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How Popular Media Characters Influence Children's Object Choices

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Table of Contents

ABSTRACT.....	3
<i>Parasocial Relationships</i>	5
<i>Advertising and Licensed Characters</i>	6
<i>Children's Difficulty Processing Advertisements</i>	9
<i>How Popular Characters Influence Product Preference</i>	10
<i>Inhibitory Control</i>	16
<i>The Current Study</i>	17
METHOD.....	18
<i>Power Analysis</i>	18
<i>Participants</i>	19
<i>General Procedure</i>	19
<i>Materials</i> 20	
<i>Conditions</i>	21
<i>Procedure</i> 22	
RESULTS.....	24
DISCUSSION.....	28
REFERENCES.....	34
<i>Table 1.</i> 40	
<i>Table 2.</i> 41	
<i>Table 3.</i> 42	
<i>Table 4.</i> 43	
<i>Table 5.</i> 44	
<i>Figure 1.</i> 45	
<i>Figure 2</i> 46	
<i>Figure 3.</i> 47	
<i>Figure 4.</i> 48	
<i>Appendix A</i>	49

Abstract

Children struggle with weighing relevant and irrelevant information when making purchasing decisions about products. Advertisers often take advantage of this weakness, as product marketing strategies include popular cartoon characters specifically to sway children's preferences. This strategy is so effective, children prefer *damaged* objects with characters on them over undamaged objects bearing no character (Danovitch & Mills, 2014; 2017). One element that was not examined in previous research is context regarding the intended purpose of the objects, rather only their preference was explored. Thus, children may have felt they were making a subjective choice with little or no practical consequences, and therefore gave greater weight to their personal aesthetic preferences. This study investigated whether children's choice in this situation related to inhibitory control, and whether children would change their object choice if forced to directly consider object functionality. Across six trials, three-to-four year-olds ($N = 84$) chose their preference for a damaged object bearing a familiar character or an undamaged version of the same object bearing no character (*preference trials*). Next, children were asked to move several items across the room, using one of two buckets from the last trial (*utility trials*). Results showed that children preferred damaged objects with characters over plain, undamaged objects 53% of the time. On utility trials, children picked the damaged objects with the character over the undamaged object only 33% of the time. This suggests children may value the objects' utility over the character's presence in some contexts. Children's choices on both preference and utility trials were not impacted by their performance on the Day-Night inhibitory control task, suggesting that children are not making an impulsive decision. The results from the current study suggest that children ages three-to-four are capable of weighing context specific information regarding objects.

How Popular Media Characters Influence Children's Object Choices

Children often struggle with weighing relevant and irrelevant information when making purchasing decisions about products such as toys, clothing, school supplies, and food (Danovitch & Mills, 2014). Advertisers often take advantage of this weakness. For example, marketing strategies targeted towards children often include popular cartoon characters from children's media outlets in an effort to sway children's product preferences. Products that use characters from children's media programs reached \$5 billion in sales in 2011 (NPD Group, 2012). In addition to characters from media sources (e.g., Moana, Dora the Explorer, Batman), novel characters, referred to as brand mascots, (e.g., Toucan Sam from Froot Loops) are owned by food and beverage companies and are commonly created for the exclusive purpose of marketing to children (Connor, 2006). Characters used for marketing purposes in advertisements and on merchandise help capture the attention of children, increase memory cues, induce positive affect, and even build brand loyalty (Neeley & Schumann, 2004). Given the large impact marketing and cartoon character endorsements have on children, it is important for developmental psychologists, educators, and parents to understand how children make decisions about products in the context of persuasive strategies.

A small body of research suggests that popular characters influence preschool-age children's preferences for objects, such as backpacks and toys, regardless of the quality of the object (e.g., new or damaged) (Danovitch & Mills, 2014; 2017). Specifically, when children were asked to indicate their preference between object pairs, they significantly preferred damaged objects with characters on them over the same object—undamaged, but without the character (Danovitch & Mills, 2014; 2017). This preference for damaged objects was not seen when the damaged object bore a control cartoon character or a star of the child's favorite color.

