dissociating from beloved brands is depleting. We continue with a review of the literature on self–regulation and why eating vegetables requires available self–regulatory resources. We then provide the results of three experimental studies and conclude with a discussion of these results.

**Identification with food brands**

The self, or one’s identity, is a psychological knowledge structure that contains information such as one’s personality characteristics (Markus, 1977) and social roles (e.g., being a professor or a daughter) (e.g., Roberts & Donahue, 1994). Much research has supported the pioneering psychologist William James’s (1890) conceptualization of the self as incorporating one’s social relationships, material possessions, and more. For example, people’s group memberships (e.g., Tajfel & Turner, 1986) and close relationship partners (e.g., Aron, Aron, Tudor, & Nelson, 1991) may be included in the psychological self.

In line with this, marketplace brands are also included in the self (e.g., Escalas & Bettman, 2003; Reimann & Aron, 2009). People often form strong relationships with brands, even to the point of thinking of brands as friends or family members (Fournier, 1998). When this occurs, people come to identify with their most beloved brands, incorporating these brands into their psychological selves (Batra, Ahuvia, & Bagozzi, 2012; Trump & Brucks, 2012). Not surprisingly, people tend to prefer and select brands with which they identify (e.g., Perkins & Forehand, 2012). Thus, appealing to people’s identities in marketing messages is a fruitful business tactic, with people responding more favorably to marketing stimuli (e.g., brands, advertisements, products) when marketing messages evoke the self (e.g., Reed, Forehand, Puntoni, & Warlop, 2012). To illustrate, many advertisements (e.g., for detergent, minivans, food) convey that the brand symbolizes what it means to be a good parent, thus attempting to appeal to the parent aspect of the onlooker’s identity.

**The impact of self–brand dissociation on depletion**

Because people are often drawn to brands with which they identify, and the marketing of many brands aims to resonate with people’s identities, weakening identity–based relationships with unhealthy food brands intuitively seems to be an attractive avenue to improve health. However, we argue such a tactic can backfire, leading to decreased interest in consuming vegetables, because dissociating from beloved brands is quite difficult and drains self–regulatory resources. This difficulty people experience when brand relationships are severed is illustrated by loyal followers describing the loss of a brand similarly to interpersonal losses, experiencing mourning or feelings of abandonment (Russell & Schau, 2014).

In this research, we operationalize self–brand dissociation by altering people’s cognitive associations, having participants override their tendencies to associate beloved brands with the self (“Me”) to associate the beloved brand with “Not Me,” thereby dissociating the self from the brand. We induce this self–brand dissociation using both implicit (studies 1 and 2) (Perkins & Forehand, 2012) and explicit (study 3) (e.g., Rios, Finkelstein, & Landa, 2014) tasks.

In sum, because people’s most beloved brands may be incorporated into the self, severing a self–brand association requires a change in this critical knowledge structure. We argue that such effortful self–brand dissociation with beloved unhealthy food brands depletes self–regulatory resources, thus decreasing vegetable consumption.

**Self–regulation and vegetable consumption**

 Self–regulation is characterized as the ability and motivation to engage in effortful control over one’s behavior (Inzlicht & Schmeichel, 2012). Research has demonstrated that diminished self–regulation leads to poorer food choices (e.g., Lisjak, Bonezzi, Kim, & Rucker, 2015; Vohs & Heatherton, 2000) and has identified many factors that require, and thus diminish, self–regulatory resources. These factors include avoiding eating tempting foods (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Vohs & Heatherton, 2000), inhibiting emotional responses (Baumeister et al., 1998; Vohs & Heatherton, 2000), making decisions (Baumeister et al., 1998; Vohs et al., 2008), and resisting persuasive attempts (Burkley, 2008; Wheeler, Briñol, & Hermann, 2007). Time of day is also related to self-regulatory abilities (Baumeister, 2002; Boland, Connell, & Vallen, 2013), presumably because people are required to inhibit their natural responses frequently throughout the day, thus chipping away at self–regulatory resources as time passes. The resource depletion model of self–control states that people have limitations in their ability to override their natural responses, such that exerting self–control in one instance or task diminishes their ability to do so in a subsequent task (e.g., Muraven & Baumeister, 2000; Muraven, Tice, & Baumeister, 1998; Vohs et al., 2008; Vohs & Heatherton, 2000).

