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## Getting Consumers to Recycle *NOW!*:

### When and Why Cuteness Appeals influence Prosocial and Sustainable Behavior

#### Abstract

Encouraging prosocial and sustainable behaviors is a major global challenge, which policymakers and social agencies need novel insights to effectively manage. This research identifies a positive aesthetic cue, specifically “kindchenschema” cuteness, that can reliably induce some individuals, specifically those who exhibit high approach motivational orientation (i.e., BAS, Carver and White 1994), to engage in prosocial and conservation behaviors. Studies 1 and 2 show that consumers high (vs. low) in BAS (measured) react more favorably to conservation appeals featuring cuteness, an effect mediated by experienced feelings of tenderness. Study 3 replicates the effect using a prime of approach motivation (BAS) to assess donation intentions. Study 4, a large-scale field experiment conducted over eight weeks at multiple locations, shows that people recycle more at bins featuring cute visuals with active (high-BAS) messages, compared to bins featuring cute visuals with passive (low-BAS) messages. The authors conclude with a discussion of practical implications for policymakers.

**Keywords:** kindchenschema cuteness, aesthetics, sustainability, prosocial behavior, motivation, emotion

Modern economic development has led to great improvements in living standards, but there is growing recognition that overconsumption and waste at unprecedented rates, promoted by economic development, are inflicting increasing harm on the environment (Geller 2002). The prognosis is grim, and action is needed on multiple fronts. In recognition of the scale and scope of the crisis facing our planet, the United Nations has set seventeen Sustainable Development Goals for 2030, which aim to tackle environmental and social issues ranging from eradication of poverty, sustainable agriculture, sustainable water sanitation, to sustainable consumption and production patterns (United Nations Economic and Social Council 2016). The message is clear: all stakeholders need to take actions to steer the world onto “a sustainable and resilient path, leaving no one behind” (United Nations Economic and Social Council 2016, p. 1).

In efforts to communicate prosocial messages, and to instill behavior change, public policymakers and social agencies frequently rely on mass media communications such as advertisements and promotional campaigns. Researchers have noted that extant policies and promotion tactics are predominantly coercive in nature, aiming either to frighten people about the plight of the environment or to induce them using monetary rewards, e.g., “Every 60 seconds a species dies out. Each minute counts.” (Griskevicius, Cantu, and van Vugt 2012; Moller, Ryan, and Deci 2006). Some researchers have claimed that the coercive strategies tend to prompt defiance and resentment and are therefore ineffective, particularly in terms of long-term behavior change (Geller 2012; Moller et al. 2006). Clearly, prosocial and sustainability initiatives need to be implemented and communicated more effectively. Summarizing the situation, Prothero et al. (2011) called for fresh perspectives to help create and implement policies and strategies.

In this spirit, the current research investigates the interplay between a non-coercive and frequently used but under-studied element in communications, namely, cute visuals, and an

individual difference in approach tendency (Behavioral Approach System – BAS) with the goal of identifying their joint effectiveness in driving prosocial and sustainable behaviors.

Cuteness is a popular tactic in many product categories (Nenkov and Scott 2014), and is not uncommon in prosocial appeals. For example, organizations such as the World Wide Fund for Nature and the American Society for the Prevention of Cruelty to Animals sometimes employ images of cute animals in their advertising, in addition to the more frequently used fear strategies. Given the enduring success of cuteness in the market (e.g., Hello Kitty reaps five billion dollars annually in profits for Sanrio), it is possible that cuteness may well “sell” people on prosocial and sustainable behaviors (Shrum, Lowrey, and McCarty 1994). However, there is no academic research into this important phenomenon, and it is unclear whether, when, and, how cuteness can enhance people’s prosocial and sustainability-enhancing behaviors.

Moreover, not every consumer responds to cute products in the market in the same way. In fact, it is likely that the persuasiveness of cute prosocial advertising varies across consumers (Kollmuss and Agyeman 2002). Therefore, this research aims to investigate the personal characteristics that shape consumer responses to cute prosocial appeals. Building on past research on motivation (Gray 1970, 1981), as well as research on the evolutionary significance of cuteness (Kringelbach et al. 2016; Lorenz 1943; Shaver, Mikulincer, and Shemesh-Iron 2010), we propose and demonstrate that consumers’ behavioral approach tendencies (i.e., BAS, Carver and White 1994) interact with prosocial cuteness appeals to influence their behaviors, such that consumers who are high in BAS respond more positively to cuteness in prosocial communications. Moreover, we identify that it is the emotional response to cuteness, specifically, feelings of tenderness, that drive this effect. Our results hold true using both self-reported intentions in experiments and actual behaviors in a large-scale field experiment, and our findings

corroborate previous insights into the advantages of non-coercive policies (Moller et al. 2006; Ryan and Deci 2000), and inform policymakers and social entrepreneurs about an effective new approach to stimulate behavior change.

## **Theoretical Development**

### **Behavioral Approach System (BAS) and Consumer Responses to Rewards**

It is well acknowledged that human beings tend to approach rewards (Gray 1970), a fact that explains the success of sustainability programs that provide monetary rewards to engage consumers (Griskevicius et al. 2012). However, people differ in their sensitivity to rewards and their general approach tendencies towards rewards. These differential responses to reward are attributable to an individual difference variable, specifically, baseline levels of activation of the Behavioral Approach System (BAS; Carver and White 1994; Gray 1970, 1981).

The BAS is a primary biologically based motivational system that regulates approach motivations. It facilitates the expenditure of energy and prompts actions to pursue rewards, and guides responses to rewards (Gray 1970, 1981). The strength of the BAS varies across individuals, and these variations in sensitivity to rewards across individuals are often measured using Carver and White's (1994) BIS/BAS scale. In other words, people with strong BAS possess strong general approach tendencies, are highly responsive to rewarding cues in the environment, and tend to show intense emotional, cognitive, and behavioral reactions to rewards. In contrast, people with weak BAS are relatively insensitive to rewarding cues, and tend to exhibit indifferent responses to rewarding stimuli and neutral stimuli. According to Henriques and Davidson (2000), people with clinical depression typically have weak BAS systems and

exhibit reduced sensitivity to rewards. In the consumption domain, Wadhwa, Shiv, and Nowlis (2008) found that participants who scored low on BAS did not approach rewarding consumption cues whether in the presence of a rewarding consumption cue or no cue, while participants who scored high on BAS exhibited approach behaviors to obtain other rewarding consumption cues when in the rewarding-cue (vs. no-cue) condition. Corroborating these behavioral studies, recent fMRI research provides direct evidence that when in receipt of monetary rewards, low-BAS (vs. high-BAS) people showed reduced (vs. heightened) activity in the ventral striatum and the medial orbitofrontal cortex, the neural substrates of reward processing (Simon et al. 2010). These findings all suggest that a rewarding stimulus elicits heightened approach-related responses from high-BAS consumers, but fails to elicit such responses from low-BAS consumers.

Directly relevant to this research, cuteness is an inherently rewarding aesthetic cue for human beings, who are born with instinctive predispositions to approach cute entities and treat them as rewards (Kringelbach et al. 2016; Lorenz 1943). Next, we provide the definition of cuteness as is investigated in this research, and develop propositions for the interplay between prosocial cuteness appeals and BAS, specifically, how people with varying general approach tendencies respond to prosocial cuteness appeals.

### **Kindchenschema Cuteness**

Colloquial usages of “cute” have various connotations, ranging from “someone that is sweet and nice” to “behaviors that are funny and humorous” (Urban dictionary). Fortunately, the academic representation of this construct is limited to two distinct facets: kindchenschema and whimsicality. *Kindchenschema* is the classical definition of cuteness, and assesses the degree to which a given stimulus is baby-like in appearance (Lorenz 1943). A prototype would be the human infants photographed by Anne Geddes, with their big eyes, round faces, and chubby

bodies. By definition, kindchenschema cuteness is linked to infantility, and tied to helplessness of the young. In contrast, whimsical cuteness is a more recent addition to the literature, and emphasizes representations of whimsical fun, playfulness, and capricious humor, as created by marketers (Nenkov and Scott 2014), for example, “an ice-cream scoop shaped like a miniature person or a dress with tropical colors and pink flamingos” (p. 327). Our focus in the current research is on kindchenschema cuteness. This concept is not limited to human infants, but generalizes to other infant-like stimuli, such as human adults, animals, and inanimate objects (Kringelbach et al. 2016; Lorenz 1943). An entity that possesses a sufficient proportion of infantile features, including a relatively big head, round and protruding cheeks, large eyes, and plump body with soft-elastic surface texture, simulates the physical attractiveness of infants and thereby causes people to perceive it as being cute (Alley 1981, 1983; Lorenz 1943).

Germane to the current research, kindchenschema cuteness has the capacity to ignite nurturing instincts and elicits innately unique human behaviors, to the extent that Kringelbach et al. (2016, p. 545) referred to it as “one of the most basic and powerful forces shaping our behaviour”. Specifically, helpless infants (human and animal) are highly vulnerable and incapable of caring for themselves, and thus depend heavily on adults’ protection and nurturing to survive. The cute appearance of these infant creatures serves the evolutionary purpose of stimulating instinctive nurturing behaviors in adults, motivating caregiving and protection, which thereby ensures the survival of the young and increases the evolutionary fitness of the species (Glocker et al. 2009; Lorenz 1943). As a result, kindchenschema cuteness represents a rewarding stimulus for people. Cuteness provides hedonic pleasure in and of itself, spurs approaching actions from people, and even generates rich responses from people (Hildebrandt and Fitzgerald 1978; Kringelbach et al. 2016). It is specifically due to these response patterns that this research



focuses on kindchenschema cuteness to explore whether, when, and why, it is effective in motivating prosocial and sustainable behaviors.