One element not examined in previous research was if children's preferences for damaged objects were related to any developmental factors such as the child's ability to control their impulses (i.e., inhibitory control). Another element not examined in previous research was context regarding the intended purpose of the objects, rather only their preference was explored. Thus, children may have placed greater weight on the presence of the sticker rather than the functionality of the object.

To further investigate these questions, the current study examined the influence of popular characters on children's object preferences, similar to Danovitch and Mills (2017). Additionally, the current study examined what object children would use to carry out a task to investigate their object choice when functionality was made more salient. Last, we examined if children's inhibitory control impacted children's object choices.

In order to provide background for the current study, first I will discuss the connection individuals have with media characters and how advertisers might take advantage of this relationship in their marketing strategies. Then, I will review the literature on advertising and popular characters. Last, I will discuss the possible relationship of inhibitory control in children's product decisions and point out gaps in the current literature.

Parasocial Relationships

The imaginary, one-sided connection people have with media characters is referred to as a parasocial interaction or relationship, in which people respond to media characters in a way resembling a true social relationship (Giles, 2002; Horton & Wohl, 1956; Richert, Robb, & Smith, 2011). These media characters can also serve as role models through social learning (Austin & Meili, 1994; Giles, 2002; Kotler, Schiffman, & Hanson, 2012). Researchers suggest that children might start to develop a parasocial relationship after a brief exposure to the

character by imitating their behavior, discussing the characters with others, imagining interactions with the character, and maybe even attempting to contact the character (Giles, 2002). It is believed that parasocial relationships play a role in identity formation and autonomy development of children and adolescents (Gleason, Theran, & Newberg, 2017). The strategy of using media figures in advertising to market to a large audience is effective due to these one-sided connections individuals make with celebrities and media figures (Horton & Wohl, 1956; Kotler et al., 2012). Advertisers take advantage of parasocial relationships, social learning, and social norms by using admired media figures to promote their product.

Advertising and Licensed Characters

Because children are influenced by content they see in the media, they are vulnerable to persuasive advertising messages (Moses & Baldwin, 2005). It is recommended by the American Academy of Pediatrics that preschool-age children not engage in more than one hour of screen time (e.g., watching television, iPad use, computer games) per day. However, children typically spend much more time engaging in screen time than is recommended (AAP, 2016). Results from a 2017 study suggested that three- to five-year-old children on average spent 1.15 hours per day watching TV and 1.04 hours using a tablet, while only .81 hours playing outside and 1.10 hours playing with traditional toys (Slutsky & DeShetler, 2017). Additionally, it is estimated that children in the United States view around 40,000 advertisements per year on TV alone (APA Task Force on Advertising and Children, 2004; Lapierre, Fleming-Milici, Rozendaal, McAlister, & Castonguay, 2017). This exposure to advertisements can be dangerous because these messages have the potential to facilitate negative outcomes for the child's health and overall well-being by influencing them to desire less healthful food options such as sugary cereals over fruits and vegetables (Kraak & Story, 2015). After a review of previous research on children and

advertising, the American Psychological Association recommended a restriction on advertising to children under the age of eight due to the consensus that children are unable to comprehend advertisements and are therefore susceptible to persuasive intentions (APA Task Force on Advertising and Children, 2004).

In addition, the World Health Organization has recommended that children should not be exposed to advertisements for unhealthy food and beverages due to the overwhelming amount of research by scientists and public health experts on the topic of children being influenced by brand mascots and media characters (Kraak & Story, 2015; WHO, 2010). For example, research has suggested that children rate food as tasting better when characters are on the packaging (Lapierre, Vaala, & Linebarger, 2011; Letona, Chacon, Roberto, & Barnoya, 2014; Roberto, Baik, Harris, & Brownell, 2010). In their study, Letona et al. (2014) asked four- to nine-year-old children to taste three types of snack food (potato chips, crackers, and carrots) with each food presented in packaging with a popular licensed character (e.g., SpongeBob) and packaging without a licensed character. After tasting the two samples of food in the two types of packaging, the children were asked if the food tasted the same or if one tasted better. Children then rated their snack preference for both samples of food on a smiley-face Likert scale. The results showed that 66% of children picked the food packaged with the character for their snack choice and 34% picked the food packaged without the character. In addition, children significantly preferred the taste of all three foods packaged with the character when asked if the foods tasted the same or if one tasted better. These results highlight how the presence of popular characters can sway children's evaluations of products, even in seemingly irrational ways.