 Of particular interest in this study is the finding that eating vegetables is a learned preference that requires one to override innate taste preferences (i.e., fatty, sweet, salty) during consumption (e.g., Ahern et al., 2013, 2014; Birch, 1999; Wertz & Wynn, 2014; Zeinstra et al., 2009) and would therefore require self–regulatory resources to be available. Previous research has found that preferences for sweet and fatty tastes are innate and robust across cultures (Drewnowski, 1997). In contrast, most vegetables have a bitter taste, which people must acquire a liking for over time (Birch, 1999; Zeinstra et al., 2009). Recent studies have shown that vegetable consumption is learned primarily from socialization, and the introduction of novel vegetables at younger ages leads to a greater likelihood of consuming those vegetables (Ahern et al., 2013; Ahern, Caton, Blundell, & Heatherington, 2014; Hetherington et al., 2015; Wertz & Wynn, 2014, Zeinstra et al., 2009.). These findings are consistent with the assertion that vegetable preference and consumption require greater self–regulatory resources than other nutritious food choices that are compatible with human innate preferences (e.g., fruits that are sweet). Our assertion is also consistent with research on preferred foods of nonhuman primate species, which reflect evolutionary bases of food preference in humans. For example, capuchin monkeys favor grapes as a reward over cucumbers (Brosnan & de Waal, 2003), chimpanzees choose fruits such as figs or bananas over vegetables such as parsnips (Remis, 2002), and gorillas strongly prefer fruits such as mangoes or cantaloupe over vegetables such as carrots or celery (Remis, 2002). Thus, we predict that vegetable consumption (or contemplation of it) requires greater availability of self–regulatory resources than many other foods because primates, including humans, have a genetic predisposition to prefer other foods over vegetables.

We expect that when people dissociate from a beloved unhealthy food brand, this effortful act will result in depleted self–regulatory resources. In turn, depleted self–regulatory resources will shift food preferences away from vegetable consumption. However, we do not expect self–brand dissociation to affect food choices that require fewer available self–regulatory resources due to their preferred flavor composition (e.g., sweet or salty). These choices that are more in line with innate preferences would include not only indulgent options such as ice cream and cookies, but also healthier options such as fruits.

**The current research**

We propose that dissociating from a beloved unhealthy food brand depletes self–regulatory resources, subsequently reducing preferences for vegetables and vegetable consumption. People often come to form strong bonds with brands (e.g., Fournier, 1998), incorporating beloved brands in the psychological self (e.g., Batra, Ahuvia, & Bagozzi, 2012; Escalas & Bettman, 2003; Reimann & Aron, 2009; Trump & Brucks, 2012). We assert that dissociating or distancing the self from beloved brands is an effortful act because it necessitates overriding psychological associations between the brand and the self. Thus, self–brand dissociation depletes self–regulatory resources, which in turn inhibits people’s ability to override natural preferences. Thus, we expect interest in consuming vegetables, which is a learned preference, to decrease.

Notably, acts that require self–regulatory resources are not equally effortful for all individuals. For example, avoiding unhealthy but tempting food is more difficult, and thus more depleting, for restrained eaters (i.e., those who highly regulate their food choices) (e.g., Balantekin & Roemmich, 2012; Vohs & Heatherton, 2000). Those who strongly identify with the brand will need to override their natural responses when dissociating from the brand, thus depleting their self–regulatory resources. In contrast, those who do not identify with the brand will not need to override an existing self–brand association to dissociate from the brand, thereby leaving their self–regulatory resources intact. In other words, when the unhealthy brand is included in the self, dissociating from the brand will be depleting, thus leading to reduced interest in consuming vegetables.

In the sections that follow, we present three experimental studies that demonstrate that dissociation from beloved unhealthy brands is effortful and can have the counter–intuitive effect of decreasing vegetable consumption and preference for vegetables as a result of depletion. Study 1 finds that dissociation from (vs. association with) a beloved unhealthy food brand decreases vegetable consumption. Study 2 then demonstrates that the adverse effect of dissociation on interest in vegetables is pronounced for those who strongly identify with the brand. Finally, study 3 provides evidence that depleted self–regulatory resources drive the relationship between dissociation from an unhealthy food brand and decreased preference for vegetables for those who strongly (vs. weakly) identify with the brand.

**Study 1**

*Pretests*

The goal of study 1 is to demonstrate that dissociating from a beloved unhealthy food brand has the adverse effect of reducing vegetable consumption. We conducted two pre–tests that revealed favorable attitudes toward a candy brand among two different study populations in the United States (undergraduate students and online panelists). Importantly, prior to completing any pretests or studies carried out for this research, participants gave informed consent, and we collected no identifying information for any participant involved in this research

In the first pretest, we recruited 57 United States participants from an online participant panel (Amazon Mechanical Turk) who were paid for their participation. Participants rated how much they liked a series of 10 candy brands on a seven–point scale. The four best–liked candy brands did not differ from one another on this rating (*M*KitKat = 5.11, *SD* = 1.71; *M*Reese's = 5.46, *SD* = 1.67; *M*Snickers = 5.37, *SD* = 1.74; *M*Twix = 5.42, *SD* = 1.63; all paired sample *t* < |1.54|, all *p* > .12). Reese’s was the most liked in an absolute sense of these four popular brands.