### **BAS Regulates Responses to Cuteness Appeals**

Since an individual's level of BAS influences his/her sensitivity and reactions to rewards, we predict that a person's responses to kindchenschematically cute entities are subject to the influence of BAS. Indeed, Desjardins, Zelenski, and Coplan (2008) found that mothers who score high on BAS reported to be more nurturing and caring towards their children than mothers who score low on BAS. This suggests that even the basic instinctive responses towards cuteness are regulated by individuals' BAS characteristics. Low-BAS mothers have generally weak approach tendencies towards rewards, and hence are not as strongly spurred by cuteness as high-BAS mothers, resulting in reduced nurturing behaviors towards their children. Based on this, we predict that when exposed to a cute (versus non-cute) stimulus, people with strong motivational approach tendencies (high BAS) are more likely to express the unique responses (which we discuss next) elicited by the cute stimulus. In contrast, people with weak approach motivational tendencies (low BAS) have reduced sensitivity to cuteness, and therefore are less responsive to cute stimuli. Following this logic, we predict that employing cute (vs. non-cute) visuals in prosocial communications should influence prosocial behaviors among high-BAS consumers but not among low-BAS consumers.

### **Cuteness and Prosocial and Sustainable Behaviors**

Sustainable behaviors are “deliberative and efficient actions that result in the conservation of the socio-physical environment for present and future generations” (Corral-Verdugo et al. 2011, p. 95). Sustainable behaviors are by definition prosocially oriented, similar to other prosocial behaviors such as helpful interventions and charitable donation, which look out

for other people's well-being and serve collective benefits (Batson 2009). Extant research states that prosociality has both evolutionary and psychological antecedents. Evolutionary theories of prosociality build on Darwin's (1982 [1871]) groundbreaking work on natural selection to study the existence of prosociality throughout evolution, and explore why people have evolved to sometimes benefit others at a cost to themselves.

Despite some differences, researchers largely agree that prosocial behaviors can enhance the evolutionary fitness of the human species (de Waal 1996, 2008; Sober and Wilson 1998). The argument here is that prosociality is an extension of the nurturing instinct, which is the most fundamental altruistic behavior that enhances the reproduction and survival of the human species (Batson et al. 2005; McDougall 1908; Shaver et al. 2010). Relatedly, a key feature of kindchenschema cuteness is its capacity to induce nurturing responses. This implies a possible evolution-based link between prosocial behaviors and kindchenschema cuteness, because the cuteness of an infant spurs adults to care for and protect it.

Importantly, because of the social nature of humans, these nurturing responses are not restricted to one's own offspring, but rather generalize to "other human beings' needs for comfort, protection, support, and encouragement" (Shaver et al. 2010, p. 73), which are by definition prosocial behaviors. Hence, human prosociality represents a direct extension of the nurturing instinct that can be triggered by cuteness. Corroborating this, Glocker et al. (2009) found that exposure to cute infant faces can activate the ventral striatum, a brain region associated with general altruistic behaviors, signaling that responses to cuteness and prosocial behaviors may share a common neural basis. The above reasoning suggests that the use of cuteness in prosocial appeals may induce heightened general prosocial intentions. However, as reasoned earlier, people with strong BAS are responsive to cuteness, whereas people with weak

BAS tend to exhibit indifferent reactions towards cute and neural stimuli. Therefore, we argue that the potential positive relationship between cuteness and prosociality should manifest itself among people high in BAS but not among low-BAS individuals. Formally:

**H1:** Individuals' approach tendencies (BAS) moderate their responses to kindchenschema cute (vs. non-cute) appeals, such that people high in BAS show enhanced prosocial and sustainable motivations in response to the same kindchenschema cute (vs. non-cute) appeal, whereas people low in BAS do not.

### **The Mediating Effect of Tenderness**

Prosocial behaviors are not automatic, but rather depend on psychological and situational triggers (Batson et al. 2005; de Waal 2008). Existing research agrees that empathic concern, defined as “an other-oriented emotional response elicited by and congruent with the perceived welfare of someone in need” (Batson 2009, p. 8), is the motivating impetus for prosocial behaviors (Batson 2009; de Waal 2008; Lishner, Batson, and Huss 2011). Moreover, empathy is composed of two distinct emotions: tenderness and sympathy; tenderness is a warm positive emotional response, and is triggered by perceiving someone's vulnerability (Niezink et al. 2012), whereas sympathy represents a state of compassion towards someone's plight, and is elicited by an appraisal of someone's current need (Lishner et al. 2011).

Critically, kindchenschema cuteness has been argued to trigger empathy (Kringelbach et al. 2016), and specifically, it produces the emotion of tenderness, not sympathy (Lishner et al. 2011). This suggests that the positive effect of cuteness on prosociality may be caused by its produced tender feelings. This theorizing is consistent with the evolutionary link between cuteness and prosociality, as articulated earlier. Many researchers have contended that feelings of tenderness originate from the nurturing instinct; people's experienced tender feelings elicited by

cuteness help release caregiving behaviors towards their cute offspring (Batson et al. 2005; de Waal 2008; McDougall 1908; Sober and Wilson 1998). As Frijda (1986, p. 83) puts, “tenderness can be regarded as the impulse toward tender—that is, caregiving—behavior”. Furthermore, people with strong BAS who have enhanced responsiveness to cuteness should experience stronger feelings of tenderness towards a cute versus non-cute stimulus, but in contrast, people with weak BAS who are insensitive to cuteness do not experience stronger feelings of tenderness towards a cute versus non-cute object. As tenderness prompts prosocial motivation, the stronger tender feelings experienced by high-BAS (but not low-BAS) people, the more motivated they should be to behave prosocially. Formally:

**H2:** The positive effect of kindchenschema cuteness (vs. non-cuteness) on prosociality among individuals high (vs. low) in BAS is mediated by tender feelings produced by cuteness; such that people with high BAS (vs. low BAS) experience greater tenderness in response to a cute appeal than to a non-cute appeal, causing them to exhibit stronger prosocial intentions.

Our conceptual framework (see Figure 1) diagrammatically represents the theoretical model that guides this research.

[Insert Figure 1 about here]

## **Overview of the Empirical Investigation**

We report four studies conducted to test our proposition that high-BAS (vs. low-BAS) individuals exhibit heightened prosocial and sustainable intentions towards cute prosocial appeals. Across these studies, we (1) expose individuals to cute appeals that promote

prosociality, (2) measure (Studies 1 and 2) or prime (Studies 3 and 4) BAS orientation, and, (3) measure pro-environmental intentions (Studies 1 and 2), charitable donation intention (Study 3), and actual recycling behavior (Study 4) to test the hypothesized effects. Study 1 examines participants' intentions to recycle and to consume environment-friendly products after exposure to conservation advertisements that feature either kindchenschema cuteness or non-cuteness, and reveals heightened prosocial intentions among high-BAS participants after exposure to the cute ads. Study 2 demonstrates that feelings of tenderness produced by cuteness mediate this effect. Study 3 primes participants' BAS by using active versus passive appeals and generalizes the effect to charitable donation intentions. Study 4 takes our propositions to the real world in a large-scale field study conducted at multiple locations on a university campus over eight weeks, demonstrating the effect of an intervention combining cuteness and active high-BAS appeals on the amount of materials recycled.

Across studies, we use a self-reported measure of participants' motivational approach tendencies with Carver and White's (1994) scale (Studies 1 and 2) or prime participants' approach motivation using messages that stress action versus not (Studies 3 and 4). This method of manipulating BAS is new to the literature and stems from its core function of regulating responses to rewards. The defining feature of high-BAS people is their heightened responsiveness to and active approach-related behaviors towards rewards, compared to low-BAS people' lack of these actions towards rewards (Gray 1970, 1981; Wadhwa et al. 2008). As such, emphasizing action orientation might prime strong BAS, and thus elicit heightened prosocial intentions towards cute prosocial ads. We implement this logic in Studies 3 and 4 by creating active prosocial slogans that stress action orientation. Specifically, to serve the purpose of enhancing BAS, these slogans call for immediate prosocial actions with specific words adopted

from the Carver and White (1994) scale, are written in italic font which heightens behavioral movement (Cian, Krishna, and Elder 2015), and are expressed in a relatively assertive tone, which is associated with extraversion, a personality feature that is linked with strong BAS (Barrick and Mount 1991; Muris et al. 2005; i.e., “Donate *NOW!*” in Study 3, and “Recycle *NOW!*”, “Recycling is *FUN!*” in Study 4). We contrasted these with passive slogans in normal font and in a nonassertive tone (i.e., “Donate please” in Study 3, and “Recycle please”, “Recycle for me” in Study 4), which functioned as the low-BAS messages. Importantly, both the scale measure and the prime of BAS yielded similar results that are consistent with our theorizing.