In a similar study, Kotler et al. (2012) examined the influence of familiar media characters from *Sesame Street* on children's self-reported preference and quantity of foods eaten.

Children's food preference was measured in a series of experiments by asking which food they would like to eat on nine trials of competing food pairs (e.g., zucchini versus celery, potato chips versus apple, Saltine crackers versus pumpernickel crackers). In the experimental condition, one snack was branded with a *Sesame Street* character and the other was branded with a color matched unfamiliar control character. Prior to the study, children were classified as high *Sesame Street* fans if they preferred the three Sesame Street characters over the three matched control characters. The results indicated that children who were classified as high *Sesame Street* fans were more likely to pick the sugary or salty snack branded with the familiar character over the healthy snack branded with the unfamiliar character. In addition, they were more likely to pick a healthy snack branded with the familiar character over a healthy snack branded with the unfamiliar character. The authors concluded that branding familiar characters on healthy foods might be effective to promote healthy eating, especially if the marketing of unhealthy foods is limited.

As previous research has demonstrated, this strategy of using licensed characters could be a successful way to promote health-related products that relate to positive health outcomes (Kotler et al., 2012; Kraak & Story, 2015) (vegetables, sunscreen, toothpaste). However, food packaging with characters from popular TV shows are often on unhealthy foods with little nutritional value. Harris, Schwartz, and Brownell (2010) examined the increasing rate of third-party licensed characters on food packaging in supermarkets from 2006 to 2009 in addition to the quality of the food being marketed. They reported that cross-promotions involving third-party licensed characters targeting a preschool audience increased from 23% in 2006 to 54% in 2008. In addition, only 18% of these products using cross-promotions targeted to children met acceptable nutrition standards.

High-sugar breakfast cereals are a common form of low-nutritional food using popular licensed media characters to promote consumption (Kraak & Story, 2015) and are the most advertised packaged-food targeted to children on TV (LoDolce, Harris, & Schwartz, 2013). Longacre et al. (2017) examined high-sugar breakfast cereal consumption and high-sugar breakfast cereal TV advertisement exposure with 548 three- to five-year-old children. Cereal TV advertisement exposure was calculated by parental reports of their child's TV viewing time for 11 specific kids' channels combined with advertising data from cereal advertisements aired on those channels. The results suggested that exposure to high-sugar breakfast cereal TV advertisements was positively associated with high-sugar breakfast cereals consumption with children consuming 14% more cereal for every 10 cereal advertisements viewed in the last 7 days. This area of research highlights that children have a strong preference towards licensed media characters when making product related decisions.

Children's Difficulty Processing Advertisements

Advertisers are familiar with various strategies to target children's vulnerabilities and susceptibilities to marketing tactics. However, only a limited amount of scientific research has investigated the impact of exposure to media and advertising on preschool-age children. Specifically, a small body of research evaluated what factors likely contribute to children's lack of understanding of advertisements and persuasive intentions. It is thought that children's ability to evaluate and cope with advertising is related to their cognitive development (Moses & Baldwin, 2005). To understand advertising and persuasive intentions, children must first have the information processing skills necessary to distinguish the difference between a TV program and an advertisement. For example, when watching a TV program such as SpongeBob, children have a difficult time noticing the difference between the program and the short advertisements.