We followed this study up in a second pretest with a slightly different measure (a four–item, seven–point attitude toward the brand scale; Holbrook & Batra, 1987). Twenty–one students recruited from an undergraduate participation pool at Loyola University in Baltimore, Maryland, indicated their attitudes toward the four most popular candy brands from the first pretest (Reese’s, Snickers, Kit Kat, and Twix). All brands were well liked by the population (*M*Reese’s = 6.11, *SD* = 1.56; *M*Snickers = 5.15, *SD* = 1.46; *M*KitKat = 5.01, *SD* = 1.83; *M*Twix = 5.67, *SD* = 1.59). Attitudes toward Reese’s were significantly more favorable than attitudes toward Snickers (*t*(20) = –3.95, *p* = .00). Attitudes toward Reese’s were also more favorable in absolute terms than the other two brands, though these differences were not statistically significant (all *t* < |1.71|, *p* > .10). Given such favorable attitudes toward Reese’s across two distinct pretest populations, we presumed Reese’s was a highly beloved brand in the United States. Thus, we selected it as the focal brand for studies 1 and 2 (though all the brands were liked and also would have likely served well as experimental stimuli).

*Participants and procedure*

One hundred two undergraduate students at Baruch College in New York (*M*age = 22.10 years, *SD*age = 3.91 years; 62 women) took part in this study in exchange for course credit. Participants were randomly assigned to either a dissociation or an association condition. Having selected a beloved candy brand, we implicitly manipulated dissociation from (vs. association with) Reese’s. We opted for an implicit task based on previous findings that associations in memory may exist without conscious awareness (Greenwald & Banaji, 1995), and such automatic associations may be induced using implicit methodologies (Perkins & Forehand, 2012).

The most common implicit methodology is the Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998). However, the IAT juxtaposes complementary or contrasting objects (e.g., overweight/thin people and positive/negative concepts). Because we were only interested in responses to a single target category (Reese’s), we opted for a related test, the Go-No Go Association Task (GNAT), that was developed for this purpose (Nosek & Banaji, 2001).

In the GNAT, participants are instructed to complete a computer–mediated categorization task as quickly as possible. Two focal concepts, or categories, are displayed at the top of the computer screen, and images and words representing those two concepts, as well as filler images and words, appear quickly in the middle of the screen. Participants press the space bar if the image or word that appears on the screen belongs to either of the focal concepts at the top of the screen and do not touch the keyboard in response to any other images or words.

In this study, the two focal concepts for participants in the association (dissociation) condition were Reese’s and “Me” (“Not Me”). The images and words that appeared in the middle of the screen included pictures representing Reese’s (e.g., images of packaging or logos), as well as filler images of brands that would be unfamiliar to participants (European candy brands), and words representing the concepts “Me” (e.g., “I,” “me”) or “Not Me” (e.g., “they,” “them”). Participants in the association (dissociation) condition were instructed only to respond with a keystroke when images or words representing Reese’s and “Me” (“Not Me”) appeared on the screen. This induced those in the association condition to categorize Reese’s with “Me,” while those in the dissociation condition were induced to categorize Reese’s with “Not Me.” Categorizations incongruent with existing mental associations are more difficult (Greenwald & Banaji, 1995; Greenwald et al., 1998; Nosek & Banaji, 2001), requiring, and thus diminishing, self–regulatory resources (e.g., if a self–Reese’s association exists, it would be easier to classify it as “Me” than “Not Me”) (Muraven et al., 1998).

After finishing the GNAT, participants moved to another room and completed a 10–minute filler task to obscure the true purpose of the study. While they completed these filler tasks, an experimenter mentioned that snacks were left over from another study and that participants were welcome to help themselves to the snack (carrots). We chose carrots as our focal measure because they are easily provided in a snack format (baby carrots) that would not be considered unusual. In addition, carrots represent a conservative test of our hypothesis by virtue of their relatively sweet flavor profile for a vegetable. Our dependent variable of interest was the amount consumed, which we assessed by measuring the weight of a bowl filled with baby carrots before and after the participant snacked, with the difference being the total number of grams consumed. In debriefing, no participants reported being aware that consumption of carrots was linked to the computer task, thus reducing concern about potential demand effects.