### **Study 1: Cuteness Enhances Sustainability-Related Intentions among High-BAS (vs. Low-BAS) Individuals**

The purpose of Study 1 was to test the proposed interactive effect of cuteness and participants’ BAS on sustainability-related intentions. For this purpose, we designed posters promoting recycling, which featured images either of kindchenschema cute animals or of non-cute animals, and measured respondents’ BAS and their intentions to engage in sustainability-related behaviors. We predicted that for participants high in BAS there would be a positive effect of the cute images rather than the non-cute ones, but not for participants low in BAS.

#### **Method**

##### *Design and Stimuli*

This experiment was in a 2 (appeal: cute vs. non-cute) by 2 (BAS: high vs. low) between-subjects design with BAS as a measured variable. Participants (N = 202, 125 males,  $M_{age} = 33$ ) were recruited for US\$0.30 on Amazon Mechanical Turk. Under the cover story of examining

the effectiveness of poster design, participants were shown a poster that featured either four cute animals or four non-cute animals with the slogan “Recycling saves animals. Please recycle.” (see Appendix A).

We selected images of four cute animals (to appear in the cute poster) that possess multiple prototypical kindchenschema features as identified in the literature (Alley 1981, 1983), and, correspondingly, four equivalent non-cute animals that possessed few kindchenschema features to appear in the non-cute poster. We then pretested the selected images. Participants (N = 27) were shown a set of four animals, either all cute or all non-cute, and rated the cuteness of each animal (1 = not cute at all, 100 = extremely cute). One-way ANOVA showed that the cute animals were indeed perceived as being cuter than the non-cute ones (all  $ps < .05$ ).

### *Procedure*

Participants were randomly assigned to view either the cute recycling poster or the non-cute one, depending on condition. Afterwards, we assessed participant’s sustainability-related intentions by assessing intentions to recycle (“To what extent are you willing to recycle after seeing this poster?”, “How likely are you to recycle after seeing this poster?”, and “To what extent does this poster motivate you to recycle?”) and the willingness to try environment-friendly products (“How much do you want to try products that are made of recycled materials / biodegradable trash bags / phosphate-free detergents?”). All questions were administered on 7-point scales (1 = not at all, 7 = very much) and later combined to form an index of sustainability-related intentions ( $\alpha = .91$ ). Then, as a manipulation check, we asked participants to rate the cuteness of the animals appearing in the poster (1 = not cute at all, 7 = extremely cute). Finally, participants responded to the BIS/BAS questionnaire (Carver and White 1994), which was presented as an ostensibly different consumer survey, and then ended the experiment.

## Results and Discussion

### *Manipulation Check*

One-way ANOVA showed that the animals in the cute poster were rated much cuter than the equivalent animals in the non-cute condition ( $M_{\text{cute}} = 6.24$  vs.  $M_{\text{non-cute}} = 5.32$ ,  $p < .0001$ ).

### *Sustainability-related Intentions*

Participants' scores on the index of sustainability-related intentions were regressed on type of appeal (1 = cute, -1 = non-cute), BAS (standardized), and the appeal x BAS interaction. In support of H1, there was a significant interaction effect ( $\beta = .29$ ,  $t = 2.93$ ,  $p < .01$ ), and no other effects were significant ( $p > .10$ ). Follow-up spotlight analyses revealed that high-BAS participants (i.e.,  $M + 1$  SD) reported higher intentions to behave sustainably after having viewed the cute recycling poster compared to the non-cute one ( $M_{\text{cute}} = 5.38$  vs.  $M_{\text{non-cute}} = 4.74$ ;  $\beta = .32$ ,  $t = 2.31$ ,  $p < .03$ ), suggesting a positive effect of cuteness on sustainability-related intentions among high-BAS consumers. In contrast, among low-BAS participants (i.e.,  $M - 1$  SD) there was a directionally significant difference in the opposite direction ( $M_{\text{cute}} = 4.47$  vs.  $M_{\text{non-cute}} = 4.99$ ;  $\beta = -.26$ ,  $t = -1.86$ ,  $p = .07$ ; see Figure 2). We did not expect this marginally significant negative effect of cuteness among low-BAS participants. We test this further in the following studies, and return to it in the General Discussion.

[Insert Figure 2 about here]

Additionally, we analyzed the slopes of BAS for the two posters, and found that BAS had a significantly positive effect for the cute poster ( $\beta = .45$ ,  $t = 3.53$ ,  $p < .01$ ), but no effect for the non-cute poster ( $\beta = -.13$ ,  $t = -.84$ ,  $p > .40$ ). That is, among those who saw the cute poster, increasing BAS led to increasingly positive intentions. In contrast, all participants regardless of BAS responded similarly to the non-cute poster.



These results provided initial evidence for our hypothesized positive effect of cuteness in enhancing sustainability-related motivation among individuals who have strong general approach tendencies (H1). Consistent with our predictions, exposure to a poster that presented images of cute (vs. non-cute) animals enhanced high-BAS participants' intentions to recycle and to try environment-friendly green products; this effect was not apparent for participants with low BAS.

### **Study 2: The Mediating Role of Tenderness**

The goal of Study 2 was to test the mechanism underlying the effect observed in Study 1 (H2). We expected that high-BAS people should be more predisposed to respond with tenderness to a cute (vs. non-cute) appeal, and these feelings of tenderness should drive their prosocial intentions. In this study, we measured two different empathic emotions—tenderness and sympathy (Lishner et al. 2011; Niezink et al. 2012) to test whether it is indeed tenderness, rather than sympathy, that drives the proposed cuteness by BAS interaction.

Another purpose of Study 2 was to examine an alternative explanation for the observed effect. Prior research has argued that cuteness is generally liked and produces general positive affect among its viewers (Hildebrandt and Fitzgerald 1978), which raises the possibility that high-BAS individuals' positive responses to cute prosocial appeals might be caused not by tenderness, but by enhanced general positive feelings towards cuteness. We theorize, based on prior research, that the general positive affect account is less likely. The extant literature reveals no conclusive findings regarding the relationship between general positive affect and prosocial behaviors (e.g., Fisher, Vandenbroch, and Antia 2008; Small and Verrochi 2009). Rather, it has been suggested that prosocial appeals that produce positive feelings may not enjoy advantages in

eliciting prosocial behaviors (Small and Verrochi 2009), and could even discourage prosocial motivations (Fisher et al. 2008). To empirically disentangle the underlying process, here we measured participants' affective responses, including tenderness, sympathy, and general positive affect, and conducted mediation analyses to test which construct mediates the observed effect.

## **Method**

Study 2 employed a 2 (appeal: cute vs. non-cute) by 2 (BAS: high vs. low; measured factor) between-subjects design. Mechanical Turk workers (N = 240, 145 males,  $M_{\text{age}} = 35$ ) participated in return for US\$0.50. We adopted a similar procedure to that of Study 1, except that participants' affective responses were also measured. Under the cover story of examining the effectiveness of recycling poster design, participants were randomly assigned to see one of the two posters used in Study 1. They then indicated their willingness to recycle on a 7-point scale (1 = not at all, 7 = very much). Afterwards, participants responded to multiple items that describe how they might have felt when viewing the poster (1 = strongly disagree to 7 = strongly agree). These items were displayed in randomized order, and measured feelings of tenderness (3 items: tender, warm, softhearted; Niezink et al. 2012), sympathy (3 items: compassionate, moved, sympathetic; Niezink et al. 2012), and general positive feelings (5 items: happy, alert, inspired, determined, attentive; PANAS short version; Thompson 2007). Following this, as manipulation check, participants rated the cuteness of the animals in the poster (1 = not cute at all to 7 = extremely cute). Finally, they completed the BIS/BAS questionnaire, which was administered as an ostensibly different consumer survey, and then ended the study.

## **Results**

### *Manipulation Check*

A one-way ANOVA of the averaged cuteness ratings showed that participants perceived

the animal images in the cute poster as being cuter than those used in the non-cute poster ( $M_{\text{cute}} = 6.09$  vs.  $M_{\text{non-cute}} = 5.50$ ,  $F(1, 238) = 18.06$ ,  $p < .001$ ).

### *Willingness to Recycle*

We regressed participants' willingness to recycle on appeal (1 = cute, -1 = non-cute), BAS (standardized), and the appeal x BAS interaction. As predicted, there was a significant interaction effect ( $\beta = .21$ ,  $t = 1.96$ ,  $p = .05$ ). No other effects were significant ( $ps > .10$ ). Follow-up spotlight analyses revealed that high-BAS participants (i.e.,  $M + 1$  SD) were directionally more willing to recycle after viewing the cute poster than after viewing the non-cute one ( $M_{\text{cute}} = 5.50$  vs.  $M_{\text{non-cute}} = 4.99$ ;  $\beta = .25$ ,  $t = 1.66$ ,  $p < .05$  one-tailed). In contrast, low-BAS participants (i.e.,  $M - 1$  SD) did not differ in their stated intention to recycle ( $M_{\text{cute}} = 4.71$  vs.  $M_{\text{non-cute}} = 5.05$ ;  $\beta = -.17$ ,  $t = -1.11$ ,  $p = .27$ ). This null effect is different from what we observed in Study 1, and we will return to this point in the General Discussion.

Additionally, we conducted simple slopes analyses and found that in the cute poster condition, increasing BAS led to significantly higher willingness to recycle ( $\beta = .39$ ,  $t = 2.64$ ,  $p < .01$ ). However, in the non-cute poster condition, there was no effect of BAS on recycling intentions ( $\beta = -.03$ ,  $t = -.20$ ,  $p = .84$ ).