Advertisements are made to look and feel like the TV program just for this reason. Previous experiments have suggested that preschool-age children cannot consistently tell the program content apart from the commercial content (Gunter, Oates, & Blades, 2004; Moses & Baldwin, 2005). Therefore, a child could interpret that SpongeBob is endorsing the toy or that the toy is part of the show. This inability to distinguish advertising from programs leaves children particularly vulnerable to persuasive content. Research has supported the idea that executive functioning is closely related to the ability to understand and cope with advertising, such as inhibitory control, self-regulation, error detection and correction, working memory, and more (Moses & Baldwin, 2005).

Though we know a great deal about the effectiveness of advertising and popular characters on children's decision-making, we know very little about how children weigh competing information in such situations. Despite an APA call for more research on the topic in 2004 (APA Task Force on Advertising and Children, 2004), very little research within cognitive development has attempted to investigate how children weigh and interpret information about products in such contexts. What information is relevant to children's decisions? Do children use information about objects differently when making product related decisions in different contexts? What other developmental abilities, such as inhibitory control, influence children's decisions and use of information?

How Popular Characters Influence Product Preference

One line of research that has investigated the impact of popular characters on children's decision-making is a series of studies conducted by Danovitch and Mills (2014; 2017). Extending from the existing evidence that children are drawn to marketing strategies using popular characters, Danovitch and Mills (2014) conducted a series of experiments to examine

how heavily children weigh familiarity and accuracy when evaluating information from conflicting sources in a selective trust paradigm. Because marketing strategies use TV characters in advertising to pair a familiar and positive association and transfer it to the product, this particular series of experiments tested whether the positive association children have with familiar cartoon characters would influence children's trust in sources of information.

After examining what characters were popular among preschool-age children, Danovitch and Mills (2014) selected four TV characters as options for the children to identify as their favorite character: Dora the Explorer, Nemo, Blue, and Bob the Builder. The character they identified as their favorite was used in the series of experiments as the familiar character. A similar looking character was used as the unfamiliar control character and was introduced as a character for a new TV show. Their first experiment examined if children preferred to seek novel information from familiar TV characters or unfamiliar characters depending on prior accuracy. Children were randomly assigned to one of two conditions: familiar-accurate or familiar-inaccurate. In the familiar-accurate condition, children first listened to familiar characters state accurate, commonly known information (e.g., "the sky is blue") and listened to unfamiliar characters state inaccurate information. In the familiar-inaccurate condition, children first listened to familiar characters state inaccurate, commonly known information (e.g., "the sky is green") and to unfamiliar characters state accurate information.

The results indicated that children in the familiar-inaccurate condition acknowledged that the familiar character was wrong, but when asked to endorse the statement from either the familiar or unfamiliar character, the children did not consistently switch to trusting the accurate-unfamiliar character. Specifically, children preferred both subjective (e.g., this cereal is delicious) and objective (e.g., the number of legs on an animal) information from familiar characters, even

when the familiar character was previously shown to be unreliable with common information in a previous practice trial (e.g., “the grass is blue”). Danovitch and Mills (2014) concluded from this experiment that the influence of the familiar character was more influential than prior accuracy. These results are important because they suggest that presence of a popular cartoon character is more salient than accuracy. Specifically, children's preference for the characters overshadowed other kinds of information children had about the character, such as how knowledgeable or accurate the character was.

In addition to trust, familiar characters have been shown to influence preference for objects regardless of the quality of the object (i.e., new or damaged). Danovitch and Mills (2014) were the first to examine how the presence of familiar characters influenced children's preferences for non-edible products as well as the first to examine if the powerful presence of a familiar character can compensate for a product being of less value/damaged. Following the accuracy manipulation, children completed an object preference task measuring their preference for damaged objects bearing their favorite character or new objects in perfect condition with no character. Danovitch and Mills (2014) used five object pairs to measure object preference: a comb, notebook, tennis ball, marker, and cup. The item pairs were identical except the object with the familiar character was clearly damaged (e.g., spiral binding on the notebook was twisted and the cover was torn). The results showed children in the *damaged-character* condition preferred the damaged objects bearing the familiar character 67% over the neutral object. However, children in the control group (plain/damaged versus new neutral objects) preferred the damaged objects only 1.8% of the time over the neutral object. In another (control) version of the task, the undamaged object in the pair bore a control rectangular sticker that matched the character image in color complexity and covered approximately the same area as the familiar