*Results and discussion*

There were no main effects of participant sex on consumption (*t*(100) = .54, *p* = .59), nor did participant sex interact with the association (dissociation) condition (*F* (1, 98) = .03, *p* = .87). As predicted, participants in the dissociation (vs. association) condition consumed fewer carrots (*M*Dissociate = 3.90 grams, *SD* = 5.92; *M*Associate = 10.22 grams, *SD* = 22.14; *t*(100) = 1.72, *p* = .04 (one-tailed); *d* = 0.41).Thus, dissociating from a beloved candy brand decreases vegetable consumption, presumably because dissociation depletes self–regulatory resources and reduces motivation to consume vegetables. Importantly, in study 1 we presumed, based on extremely favorable attitudes indicated by the pretests, that Reese’s was a beloved brand. However, we did not directly assess this. We address this limitation in study 2. By measuring participants’ level of identification with the unhealthy food brand, we further investigate our proposed psychological process of depletion. In particular, we predict that the negative effect of dissociation on interest in consuming vegetables will be more pronounced for those who strongly identify with Reese’s. These people will need to override their existing self–brand association when dissociating from the brand, thus depleting their self–regulatory resources and reducing preference for vegetables.

**Study 2**

 In study 2, we demonstrate that an individual’s level of identification with a beloved candy brand heightens the adverse effect of dissociation from the brand on preference for vegetables. Specifically, this study demonstrates that those who strongly identify with the brand and are induced to dissociate from the brand have less interest in consuming vegetables, but this effect does not hold for those who weakly identify with the brand.

 As in study 1, we manipulated the first factor, dissociation from/association with the target brand, Reese’s, using the GNAT. We measured the second factor, participants’ level of identification with Reese’s. For the dependent variable, rather than measuring actual vegetable consumption as in study 1, we assessed participants’ self–reported interest in consuming vegetables, along with other food items. Doing so allows us to generalize the results beyond a single vegetable (carrots) and to demonstrate that the effect is limited to vegetables and not to foods that are more representative of innate food preferences in humans. We predict that those who strongly identify with Reese’s and are induced to dissociate from (vs. associate with) the brand will be less interested in consuming vegetables, but not food groups that require fewer self–regulatory resources to contemplate consuming.

*Participants and procedure*

One hundred undergraduate students at Loyola University in Baltimore, Maryland took part in this study in exchange for course credit. Due to incomplete data, responses from two participants were removed from the analysis, leaving 98 (*M*age = 19.71 years, *SDage* = 0.81 years; 54 women). Participants were randomly assigned to either the dissociation or the association condition. Participants began the study by indicating their level of identification with Reese’s using the Inclusion of Other in the Self (IOS) scale (Aron, Aron, & Smollan, 1992). Specifically, participants saw a series of seven Venn diagrams with various degrees of overlap between Reese’s and the self and indicated which image best represented their level of identification with the brand (Aron et al., 1992; Reimann & Aron, 2009).

As in study 1, participants then completed the GNAT, which manipulated dissociation from/association with Reese’s. Afterward, participants engaged in a 10–minute filler task to obscure the true nature of the study. Finally, they completed the dependent measures. They viewed a series of food images and were instructed to “Please rate how much you would like to eat the following items right now.” They rated their interest in eating each food item on a seven–point scale, ranging from “not at all” to “very much.” Participants rated 26 food items, including sweet treats, meats, fruits, dairy products, grains, and vegetables. Our focal items for the dependent variable were five vegetables (asparagus, broccoli, green salad, guacamole, and spinach) interspersed throughout the other food items. In debriefing, no participants reported suspicion that the GNAT was aimed to impact their subsequent interest in consuming the foods presented, thus reducing concern about potential demand effects.

*Results and discussion*

We first conducted a factor analysis with varimax rotation of responses to the 26 food items to ensure that the five focal dependent variable items (asparagus, broccoli, green salad, guacamole, and spinach) loaded together, thus capturing participants’ interest in eating vegetables. Five factors emerged, which we interpreted as vegetables (the five vegetable items), fruits (fruit salad, fruit smoothie, and dried fruits), savory foods (mashed potatoes, french fries, fried chicken, grilled chicken, burger, and onion rings), sweets (Snickers, Reese’s, Kit Kat, Starburst, Skittles, gummi bears, and ice cream), and breakfast foods (yogurt, granola, chocolate croissant, Clif bar, and nuts). We averaged each participant’s response on the five vegetable items to create a dependent variable score (α = .86), where higher scores indicated greater interest in consuming vegetables. Potentially due to time of day effects (Birch, Billman, & Richards, 1984), the breakfast foods factor was not supported in factor analyses from subsequent studies (whereas the other food categories were), and the items within this factor did not consistently load onto the same factors in subsequent studies. Thus, we did not run analyses on this category and no longer discuss it.