### *Tenderness as the Underlying Mechanism*

We averaged participants' responses to each of the three sets of items measuring tenderness ( $\alpha = .96$ ), sympathy ( $\alpha = .95$ ), and general positive feelings ( $\alpha = .86$ ) respectively, to create indices of each. We then regressed the tenderness index on appeal (1 = cute, -1 = non-cute), BAS (standardized), and the appeal x BAS interaction. There was a marginally significant interaction effect ( $p = .09$ ), such that high-BAS consumers reported significantly greater feelings of tenderness in response to the cute poster than to the non-cute poster ( $M_{\text{cute}} = 5.60$  vs.  $M_{\text{non-cute}}$

= 4.86;  $\beta = .37$ ,  $t = 2.38$ ,  $p < .02$ ). In contrast, low-BAS consumers experienced similar levels of tenderness ( $M_{\text{cute}} = 4.84$  vs.  $M_{\text{non-cute}} = 4.85$ ;  $\beta = .0$ ,  $t = -.02$ ,  $p = .98$ ). Separate similar analyses, on sympathy and positive affect as dependent variables, revealed no significant interaction effect either on sympathy ( $p < .19$ , *NS*) or positive affect ( $p < .17$ , *NS*), suggesting that neither sympathy nor positive affect mediates the observed effect.

To directly test whether tenderness and not the other two affective states mediates the observed effect, we conducted three separate mediated moderation analyses with tenderness, sympathy, and general positive feelings as the possible mediators (Model 7, Hayes 2013). Most importantly, introducing tenderness to the regression model on participants' willingness to recycle yielded a significant indirect effect of the appeal by BAS interaction via tenderness. Among high-BAS participants, exactly as predicted by H2, tenderness mediated the effect on their willingness to recycle ( $\beta = .21$ , bootstrapped 95% CI: [.04, .44], 5000 samples). In contrast, tenderness did not mediate the effect among low-BAS participants ( $\beta = 0$ , bootstrapped 95% CI: [-.17, .17], 5000 samples), and the direct effect was no longer significant ( $\beta = -.08$ ,  $p = .40$ ).

Additional analyses ruled out possible mediating roles of sympathy and positive affect. When sympathy (instead of tenderness) was used as the mediator, there was no significant indirect effect of the appeal by BAS interaction via sympathy among either high-BAS participants ( $\beta = .16$ , bootstrapped 95% CI: [-.01, .37], 5000 samples) or those low in BAS ( $\beta = 0$ , bootstrapped 95% CI: [-.17, .17], 5000 samples). Similarly, using general positive affect (instead of tenderness) revealed no significant indirect effect of the appeal by BAS interaction via positive affect among high-BAS participants ( $\beta = .17$ , bootstrapped 95% CI: [-.001, .38], 5000 samples) or those low in BAS ( $\beta = 0$ , bootstrapped 95% CI: [-.15, .16], 5000 samples).

## **Discussion**

This study builds on Study 1 to support our proposition that participants' general approach tendencies (BAS) determine their responses to prosocial cuteness appeals (H1). Importantly, it provides direct support for our proposed underlying mechanism implicating feelings of tenderness (H2). As shown by the mediation analyses results, high-BAS participants' enhanced prosocial motivation was mediated by their experienced feelings of tenderness. Notably, similar tests of mediation revealed that neither participants' experienced sympathy nor generalized positive affect mediated the effect, ruling these out as alternative mechanisms. These also help rule out the possibility of a demand effect, because the different items measuring participants' affective feelings were randomized and intermingled, which should have led to reduced awareness of the study's purpose. Further, had participants responded to these affective items as they thought they should (e.g., participants in the cute condition intentionally reporting greater affective feelings than they really experienced), we would have observed similar patterns vis-a-vis sympathy and generalized positive affect. Also the null effect of general positive affect is consistent with previous research that positive affect may not effectively elicit prosocial behaviors (Fisher et al. 2008; Small and Verrochi 2009). Importantly, in this study we were able to tease apart two distinct empathic emotions, tenderness and sympathy. The mediation analyses revealed that high-BAS participants' enhanced prosocial motivation is driven by experienced tenderness rather than sympathy. This finding corroborates previous research that cuteness elicits feelings of tenderness, which are emotional antecedents of nurturing tendencies (Frijda 1986; Sober and Wilson 1998).

### **Study 3: Cuteness and Primed Approach Motivation Enhance Charitable Intentions**

Study 3 aims to lend additional support to the conceptual framework and extend it in two key ways. First, it examines a more general prosocial intention - people's intention to donate to charities - to generalize the scope of the effect. In addition, it captures the role of approach motivation by priming (instead of measuring) BAS via displaying either an action-oriented active message versus a passive one. To recap our logic, cuteness, as a reward, spurs approach motivation, and BAS regulates approach tendencies towards rewards. People with strong general approach tendencies actively approach rewards, whereas people with weak approach tendencies show reduced sensitivity to rewards (Gray 1970, 1981). As such, messages that stress action orientation may prime strong BAS and subsequently elicit enhanced responses towards cuteness. Following this logic, we expect that prosocial advertisements that combine high-BAS messages with cute visuals should be more likely to induce heightened donation intentions, akin to the effect of cuteness for high-BAS individuals who display chronically strong approach tendencies.

## **Method**

### *Design and Stimuli*

This study followed a 2 (appeal: cute vs. non-cute) by 2 (BAS priming: active vs. passive) between-subjects design, and examined participants' responses towards charitable advertisements that request donation to help animals. We created four posters featuring images of a dog with a caption (see Appendix B). We manipulated cuteness using the images, either a cute puppy or a non-cute adult dog. These images were pretested on participants ( $N = 30$ ) who were randomly shown one of the two images, and rated its cuteness (1 = not cute at all to 7 = very cute). A 2-sample  $t$ -test confirmed that the cute dog was perceived as significantly cuter than the non-cute one ( $M_{\text{cute}} = 6.03$  vs.  $M_{\text{non-cute}} = 4.23$ ,  $t(29) = 6.60$ ,  $p < .001$ ).

As manipulation of BAS, the advertisements featured either an action-oriented message

that called for a donation, written in italics with an exclamation mark (“Your donation can help animals. *Donate NOW!*”) in the high-BAS condition, or a passive message written in normal font (“Your donation can help animals. Please Donate”) in the low-BAS condition. We expected that the BAS priming should affect participants’ prosocial intentions only in the cute image condition, and that the priming alone should not directly influence prosocial intentions. To confirm this, we conducted a separate study with participants ( $N = 64$ ), whereby they were randomly shown either the poster featuring the high-BAS message or the poster featuring the low-BAS message (no visual images appeared in either poster). There was no differences in prosocial intentions across the two BAS-priming conditions ( $M_{\text{active}} = 4.02$  vs.  $M_{\text{passive}} = 4.39$ ;  $F(1, 62) = 1.17, p = .28$ ).

### *Participants and Procedure*

Participants ( $N = 144$ , 81 males,  $M_{\text{age}} = 36$ ) were recruited for US\$0.50 on Amazon Mechanical Turk. Participants were told that a local animal protection agency had designed a poster to generate donations to help save animals and improve their living conditions, and we were interested in their reactions to the poster. Depending on condition, participants were shown one of the four posters. After they saw the poster, participants indicated the extent to which they were willing to donate their payment for participating in this research to help the animals (1 = not at all, 7 = very much). As a manipulation check, they also rated the cuteness of the animal appearing in the poster (1 = not at all to 7 = extremely cute).

## **Results**

### *Manipulation Check*

A one-way ANOVA showed that the animal image used in the cute condition was rated as significantly cuter than the one used in the non-cute condition ( $M_{\text{cute}} = 6.19$  vs.  $M_{\text{non-cute}} = 5.16$ ,  $F(1, 142) = 9.55, p < .001$ ).

### *Willingness to Donate Research Payment*

A two-way cuteness by prime ANOVA on participants' willingness to donate their payment revealed a significant interaction ( $F(1, 140) = 3.87, p = .05$ ). No other effects reached significance ( $ps > .30$ ). As predicted, there was a significant simple effect of BAS priming in the cute condition, such that participants who saw the cute appeal that displayed the active (high-BAS) message were more willing to donate their payment than those who saw the cute appeal with the passive (low-BAS) message ( $M_{\text{active}} = 3.21$  vs.  $M_{\text{passive}} = 2.22$ ;  $F(1, 140) = 4.23, p < .05$ ). In contrast, participants had similar intentions to donate after viewing the non-cute active versus the non-cute passive poster ( $M_{\text{active}} = 2.73$  vs.  $M_{\text{passive}} = 3.05$ ;  $F(1, 140) = .49, p > .45$ ).

### **Discussion**

Study 3 replicates the interactive effect of cuteness and BAS (primed) on charitable intentions to provide further support for our conceptual framework. Participants who saw the prosocial appeal featuring the combination of a cute visual and a high-BAS message reported greater intentions to donate than others. The generalization of our proposed effect from pro-environmental intentions (Studies 1 and 2) to charitable donation intentions lends additional external validity to our findings.

Taken together, the results of Studies 1- 3 are supportive of our conceptual framework, but each of them measures intentions and not actual behaviors. It is well known that there is some inconsistency between consumers' articulated attitudes and their actual behaviors (Fazio, Powell, and Williams 1989). This attitude-behavior gap is particularly relevant to the current context of prosocial and sustainable behaviors since many people may articulate what they believe is the "right" thing to do, but not follow through with their actions (Kollmuss and Agyeman 2002). With this in mind, Study 4 presented next is a large-scale field study conducted



at a university campus that demonstrates the positive effect of prosocial cuteness appeals with BAS orientation on actual recycling behaviors over an extended period of time.