character sticker on the damaged object. The addition of a control sticker examined if children are drawn to the damaged objects simply because of the addition of a colorful sticker. Results indicated that children had a strong preference for the damaged objects with familiar characters over the undamaged objects with a perceptually matched image. Children chose the damaged objects 74% of the time and the undamaged objects only 26% of the time. These results indicate that the familiar character was driving the decision rather than the presence of a colorful sticker. In addition, the preference for damaged objects did not differ in all experiments even when the character was previously inaccurate or accurate in the trust in testimony trial immediately before the object preference trial. The findings from Danovitch and Mills (2014) demonstrate that children's preferences have far reaching implications for their decision-making, influencing social as well as product-related judgments.

Similarly, a recent follow up study by Danovitch and Mills (2017) sought to examine the underlying factors influencing children's preference for damaged objects bearing images of familiar characters. They randomly assigned three-year-olds to one of five conditions: *Familiar character*, *unfamiliar character*, *colorful star*, *proximity*, and *baseline with no character*. Closely following the procedure from Danovitch and Mills (2014), each participant viewed a set of 10 object pairs (e.g., ball, bucket, toy car, etc.) with one object damaged and corresponding to the condition and the other object always being a plain, undamaged object with no sticker. The familiar character and unfamiliar character conditions were identical to Danovitch and Mills (2014) with respect to what characters were used (Dora, Nemo, etc.). The addition of the proximity condition examined object preference if the sticker was nearby the object rather than on the object. In the *familiar character* condition children preferred the damaged object over the undamaged object in 67% of trials. In the *unfamiliar character* condition children preferred the

damaged object over the undamaged object in 50% of trials. In the *colorful star* condition children preferred the damaged object over the undamaged object in 39% of trials. In the *proximity* condition children preferred the damaged object over the undamaged object only 21% of the time. Lastly, in the *baseline no character* condition children preferred the damaged object over the undamaged object only in 1.7% of trials. These results indicate that children only have a strong preference for damaged objects when the damaged object is bearing a familiar character. Therefore, when the familiar character is in close proximity to the object but not directly on the object, children's preference for the damaged object dropped by 46%.

The findings from Danovitch and Mills (2014; 2017) are surprising in part because children's sophisticated reasoning is well-documented in areas such as selective trust when decisions are based on factors, such as relative expertise (Landrum, Mills, & Johnston, 2013), knowledge (Sabbagh & Baldwin, 2001), past accuracy (Koenig & Harris, 2005), benevolence (Mascaro & Sperber, 2009), reliability (Kidd, Palmeri, & Aslin, 2012), and honesty (Li, Heyman, Xu, & Lee, 2014). With respect to selective trust, past research might suggest that children should trust the accurate, unfamiliar character over the inaccurate, familiar character, however, this was not the case. In terms of object preference, one might expect children to prefer the high-quality objects over the low-quality damaged objects bearing familiar characters, however, this was also not the case. Given the surprising nature of these findings, the present research aims to evaluate what factors might have contributed to children's decisions. Investigating this avenue could provide insight into how children make similar decisions about advertised products in real life.

One element that was not examined in Danovitch and Mills (2014; 2017) was context regarding the intended purpose of the objects (e.g., asking children to select a shovel and bucket

to build a sand castle). Rather, children were only asked about their object *preference* without context of the intended purpose of that object. Thus, children may have felt they were making a subjective choice with little or no practical consequences, and therefore gave greater weight to their personal aesthetic preferences. This decision is a reasonably rational choice in this circumstance. However, if the outcome of the decision carried practical consequences, such that children were selecting the object for a functional purpose, perhaps children would weigh the same information about the objects' qualities differently. If this were the case, it would demonstrate that children are able to focus on other information about the object, and weigh that information differently depending on the decision being made. If children continue to select the character bearing objects, this would suggest they value the presence of the character over the utility of the object.