The degree with which participants identified with Reese’s on the IOS scale (*M* = 2.95, *SD* = 1.72) ranged from a low of 1 (the lowest point on the scale) to a high of 7 (the highest point on the scale). Overall (across both conditions), participants showed the greatest interest in consuming fruit (*M* = 5.11, *SD* = 1.29), followed by savory foods (*M* = 3.83, *SD* = 1.72), vegetables (*M* = 3.40, *SD* = 1.64), and finally but surprisingly (possibly due to a social desirability bias) sweets (*M* = 3.27, *SD* = 1.61). There was a statistically significant difference between interest in fruit compared to both savory foods (*t*(97) = 5.17, *p* < .001) and vegetables (*t*(97) = –10.10, *p* < .001). The difference between interest in savory foods and vegetables (*t*(97) = 2.57, *p* = .01) was also significant. The difference between interest in consuming vegetables and sweet foods was not statistically significant (*t*(97) = .69, *p* = .49).

We tested our hypothesis using regression analysis. Dissociation/association, level of identification, and their interaction were independent variables, and interest in consuming vegetables was the dependent variable. There was a marginally significant main effect of level of identification (IOS) (*β =* .37, *t*(97) = 1.81, *p* = .07) and no significant effect of dissociation/association (*β =* .49, *t*(97) = 1.48, *p* = .14) on interest in consuming vegetables. These findings were qualified by the predicted dissociation/association by level of identification interaction (*β =* –.22, *t*(97) = -2.18, *p* = .03). We conducted this same analysis for fruits, savory foods, and sweets (all α > .62). As expected, none of the interactions were significant (all *F* < 2.32, all *p* > .08).

To further examine the interaction effect on interest in consuming vegetables, we used Hayes’s (2013) PROCESS model 1 to determine the impact of dissociation at high and low levels of identification with the brand. Specifically, this model examines the effect of the dissociation/association manipulation at one standard deviation above (below) the mean of brand identification to determine how those who strongly (weakly) identify with the brand responded to the manipulation. As predicted, those who strongly identified with the brand indicated less interest in consuming vegetables after dissociating from (vs. associating with) the brand (*β* = –0.52, *t*(94) = –2.13, *p* = .04). In contrast, there was no significant effect of dissociation (vs. association) on those who weakly identified with the brand (*β* = 0.22, *t*(94) = 0.96, *p* = .34; see Fig. 1).

**Fig. 1.** Study 2 estimated means demonstrating those who strongly identify with the candy brand have less interest in consuming vegetables following dissociation from the brand.

This study builds on study 1’s finding that dissociation from a beloved candy brand leads to reduced interest in vegetables. In particular, study 2 illustrates that this adverse effect of dissociation occurs only for individuals who strongly identify with the unhealthy brand. For these people, dissociating from the brand is particularly difficult because it requires overriding their extant self–brand associations, thereby depleting self–regulatory resources. In turn, depletion of self–regulatory resources leads to less interest in eating vegetables. Furthermore, we find no such effect for other food groups, including fruits, savory foods, and sweets. We assert that this is the case because unlike vegetables, these foods all have flavors (sweet, salty, and/or fatty) that humans are genetically predisposed to prefer, and thus consumption of them (or contemplation of doing so) does not require self–regulatory resources on reserve. While we observed overall low preference for sweet foods in this sample, our analyses demonstrate that this was not caused by prompting dissociation with the beloved brand and could instead be due to other factors, such as social desirability.

These findings indicate that dissociating from an unhealthy brand with which one identifies decreases preference for vegetables. In contrast, dissociating does not decrease preference for other food categories. In study 3, we address three potential concerns with the previous studies while further illuminating the role of depletion in our observed effects.

**Study 3**

This study builds on the prior studies in four ways. First, we focus on a different beloved unhealthy brand, Coca–Cola—the most valuable food brand in the world (*Forbes*, 2014). Second, we employ an alternative dissociation/association task. These two changes rule out the possibility that the focal brand (Reese’s) or the implicit methodology used to induce dissociation (the GNAT) in the previous studies drive our effects. Third, we use an online panel of participants to generalize the effects of our research beyond a student population. Fourth, in study 2 we inferred that self–brand dissociation is more difficult and effortful for those who strongly identify with the brand, thus depleting these individuals and leading to reduced preference for vegetables. In this study, in addition to measuring strength of identification with the brand, which should differentially impact dissociation difficulty, we also directly measure how difficult participants find the task of dissociating. We predict that dissociation difficulty will drive the adverse effect of dissociation from a beloved unhealthy food brand on vegetable preference for those who strongly (vs. weakly) identify with the focal brand.