#### **Study 4: Recycling Field Experiment**

This field experiment had two purposes. First, we aimed to test whether our proposed interactive effect of cuteness and BAS, as observed on intentions in the preceding studies, influenced people's actual recycling behaviors. Second, we wanted to observe whether recycling behaviors promoted by high-BAS cuteness appeals had a relatively long-lasting effect or rather wore out quickly. To serve these purposes, we collaborated with a university's Sustainability Unit on a field intervention, in which we used appropriately designed visually appealing cute images and messages on recycle bins, and measured the amount of recycled materials over eight weeks.

Our study design was subject to some key considerations and constraints, and thus has some limitations. Most notably, the total cost of one recycling bin, including sourcing the bin and designing and producing the images, was over US\$500. This imposed a limit on the total number of bins we could install, with implications for the study design. Considering our key proposition was that approach motivation regulates responses to cuteness (H1), we chose to design bins that were all cute, but featured either active (high-BAS) messages or passive (low-BAS) ones.

#### **Method**

##### *Quasi-experimental Designs*

Based on the amount of traffic, estimated amount of use of recyclable materials, and ease of comparisons, four different undergraduate dormitories (UG Halls 1, 2, 8, and 9) and the new

business school building (henceforth SBM) were initially selected for this field study. Due to unforeseen data collection issues, we had to drop Halls 8 and 9 from the study. Consequently, our final data comes from UG Halls 1 and 2 (separate buildings) that are similar in architectural structure and could be closely matched to each other, and from SBM where the comparison was within the building across floors. UG Halls 1 and 2 accommodate approximately 1000 residential undergraduate students (with mixed gender, from different majors and years), and SBM hosts approximately 4300 students and 250 faculty and staff. The study lasted eight weeks from March until early May, going through two phases: a control phase lasting three weeks, and an experimental phase that lasted five weeks.

UG Halls 1 and 2 were paired in a time-trend design. Prior to the study, the dorms had only one recycling bin placed outside the hall entrance (each bin had three compartments for paper, plastic, and metal). During the study period, we installed one recycling bin in the common room on each floor of the dorms. In the control phase, normal 3-compartment recycling bins were introduced to both halls. Then, in the experimental phase, all bins in Hall 1 were switched to reveal a passive (low-BAS) message coupled with an image of a passive cute animal (described below). At the same time, all bins in Hall 2 were switched to reveal an active (high-BAS) message coupled with an image of an active cute animal.

The SBM design was more complicated because of the different populations that use this building and the varying amount of traffic on each floor. The first three floors consist of classrooms while the top three floors house faculty offices (offices from the same department are located together on the same floor). In the control phase, normal recycling bins were introduced on each floor. Then, in the experimental phase, all bins were switched to reveal the cute visuals and messages. On student floors, three sets of recycling bins were systematically placed at three

different types of locations: high-traffic areas (i.e., near a lift), high-visibility areas (i.e., at the end of a hallway), or common-study seating areas. On faculty floors, two sets of recycling bins were placed near each of the two departments' general offices. Alternate floors displayed the active and passive executions.

### *Pretest: Stimulus Development*

Our objective was to create four different images to be used as frontage for the recycling bins. The images all needed to be cute, but vary in the extent of approach motivation they elicited. Following the same logic as in study 3, we created different executions, which either combined images of cute baby animals that were running towards the viewer, with active slogans in italic font and exclamation marks (i.e., “Recycle *NOW!*”, and “Recycling is *FUN!*”; high-BAS condition), or images of passive cute baby animals with passive slogans in normal font (i.e., “Recycle please”, and “Recycle for me”; low-BAS condition). We expected that the executions in the high-BAS condition would, in line with Study 3, prime people with approach motivations.

Using the created slogans and selected images of cute animals, we initially designed six different executions, either cute active (high-BAS) or cute passive (low-BAS). To avoid exposing the stimuli to the focal subjects, we pretested these on 89 college students (37 males) at a different local university. Participants were randomly presented with one of the six executions, and asked to answer two questions: (1) Does this poster make you want to recycle, and (2) How much do you like this poster (1 = not at all, 7 = very much). One-way ANOVAs revealed that there was no difference in participants' stated motivation to recycle ( $p > .14$ ), but a significant difference in liking ( $F(5, 83) = 2.42, p < .05$ ). Thus we deleted the two posters that participants liked the most and the least, leaving four executions (two active and two passive) rated as equally likable ( $F(3, 39) = 2.05, p > .12$ ). To increase confidence in any effects we might observe,

we used both executions for each condition. A post-test in which participants ( $N = 374$ , MTurkers) were shown either the active or the passive posters, between-subjects, and were then administered the BIS/BAS scale (Carver and White 1994), revealed that the active posters enhanced approach motivation (BAS score) directionally more than the passive posters did ( $M_{\text{active}} = 39.20$  vs.  $M_{\text{passive}} = 38.20$ ;  $F(1, 373) = 3.03, p = .08$ ). The four selected executions (see Appendix C) were printed on high quality foam boards of the same dimensions as the recycling bins (900 x 760mm), which were stuck on the bins.

#### *Data Tracking: Custom-made Bins and Bags*

Fifty-two recycling bins were custom-made, each containing three separate built-in compartments, for paper, metal, and plastic. Each bin was assigned a three-digit code such that: the first digit represented the location (e.g. UG Hall 1 = 1), the second digit represented the floor the bin was on, and the last digit represented the type of location (e.g. residence hall common room = 0). For example, the bin assigned the code “120” was placed in the common room on the second floor in UG Hall 1. We then ordered thousands of transparent plastic collection bags, and marked each bag with the code number of the bin in which it would be placed, and letters representing paper (PP), metal (M), and plastic (PL). For example, bags marked with “120PP” were put under the paper-collecting compartment of the bin numbered “120”.

#### *Data Collection*

Across the control and experimental periods, the amount of recycling in all locations was regularly weighed and recorded. We coordinated 7 student helpers, 29 janitorial staff, 34 UG hall attendants, and 12 managerial staff in the collection of data. Specifically, the janitorial staff collected recyclables daily (twice per week for SBM) from our new recycling bins, replaced them with appropriately labeled empty plastic bags, and transferred the marked filled bags to

designated weighing and storage areas. The student volunteers weighed the recycled materials and recorded the data for each bin daily (twice per week for SBM). They then transferred the recycled materials to a central collection center for municipal pickup.

## **Results and Discussion**

During the study period, over 3,087 pounds of materials were recycled at the installed bins at these five locations. Approximately 1,103 pounds came from the business school building, and the remaining 1,984 pounds was from the undergraduate dormitories.

### *SBM Building*

In the business school building, we computed a measure of relative increase (or decrease) in recycling for each individual bin during the experimental versus control period, by dividing the amount of material recycled at that bin during the experimental phase by the average amount of goods recycled there during the control phase. Hence each bin functioned as its own control. We regressed this relative amount of recycling on condition (high-BAS active bins = 1, low-BAS passive bins = -1), while controlling for time (coded from 1 to 16, representing the first to the last data point in the study), and bin number. The regression results revealed significant effects of condition ( $M_{\text{active}} = 1.55$  vs.  $M_{\text{passive}} = 1.02$ ;  $\beta = .20$ ,  $t = 2.32$ ,  $p < .03$ ), and time ( $\beta = .19$ ,  $t = 2.20$ ,  $p = .03$ ). As predicted, the cute active posters enhanced the amount of recycling by up to 55% compared to the regular recycling bins while the passive recycling posters did not have any incremental effect. Moreover, the time trend was positive, which suggests that the positive effect of the manipulated bins did not wear off, but rather was sustained over the study period.

Additional one-way ANOVAs investigating different types of users (student floors = 1, faculty floors = 2) revealed no difference ( $M_s > 1.10$ ;  $F(1, 126) = .35$ ,  $p > .80$ ). One-way ANOVAs on different types of locations also yielded no differences amongst social study areas,

high-traffic areas, and high-visibility areas on the student floors ( $F(2, 77) = 1.46, p = .24$ ), and no differences between the two wings on the faculty floors ( $F(1, 46) = .29, p = .60$ ). The patterns of total quantities recycled did not vary across replicate (i.e., the two active executions were similar to each other, as were the two passive executions). Moreover, further investigation revealed that the observed effects were driven by quantities of plastic and paper recycled rather than metal (metal constituted less than 15% of the recycled materials by weight, far less than the others).

### *Undergraduate Halls*

For each recycling bin, we again divided the amount of recycling in the experimental period by the average amount of recycling across the control period across all recycling bins. We then regressed this measure of relative increase or decrease in recycled amounts on bin design condition, location, and time. The regression analysis revealed significant effects of condition ( $M_{\text{active}} = 1.27$  vs.  $M_{\text{passive}} = .93$ ;  $\beta = .24, t = 2.04, p < .05$ ), location ( $\beta = -.28, t = -2.39, p < .05$ ), and a marginally significant effect of time ( $\beta = .08, t = 1.70, p < .09$ ). Particularly, the active cute recycling bins increased the amount of recycling by 27% compared to the regular recycling bins, while the passive cute recycling bins had no effect (if anything, slightly negative), replicating the result from SBM. Dorm occupants are assigned by gender to floor, and, using floor as proxy for gender, we found no variation by gender ( $p > .30$ ).