In an attempt to further explore the extent that popular characters influence children's judgments about different types of elements, the current research is focused on investigating the reasons behind the decisions children made in Danovitch and Mills (2014; 2017) by looking at what additional factors influence children's decisions about an object. Looking at additional factors, such as contexts regarding the functionality of the objects, will better explain how children weigh relevant and irrelevant characteristics to make product related decisions. One explanation for children's high rates of selecting damaged objects in Danovitch and Mills (2014; 2017) could be that children failed to pay adequate attention to information about the object other than the presence of characters or were unable to overlook this relatively salient feature. Thus, inhibitory control may be an important factor in children's ability to weigh different kinds of relevant information when making product-related decisions.

Inhibitory Control

Another point of interest in the present study, also not explored by Danovitch and Mills (2014; 2017), is the role that inhibitory control plays in children's decisions. The ability to control impulses has been shown to be important in young children's decision-making. Without inhibitory control, one cannot override an impulsive, incorrect response to stimuli with a more appropriate or correct response (Diamond, 2013). Perhaps children have to inhibit their preference for popular characters when making object related decisions, and therefore need inhibitory control to make a good choice. Researchers believe that inhibitory control is related to a wide variety of individual differences including memory, intelligence, emotion regulation, social competence, and different Piagetian tasks including conservation of quantity (Carlson & Moses, 2001; Dempster, 1992; Diamond, 1990; Kochanska et al., 1996; Kopp, 1982; Piaget, 1964).

There is a small body of research that has examined the relationship between inhibitory control and advertising. A study by Lister, Lawrence, Henley, Wadman, and Whiteman (2014) investigated the idea that advertising could potentially decrease self-control for snacking. Specifically, they examined if an inhibitory control training intervention could decrease snack food intake in a controlled laboratory setting. Their results suggested that participants who received food-associated inhibitory control training consumed fewer snacks after viewing food advertisements than participants who did not receive food-associated inhibitory control training (Lister et al., 2014). This research is relevant to the current study because the lack of inhibitory control could be the mechanism causing children to have a strong preference for damaged objects bearing their favorite character. Specifically, children might get overwhelmed by the

presence of a media character and might automatically gravitate towards the character without thinking about the utility of the objects.

The Current Study

This thesis examined children's judgments when making product decisions in different contexts. Specifically, the current study examined judgments made based on the value of object utility and the value of an added popular character. For example, the child will need to judge the value of the added popular character against the value lost by the object being damaged. We used a 2 (Sticker Type: popular character or star sticker) by 2 (Utility of the objects: damaged or undamaged) between-subjects factorial design.

The primary aims of this study were (1) to determine if the presence of a preferred popular character would sway children to prefer damaged objects to new objects (replicating Danovitch & Mills, 2014; 2017) and (2) to examine if children would place less value on the presence of a popular character when object functionality was made more salient. To determine this, we examined whether children would use a damaged bucket with popular character or an undamaged bucket with no character when asked to carry several small items to a new location. Providing this relevant context to the decision will be a useful addition because children rely heavily on observable and concrete elements when making complex decisions (Li et al., 2014). We also examined (3) if inhibitory control impacted children's object choices. Inhibitory control was measured using a valid and reliable 6-item task-based measure (Gerstadt, Hong, & Diamond, 1994). These aims were designed to examine the extent to which popular characters influence children's object choices in order to expand on the findings from Danovitch and Mills (2014; 2017).

Using measurements of object preference, tool choice for functionality, and inhibitory control, we predicted that:

H1: There would be a main effect of sticker type (popular character versus star) on object preference; children would generally prefer the sticker object over the plain object when the sticker is of a popular character.

H2: There would be a main effect of utility (damaged versus undamaged) on object choice when picking a tool for functional purposes; children would focus more on the utility of the object rather than the sticker to make a decision.