*Participants and procedure*

We used an online participant panel (Amazon Mechanical Turk) to recruit 178 United States participants (*M*age = 34.80 years, *SDage*= 12.32 years; 112 women), who completed an online study in exchange for payment. First, participants indicated their level of identification with the brand Coca–Cola using the IOS scale (Aron et al., 1992), as in study 2. Second, as in studies 1 and 2, participants were randomly assigned to either a dissociation or association condition. However, in contrast to studies 1 and 2, where we manipulated dissociation/association implicitly using the GNAT, here we used an explicit manipulation. We followed prior research that employed brief writing tasks to make people feel stronger or weaker associations to personality measures or persuasive appeals (see e.g., Briñol, Rucker, Tormala, & Petty, 2004; Rios, Finkelstein, & Landa, 2014). For our study, we adapted the writing task to be relevant the brand relationship context and instructed participants in the association (dissociation) condition to “Please write down three things about Coca–Cola that you (do not) identify with. In other words, ways you feel the brand Coca–Cola is “me” (“not me”) and represents (does not represent) who you are as a person.” This task prompted participants to think about ways the brand was similar (dissimilar) to them, thereby inducing association with (dissociation from) the brand. Sample responses in the association (dissociation) condition were “classic,” “timeless,” “fun,” and “sweet” (“Southern,” “outgoing,” and “arrogant”).

 Next, we assessed our proposed causal mechanism, difficulty dissociating from the brand. In particular, we asked those in the association (dissociation) condition to “Please indicate how difficult it was for you to come up with three ways you (do not) identify with Coca–Cola,” on a seven–point scale from “very easy” to “very difficult.” Finally, participants responded to our dependent variable questions. They rated their interest in eating the same selection of foods as in study 2 (with the substitution of Coca–Cola for Reese’s), with our focus being their interest in the five vegetables.

*Results and discussion*

The degree with which participants identified with Coca–Cola on the IOS scale (*M* = 2.72, *SD* = 1.89) ranged from a low of 1 (the lowest point on the scale) to a high of 7 (the highest point on the scale). The degree to which participants found the dissociation/association task difficult (*M* = 4.21, *SD* = 1.94) also ranged from a low of 1 (the lowest point on the scale) to a high of 7 (the highest point on the scale).

As in study 2, we calculated dependent variable scores for participants, which indicated their interest in consuming vegetables (α = .74). Overall (across both conditions), participants showed the greatest interest in consuming savory foods (*M* = 4.65, *SD* = 1.35), followed by fruits (*M* = 4.49, *SD* = 1.54), vegetables (*M* = 4.33, *SD* = 1.61), and finally (possibly due to a social desirability bias) sweets (*M* = 3.84, *SD* = 1.41). The difference between interest in savory foods and fruits was not significant (*t*(177) = 1.24, *p* = .22). The difference between interest in fruits and vegetables was also not significant (*t*(177) = 1.11, *p* = .27); however the difference between interest in savory foods and vegetables was significant (*t*(177) = 2.14, *p* = .03). Finally, the difference between interest in vegetables and sweets was significant (*t*(177) = 2.77, *p* <.01). These results are consistent with those in study 2, except for the order in which savory and fruits were preferred (fruits first and savory second in study 2, and savory first and fruits second in study 3).

According to our previous theorizing, those who strongly (vs. weakly) identify with the focal brand should find the dissociation task to be more difficult, thus resulting in depletion of self–regulatory resources and decreased interest in consuming vegetables (but not their preference for other foods). We empirically tested this proposed moderated mediation using Hayes’s (2013) PROCESS model 8 (with 95% confidence and 1,000 bootstraps). In this model, dissociation/association condition served as the independent variable, level of identification with the brand (IOS) served as the moderator, dissociation/association task difficulty served as the proposed mediator, and interest in consuming vegetables was the dependent variable. Overall, the indirect effect of the highest order interaction was significant, with the confidence interval excluding zero (*β =* –.10;CI = –.21, –.02), thus supporting moderated mediation. We elaborate on these results below. As in study 2, we ran this same analysis on fruits, savory foods, and sweets (all α > .50). As expected, these analyses revealed no moderated mediation, as all confidence intervals contained zero.

The moderated mediation analysis first tests the relationship between the interaction of the independent variable (dissociation/association) and the moderator (level of identification with the brand) on the proposed mediator (dissociation/association task difficulty). The results revealed significant main effects for both dissociation/association (*β =* –2.62*, t*(177) = –5.54, CI = –3.56, –1.69, *p <* .001) and level of identification with the brand (*β =* –.99*, t*(177) = –4.37, CI = –1.44, –.54, *p <* .001). These main effects were qualified by their predicted interaction (*β =* .73*, t*(177) = 5.08, CI = .45, 1.02, *p <* .001).