[Insert Figure 3 about here]

### *Time Trend*

The positive effect of time in the above regression analyses suggests that the cute active recycling bins induced a sustained effect over time. As a further test, we conducted a  $t$ -test of the weights (unit: pounds) collected in each recycling bin in UG Halls 1 and 2 on the first versus the last day of the experimental phase. The results revealed a marginal increase ( $M_{\text{first}} = 1.41$  vs.  $M_{\text{last}}$

= 3.40,  $t(17) = -.18, p < .09$ ). For SBM, a similar analysis revealed a significant difference ( $M_{\text{first}} = 5.45$  vs.  $M_{\text{last}} = 14.48, t(19) = -3.84, p < .001$ ). More recyclables were collected in the last compared to the first day of the experimental phase. Pooling the data of UG Halls and SBM yielded a significant difference ( $M_{\text{first}} = 3.51$  vs.  $M_{\text{last}} = 9.24, t(37) = -3.93, p < .001$ ), showing that people recycled more materials at the end of the experimental phase than when they first saw the cute bins.

Additionally, we counted the number of recycling bins that collected equal or more amounts of materials on the last day/half-week of the experimental phase than on the first day/half-week of the experimental phase. In UG Halls 1 and 2, out of the total 18 recycling bins, 10 bins (56%) collected more recyclable materials on the last day than on the first day, and 2 bins (11%) collected equal amounts on both days, totally accounting for 67% of the recycling bins. Similarly, we found that in SBM out of the 20 recycling bins, 18 bins (90%) collected more materials on the last half-week than on the first half-week of the experimental phase, and one recycling bin collected equal amounts on both half-weeks (5%), constituting 95% of the bins. Consistently, we observed that the semi-weekly absolute quantity of recycled goods averaged across all active bins (and all passive bins) in SBM first increase but then decreased in the control phase (i.e., the impact of introducing new bins wore off quickly), and then exhibited a slow upward trend over the experimental phase (a similar trend was observed for the passive bins; i.e., the effect of the cute interventions tended to sustain). All these results suggest that the effect of the cute high-BAS interventions did not dwindle over time.

## **Discussion**

The results of this field study replicate Study 3 and demonstrate that all cute appeals are not uniformly effective - those combined with approach messages have a positive impact on

people's actual recycling behaviors, which is consistent with our proposition (H1). The results here provide cogent and strong evidence for the generalizability of the cuteness by BAS effect over different populations: the same pattern of results was observed across the business school building and undergraduate residence halls, where different manipulations of BAS were utilized, with different target populations.

Moreover, the observed time trends showed that people's recycling behaviors lasted the duration of the experimental portion of the study, i.e., eight weeks, which suggests that the observed positive effect does not wear off quickly, but rather induce a sustained increase in recycling over several weeks. This is probably driven by the intrinsically rewarding nature of the evolutionarily functional kindchenschema cuteness for people, as previous research has shown that communications that use intrinsic incentives tend to elicit sustained behavior change over time (Moller et al. 2006; Ryan and Deci 2000). Another possibility is that during the eight-week period, people may have developed enhanced familiarity with the recycling bins and even developed habits (thus reduced the perceived effortfulness of recycling, which previous research has shown to encourage recycling behaviors; Ludwig, Gray, and Rowell 1998; Pieters 1991). It is worth noting that in the control phase after the introduction of the new bins, the recycling activity first increased but then decreased, which suggests that as the newness of recycling bins wore out, people's motivation to recycle may have decreased. However, the upward trend of recycling in the experimental phase seems to suggest that the positive effect of our interventions may have overridden the downward trend and sustained its effect over several weeks.

There are limitations in the design of and thus findings from this field study, which are worth noting. First, we did not measure the amount of trash, as opposed to recyclables, that was disposed of at the chosen locations. As a reviewer pointed out, this facilitates the alternative



explanation that the cute high-BAS bins enhanced people's tendency to dispose of materials in general, leading to increases not only in recycling, but also in the amount of regular trash. Our data does not allow us to address this possibility. However, it has been suggested that kindchenschema cuteness enhances consumers' motivation to retain (vs. discard) objects (Jia, Pol, and Park, working paper), a finding which argues against the above alternative explanation. Another limitation of this study is that we did not measure potential recyclers' chronic BAS characteristics and thus are not able to investigate the relative influence of our interventions and people's chronic BAS. We also did not measure specific demographic information and thus were unable to generate more insights regarding the role of individual differences (Iyer and Kashyap 2007). Furthermore, the recycling bins were positioned in public locations and thus the recycling activity was measured at group level rather than at individual level. Finally, we discontinued measuring and recording of recycled materials immediately after the study period, but the bins with the designated posters remained in the locations for some time after the study period, and hence we were unable to examine whether the influence of our interventions sustained even after the manipulated posters were removed.

## **General Discussion**

### **Theoretical Contributions**

Convergent findings from the lab and the field provide strong support for our propositions. Visual cues of cuteness enhance prosocial and sustainable motivation in people who have strong (vs. weak) approach motivation. This proposition holds true for appeals that encourage recycling behaviors (Studies 1, 3, and 4) and those that request for donations to help

animals (Study 3). Moreover, the mediation analyses in Study 2 indicates that feelings of tenderness (vs. sympathy or general positive affect) underlie the observed cuteness by BAS interaction effect.

Of most importance, our findings contribute to the literature on prosociality and sustainability by demonstrating that different from the frequently used coercive strategies to elicit behavior change, kindchenschematically cute visuals, which are positively-valenced and aesthetically appealing stimuli, can enhance prosocial and sustainable behaviors among high-BAS individuals. The extant literature has investigated a range of persuasion strategies for prosociality, but has somewhat neglected the role of visual aesthetics. Adding to this literature, our research reveals that aesthetically cute messaging enhances high-BAS (not low-BAS) people's motivation to engage in prosocial and sustainable causes. Moreover, this finding provides a better understanding of how consumers with different personality characteristics respond to cuteness. Extant research has predominantly focused on stimulus-based determinants of cuteness (Alley 1981, 1983), and little research has investigated individual differences in responses to cuteness. Gender has been a main exception, and research has found no reliable gender differences in responses to cuteness (Parsons et al. 2011). This research goes beyond gender and shows that individual differences in motivational approach tendencies moderate their responses to cuteness. Approach tendencies, whether measured (Studies 1 and 2) or manipulated (Studies 3 and 4), regulate responses to cuteness. Gender, in contrast, has no effect in our data.

Additionally, our field study showed that people's enhanced recycling activity in response to communications featuring the combination of cute visuals and high-BAS active messages can last over a period of several weeks. This finding is congruent with previous research showing that non-coercive tactics that support people's autonomy rather than tactics that

pressure or scare them to change are relatively more effective in stimulating behavioral compliance (Moller et al. 2006; Ryan and Deci 2000).

Furthermore, our priming of strong BAS using action-oriented messages adds to related past research. The high-BAS messages used an italic font, which has been shown to heighten behavioral movement (Cian et al. 2015). Moreover, it has been shown that assertive (vs. nonassertive) communication may decrease consumer compliance, but can be more effective in persuasion when the concerned issues are perceived as important (Kronrod, Grinsten, and Wathieu 2012). Adding to these findings, in Study 3 and the field study, we employed assertive (vs. nonassertive) language combined with other methods to induce strong (vs. weak) BAS, on the grounds that assertiveness is common among extraverts, which is explained by strong BAS. We found that the active (high-BAS) slogans together with the display of cute (vs. non-cute) visuals can motivate heightened prosocial intentions and behaviors. This suggests that assertive language combined with cute visuals might be more persuasive than otherwise, a question that future research can further investigate.

The observed null effect of cuteness among low-BAS participants is consistent with previous findings that people with weak general approach tendencies have lower sensitivity to rewards and lack approach-related behaviors towards rewarding stimuli (Gray 1970, 1981; Henriques and Davidson 2000). The fact that a motivational factor rather than a cognitive factor regulates the effect of cuteness is important because it is derived directly from the theory of cuteness as a construct, and its evolutionary basis. This effect also derives directly from evolutionary theories of prosociality (de Waal 1996, 2008; Sober and Wilson 1998), and corroborates the proposition that human's nurturing instinct is a basis of general prosocial behaviors (Batson et al. 2005; McDougall 1908).

In line with previous research, we found that cues of cuteness elicit feelings of tenderness, which is a basic type of empathic emotion (Lishner et al. 2011; Niezink et al. 2012), and these tender feelings lead to heightened motivation to behave prosocially. This finding agrees with the consensus in the prosociality literature that empathic concern plays a crucial role in motivating prosocial behaviors (Batson 2009; de Waal 2008; Lishner et al. 2011). Moreover, the mediation analyses revealed that neither sympathy nor general positive feelings mediate the observed effect. This rules out potential alternative explanations, and is consistent with previous findings that positive affect may not always motivate prosocial behaviors (Fisher et al. 2008; Small and Verrochi 2009). The findings altogether suggest that the observed effect is not due to reliance on feelings versus cognition, but is driven by the specific emotion of tenderness.