The model then tests the relationship between the interaction of the independent variable (dissociation/association) and the moderator (level of identification with the brand) on the dependent variable (interest in consuming vegetables), as well as the relationship between the mediator (dissociation/association task difficulty) and the dependent variable. The results indicated significant negative effects of both level of identification with the brand (*β =* –.58*, t*(177) = –2.79, CI = –.98, –.17, *p* < .001) and dissociation/association task difficulty (*β =* –.13*, t*(177) = –2.05, CI = –.26, –.01, *p* = .04) on interest in consuming vegetables. The main effect of dissociation/association on interest in consuming vegetables was not significant (*β =* –.67*, t*(177) = –1.52, CI = –1.54, .20, *p* = .13).These findings were qualified by interaction of dissociation/association by level of identification with the brand (*β = .26, t*(177) = 1.91, CI=0, .52, *p* = .057), which is consistent with the results of study 2.

To further understand the effects reported above, we conducted separate mediation analyses for the dissociation and association conditions. Using Hayes’s (2013) PROCESS model 4, with level of identification with the brand as the independent variable, dissociation/association task difficulty as the mediator, and interest in consuming vegetables as the dependent variable, we found support for mediation only in the dissociation condition, with the confidence interval excluding zero (*β =* –.11;CI = –.22, –.04). That is, among participants in the dissociation condition, those who strongly identified with the brand were more likely to rate the dissociation task as difficult (*β* = .48, *t*(92)= 4.80, *p < .*001), and this task difficulty consequently led to a decreased interest in consuming vegetables (*β* = –0.23, *t*(92) = –2.90, *p* = .01). In contrast, mediation was not significant in the association condition, where the confidence interval included zero (*β =* .01;CI = –.04, .06). In this condition, higher identification with the brand had a negative relationship with task difficulty, as it was an easy task for those who strongly identified with the brand (*β* = –.28, *t*(82)= –2.85, *p* = .005), and task difficulty had no effect on interest in consuming vegetables (*β* = 0.05, *t*(82) = 0.54, *p* = .59).

Taken together, these results further confirm that inducing people to dissociate from beloved unhealthy brands decreases their consumption of vegetables for those who strongly (vs. weakly) identify with the brand, because for strong brand identifiers, dissociating from a beloved brand is difficult. When this is the case, dissociation depletes self–regulatory resources, thus decreasing interest in consuming vegetables, but not for other food categories that more closely represent innate food preferences (e.g., fruits, sweets, salty and/or fatty foods).

**General discussion**

In three experimental studies, we demonstrate that dissociating from beloved unhealthy brands has the counter–intuitive effect of decreasing interest in consuming vegetables (studies 2–3) and decreasing actual vegetable consumption (study 1), as a result of depletion of self–regulatory resources. Study 1 assesses people’s consumption of vegetables following induced dissociation from (vs. association with) a beloved candy brand, finding that dissociation leads to less consumption of carrots. Study 2 demonstrates the important role of self–brand identification in this effect, finding that interest in eating vegetables decreases following dissociation from an unhealthy brand only for those who strongly identify with the brand. Finally, study 3 illustrates that it is the difficulty of self–brand dissociation that drives those who strongly (vs. weakly) identify with the brand to show less interest in eating vegetables. Thus, pushing people to dissociate from unhealthy, beloved brands diminishes their interest in consuming some of the healthiest food options when such dissociation depletes self–regulatory resources.

In contrast, we did not observe these effects for fruits, savory foods, or sweets (studies 2–3). We expected these findings because the foods in these groups possess flavors (sweet, salty, and/or fatty) that people are genetically predisposed to prefer (Birch, 1999). Because people have an innate preference for these flavors, we assert that contemplation of eating them does not require self–regulatory resources to be available. Thus, our demonstration in study 1, that dissociating from a beloved brand leads to decreased preferences for vegetables, is likely relatively conservative. This is because consumption of vegetables with a sweeter flavor profile, such as the carrots offered to participants in study 1, may not require as much self–regulation as would vegetables with a bitter flavor profile (e.g., broccoli). To address this, in studies 2 and 3 we asked participants how interested they were in eating a variety of vegetables, including vegetables with a relatively bitter flavor profile (e.g., broccoli, spinach). However, these studies relied on self–reported interest in eating vegetables, which may not directly relate to actual food choices. This suggests two avenues for future research. First, one might examine whether our main effect from study 1, of self–brand dissociation leading to decreased interest in consuming vegetables, would be more pronounced if participants were offered a vegetable likely to be less innately appealing than carrots. Second, studies 2 and 3 provide evidence that it is the difficulty of dissociating from a beloved brand that leads to decreased interest in vegetables with a bitter flavor profile, but we relied on self–reports of vegetable interest to illustrate this. Further studies might extend our findings by demonstrating our effects hold when examining actual vegetable consumption.