### **Limitations and Future Research**

One may wonder about the construct of anthropomorphism, which has been shown to elicit heightened intentions to protect the environment (Tam, Lee, and Chao 2013). For example, Tam et al. (2013) showed that an advertisement with a talking tree can increase environment-friendly attitudes due to increased feelings of connectedness with nature. However, the literature clearly shows that cuteness and anthropomorphism are two different constructs: human-like features may lead to humanization (Tam et al. 2013), but only kindchenschema features constitute the perception of cuteness (Lorenz 1943). Essentially, not all cute objects are humanized, and not all humanized objects are cute. In our investigation, we used non-human animals in all conditions. Our cute and non-cute stimuli possess equal amounts of human-like features, and thus do not differ in anthropomorphization. Hence, unless one argues that non-cute animals are somehow less human than cute baby animals, it is not possible to attribute the observed differences across conditions to anthropomorphization. Additionally, the moderating

effect of participants' motivational approach tendencies originates from the unique evolutionary advantage of cuteness as a major elicitor of parental instinct, which has nothing to do with anthropomorphization. Our finding that feelings of tenderness produced by cuteness mediate the observed effect help triangulate on the role of cuteness rather than humanization.

Another research direction worth exploring relates to the influence of kindchenschema versus whimsical cuteness on prosocial motivation. The playful nature of whimsical cuteness suggests that it may have no effect, or even a negative effect on prosocial motivation, and this may be an interesting point of contrast for future research. Besides, recent research suggests that the concept of kindchenschema cuteness can be extended to include babyish features of senses other than vision, such as positive infantile sound and smell, and that cuteness may affect human behaviors through these senses (Kringelbach et al. 2016). Such expansion of kindchenschema suggests that adopting cute infantile sounds in prosocial advertising may have similar positive effects on encouraging prosocial behaviors, an idea worth future examination.

Finally, apart from the established positive effect of cuteness for people with strong BAS across studies, we believe that the question of how to motivate low-BAS individuals' prosociality is theoretically interesting and practically important. Our data reveals mixed results regarding the effect of cuteness among low-BAS people. In Study 1, we find that low-BAS individuals respond less favorably to cute appeals than to non-cute ones ( $p = .07$ ), suggesting a potentially negative influence of cuteness among low-BAS consumers. This effect is not replicated in Study 2 ( $p = .84$ , self-reported BAS). Then in Study 3 where participants' BAS was manipulated, we observe a marginally significant negative effect of cuteness in the weak BAS priming condition ( $p = .08$ ). Given the mixed findings from our data, we think additional investigation is needed to establish the reliability of and the possible reasons for this negative effect among low-BAS

people. It is possible that low-BAS individuals might react more strongly to persuasion attempts that aim to shape their behaviors and thus react negatively to prosocial advertisements that employ cute visuals (Friestad and Wright 1994). Future research can investigate this proposition.

### **Practical Implications for Policy Implementation and Communication**

This research shows that using aesthetic stimuli characteristic of cuteness can enhance prosocial and conservation behaviors amongst consumers who have strong approach motivation. In terms of implementation, policymakers have prioritized reducing transaction costs related to sustainable behaviors, such as increasing the provision of recycling bins to enhance the convenience and ease of recycling (Pieters 1991). Consistently, our field study showed that the mere introduction of recycling bins can increase the amount of recycling. Importantly, our field study revealed that the appropriate use of cuteness can further stimulate recycling behavior; specifically, the recycling bins that feature the combination of cute visuals and strong BAS messages engendered more recycling activity than the cute low-BAS bins; moreover, people's enhanced recycling activity towards the cute high-BAS recycling bins lasted over a period of several weeks. Besides, across studies, we found that the combination of cute visuals and strong BAS heightened people's intentions to behave in prosocial and sustainable manners as well. Hence, based on these findings we recommend governments, environmental practitioners, and policymakers to consider adopting the non-coercive aesthetically cute appeals to subtly motivate prosocial behaviors. Our findings suggest two distinct approaches to implement the cuteness tactic: (1) segment the market based on consumers' BAS characteristics and target high-BAS consumers with cuteness appeals (Studies 1, 2), or (2) prime strong BAS using action-oriented messages in ads that feature cute visuals and target these ads to the public (Studies 3, 4).

The segmenting approach corroborates a basic marketing tenet that it is more efficient to

divide people into different segments based on meaningful criteria and target persuasion efforts to each segment (Shrum et al. 1994), and points to the need for policymakers to account for differences across individuals when selecting target markets, positioning products, and, designing communication strategies (Sciandra, Lamberton, and Reczek 2017). Relatedly, our finding provides a valuable indicator of high-yield consumer profiles—consumers who possess strong BAS. However, from a practical standpoint, it is indeed challenging to segment the general population and identify target consumers according to their BAS characteristics. Sciandra et al. (2017) offer a practical solution to address this issue: using surveys to identify observable and easy-to-measure variables, either demographic, psychographic, or behavioral, that are highly correlated with people’s approach tendencies, and then use these variables as proxy to segment and spot target consumers. Given the limitation of our data which contains few demographic variables (gender, age, nationality, and native language), we recommend that policymakers and social entrepreneurs should pinpoint specific observable correlates of BAS in the general population, including demographic profiles, common lifestyles, shopping patterns, to use for segmentation. Previous research has revealed several potential correlates of strong BAS, including personality traits such as extroversion and impulsivity (Muris et al. 2005), behavioral predispositions such as risky behaviors (Cooper, Agocha, and Sheldon 2000), and demographic factors such as relatively strong BAS among adolescents (Doremus-Fitzwater, Varlinskaya, and Spear 2010). Future endeavors can further investigate these variables to guide policymakers. Upon identifying consumers who have strong BAS, policymakers may employ cute visuals in the design of prosocial and sustainability-related messages to induce them to act accordingly.

The priming approach provides a valid alternative method of employing the cuteness tactic—apart from using observable correlates of BAS, policymakers can prime strong BAS by

means of action-oriented messages. Across both lab and field experiments, we found that priming BAS using action-oriented slogans combined with cute visuals enhanced people's prosocial and sustainability-related behaviors, above and beyond the influence of their chronic BAS characteristics. This priming approach can also be effective in influencing relatively large and diverse populations. As such, we suggest that public policymakers may combine BAS-related primes with cute visuals to elicit desired prosocial behaviors. Policymakers may consider designing prosocial and sustainability-related appeals that feature a combination of cute images and action-oriented messages (e.g., active slogans that call for immediate actions, in italic font, and in assertive tone, which function to prime strong BAS), and target these ads to the general population to elicit enhanced prosocial and sustainable behaviors that leverage the influence of the cuteness aesthetic for the greater good. Like our recycling field study, environment protection agencies may consider decorating recycling bins with posters that display the combination of action-oriented high-BAS messages and cute images to motivate participation in recycling.

Finally, our results suggest a potentially effective placement strategy, particularly for prosocial and sustainability-related communications that target young people who are heavy users of the Internet and social media platforms. Images of cute babies and animals are abundant online, and people actively share, tweet, and forward them. As cuteness can enhance high-BAS individuals' prosociality, policymakers may well be advised to place prosocial messages featuring images and videos of cute entities on social media platforms to attract high-BAS people and stimulate their engagement. Such practical applications of our findings, with some thought given to localization and creativity in implementation, may well help further efforts to attain the 2030 Sustainable Development Goals.



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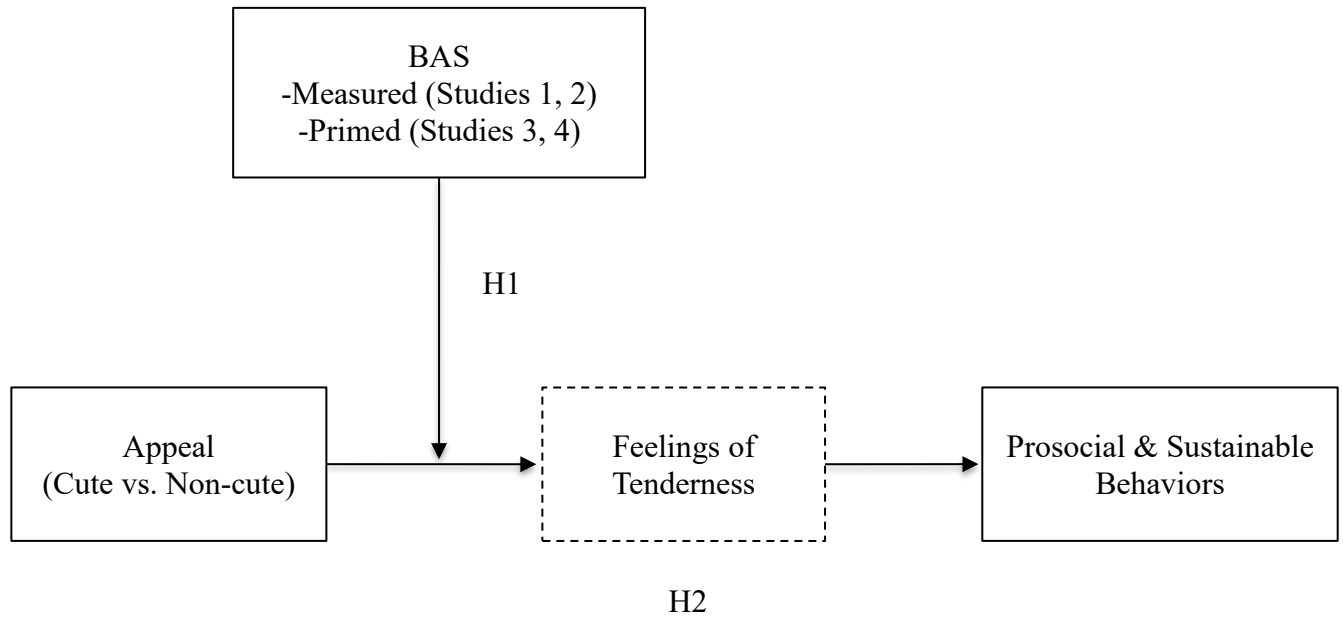
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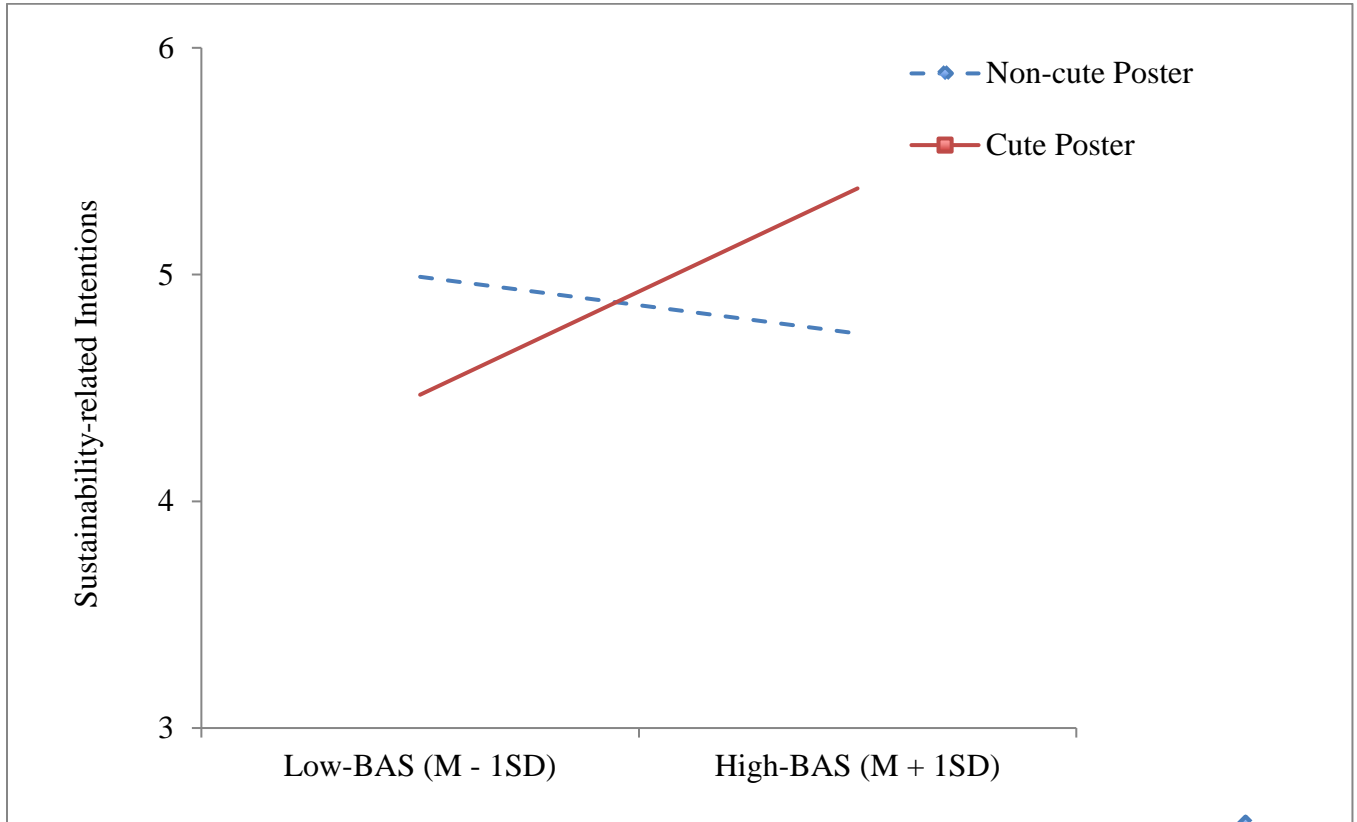
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**FIGURE 1**  
**CONCEPTUAL FRAMEWORK**



**FIGURE 2**

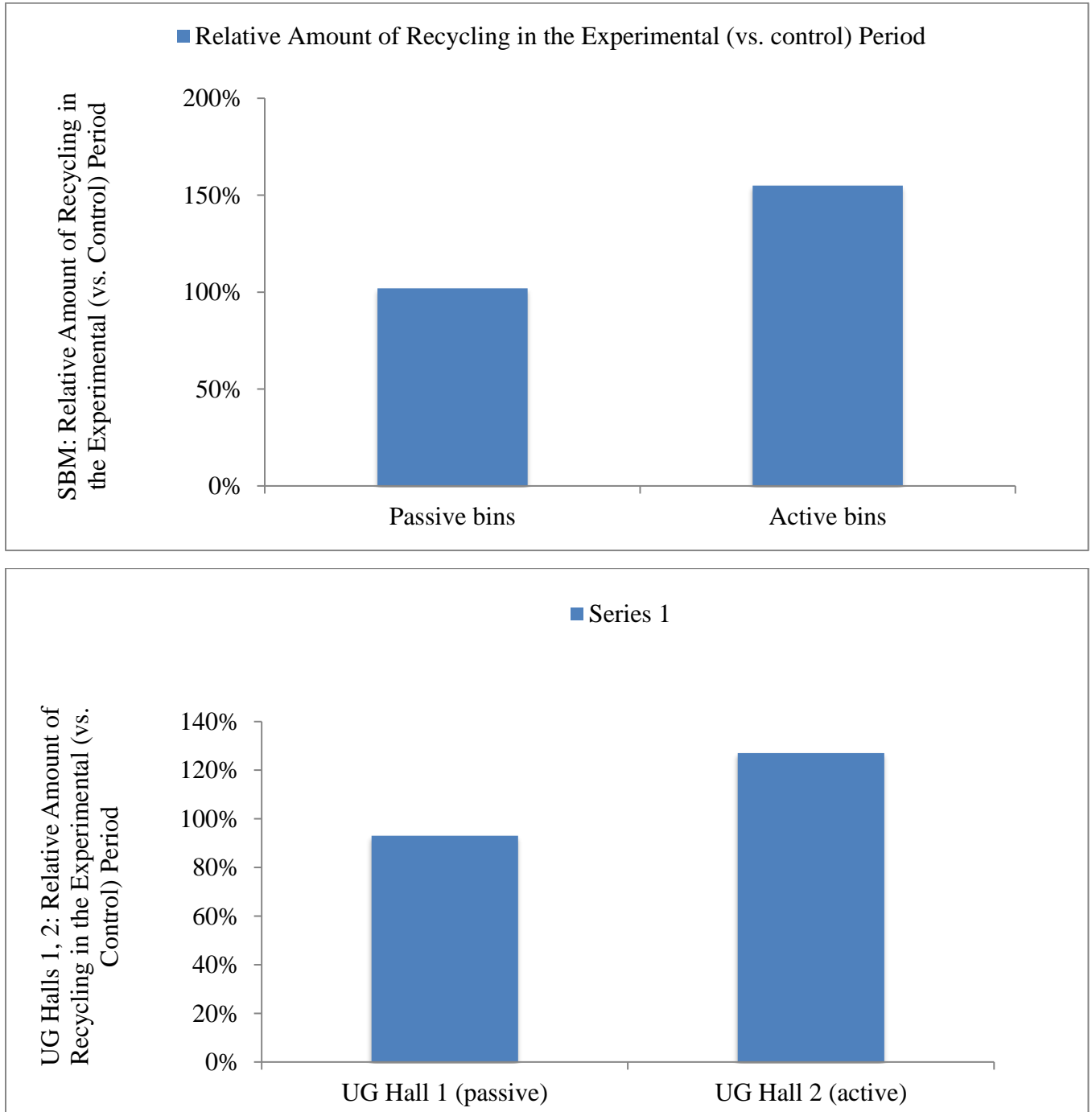
**STUDY 1: CUTENESS INTERACTS WITH BAS TO ENHANCE SUSTAINABILITY-RELATED INTENTIONS**





**FIGURE 3**

**STUDY 4: CUTE ACTIVE HIGH-BAS BINS ENHANCE RECYCLING AT SBM (TOP PANEL) AND UG DORMS (BOTTOM PANEL)**



APPENDIX A

CUTE VS. NON-CUTE RECYCLING POSTERS (STUDY 1)

**Recycling Saves Animals. Please Recycle.**



**Recycling Saves Animals. Please Recycle.**



NOTE— Top row: cute recycling poster; Bottom row: non-cute recycling poster

APPENDIX B

CHARITABLE DONATION POSTERS (STUDY 3)

Your donation can help animals

***Donate NOW !***



Your donation can help animals

**Please Donate**



Your donation can help animals

***Donate NOW !***



Your donation can help animals

**Please Donate**



NOTE— Top row: cute posters, and bottom row: non-cute posters; Left column: high-BAS posters, and right column: low-BAS posters

APPENDIX C

RECYCLING BINS USED IN FIELD STUDY 4



715 x 900mm

NOTE— Top row: High-BAS active executions; Bottom row: Low-BAS passive executions