This research contributes to the literatures on vegetable consumption, self and identity, and self–regulation. Our research, combined with previous research that indicates that vegetable liking is learned via socialization and vegetables are generally less preferred options for both human and nonhuman primates (e.g., Ahern et al. 2013, 2014; Birch, 1999; Brosnan & de Waal, 2003, Drewnowski, 1997; Remis, 2002; Wertz & Wynn, 2014), provides evidence that vegetable consumption requires more available self–control resources than other foods, even other healthy options such as fresh fruits. Our research also provides additional evidence that branding is a powerful marketing tool that is often resilient to interventions when people have strong relationships with brands (e.g., Ahluwalia, Burnkrant, & Unnava, 2000; Connell & Mayor, 2013; Reimann & Aron, 2009). Finally, our research adds to the literature on self–regulation by demonstrating that dissociation from concepts integral to identity, in our case unhealthy food brands, depletes self–regulatory resources. Future research could extend our findings to examine whether dissociating from other beloved unhealthy concepts, like product categories (e.g., chocolate) or behaviors (e.g., binge eating), also depletes self–regulatory resources.

Understanding the effects of dissociation from unhealthy brands is important for public health advocates. Our research suggests that those designing interventions should be cautious when attempting to prompt dissociation. Doing so can backfire by depleting self–regulatory resources of people who have strong relationships with the brand (arguably those who would benefit most from the intervention), thus leading to poorer dietary choices and potentially other choices as well. Treading carefully when attempting to improve people’s health is consistent with the recommendation to nudge, instead of force, people to improve the healthfulness of their food choices (Finkelstein & Fishbach, 2010; Stok, de Vet, de Wit, Renner, & de Ridder, 2014).

In this research, we examine the short–term adverse effects of prompting dissociation from a beloved unhealthy brand. A limitation of our research is this short–term focus. It is feasible that such dissociation over time could decrease an individual’s consumption of the unhealthy brand. Future research could determine whether any long–term benefits of dissociation would outweigh the short–term costs.

While our studies suggest that consuming vegetables and contemplation of consuming vegetables require self–regulatory resources to be available, future research could determine whether vegetable consumption actually depletes these same resources. If vegetable consumption is indeed depleting, then it is possible engaging in this healthy behavior could lead to less ideal subsequent behavior (e.g., consuming more alcohol at dinner). Future research could also determine whether pairing vegetables with foods that are more representative of innate preferences yet are still healthy (e.g., lean meats) could attenuate depletion.

A further avenue for research is to examine the effect of self–brand dissociation on restrained versus non–restrained eaters. Research has found that restrained eaters are more likely to indulge in sweet treats when depleted (e.g., Vohs & Heatherton, 2000). It is possible that restrained eaters would not only demonstrate decreased interested in vegetables in response to dissociation from a beloved unhealthy brand, but also greater interest in unhealthy foods.

Another future research direction could explore whether activation of health goals could attenuate or eliminate our observed effects. Research on self–regulation has proposed that there are both ability and motivational components to self–regulation (Inzlicht & Schmeichel, 2012) and that goal priming attenuates depletion effects (Walsh, 2014). Indeed, research has found that activation of health goals is an effective way to help people overcome self–regulation failures when these resources are depleted (Boland et al., 2013). Thus, it is reasonable to expect that activating health goals could increase the motivation to self–regulate, even when someone is depleted due to dissociating from a beloved brand. Future research could determine whether an intervention that combines dissociation from the unhealthy brand with activation of health goals would indeed lead to reduced preference for the unhealthy brand over time without the negative effect of reduced preference for vegetables.

A final worthwhile avenue for future research would be to determine whether vegetables can be as successfully branded as less healthy options. Vegetables are usually presented at grocery stores as commodities and are not typically supported by the same multimillion dollar advertising campaigns that fuel brand equity for products such as sodas, cookies, salty snacks, and candies. Given that early socialization to vegetables appears to be critical in consumption of them (e.g., Ahern et al., 2013, 2014; Wertz & Wynn, 2014), this might be particularly important when considering food marketing directed toward children. Demonstrating the power of branding, research has found that children’s awareness of unhealthy brands leads to higher consumption of them (Halford, Gillespie, Brown, Pontin, & Dovey, 2004). Recent investigation has shown that branding vegetables with cartoon characters can shift children’s preferences toward vegetables and away from less healthy options (Roberto, Baik, Harris, & Brownell, 2010). Given that early exposure to brands makes them more memorable and leads to resilient product favorable biases toward these brands (Connell, Brucks, & Nielsen, 2014; Ellis, Holmes, & Wright, 2010), it is possible that early exposure to cleverly branded vegetables could have long–term effects that are beneficial to society.

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