H2a: It is possible there would be an interaction between sticker type and utility on both object preference and object choice when picking a tool for functional purposes. Specifically, the effect of the character on object choice would depend on the utility of the object.

RQ1: Would inhibitory control scores be related to children's object choices?

RQ2: Would inhibitory control scores moderate children's object choices?

Method

Power Analysis

To obtain an estimated effect size, we reviewed six published studies with a similar design and calculated the average Cohen's d . Danovitch and Mills (2014) compared preference for damaged objects across two conditions: (1) the damaged object was bearing a familiar character, and (2) the damaged object was bearing a colorful control sticker; Cohen's d was 2.85. In a different experiment, Danovitch and Mills (2014) compared preference for objects across two conditions (1) the object was bearing a familiar character and was slightly damaged, and (2) the object was bearing a familiar character and was severely damaged; Cohen's d was .35. Similarly, Danovitch and Mills (2017) compared children's preference for damaged objects

bearing familiar characters versus three control conditions with damaged objects with control stickers: Cohen's d was 1.12. LoBue and DeLoache (2011) examined children's object preferences of 8 object pairs based on colors: Cohen's d was .83. Roberto et al. (2010) examined the influence of licensed characters on children's taste and snack choices: Cohen's d was 1.22. Similarly, Letona et al. (2014) had children taste the same snack side by side with one packaging bearing a licensed TV character; Cohen's d was .61.

The average effect size (weighted by sample size) from the studies reviewed was $d = .86$. Using Cohen's power table with an effect size of $d = .8$ and $\alpha = .05$, the minimum suggested sample size per condition was 17 participants (68 total). An additional power analysis was performed using G*Power 3.1. The type of statistical test was set to ANOVA: fixed effects, special, main effects, and interactions. With an effect size of $f = .4$ ($d = 8$), $\alpha = .05$, and $\text{power} = .95$, the minimum sample size of 84 children was suggested. We recruited 97 participants to confirm adequate power.

Participants

Ninety-seven 3- and 4-year-old children participated in the study. Thirteen participants were excluded from the analyses (see Table 1 for description). The final sample included eighty-four children: 39 three-year-old children ($M = 42.21$ months, $SD = 3.54$ months), 45 four-year-old children ($M = 53.27$ months, $SD = 3.88$), 55 girls, and 29 boys. Children were recruited from a local children's museum in Southern California.

General Procedure

After gaining parental consent and assent of the child, children were randomly assigned to one of four conditions (described below). The sessions were conducted individually in an area of the museum designated for research.

Materials

Popular cartoon characters were identified for the current study by conducting an online search for popular television and movie characters among preschool-age children. In addition to the online search, 30 preschool-age children at the intended location for data collection were asked to name their favorite cartoon character. Most frequently reported was Moana (20%) from the Disney movie *Moana*, Ryder (16.6%) from the Nickelodeon television show *PAW Patrol*, Elsa (13.3%) from the Disney movie *Frozen*, and Mickey Mouse (13.3%) from various Disney movies. The remaining 36.8% of children reported various other characters or movie names. The search yielded a set of four cartoon characters that were pretested for familiarity by asking 45 children ages three- to five-years-old to identify the characters by name (closely following Danovitch & Mills, 2014; 2017).

Six sets of identical objects were used in the object preference task: a ball, a toy car, a plastic shovel, a notebook, a stuffed animal, and a plastic bucket (see Appendix A for stimuli). For the two conditions with damaged objects (see conditions section for details), one object in the pair was damaged and the other object remained in pristine condition. The objects were broken by hand by the lead experimenter. The items were damaged enough to make the object less desirable and not functional for their common use (e.g., bucket to carry sand).

Ball. The ball was red and had a fist size hole cut by scissors out of the center causing the ball to appear flat.

Car. The toy car was silver and was broken by force to remove half of the windshield. The driver-side door and the front wheel were removed with pliers. The back tire was cut off with scissors leaving just the wheel exposed.

Notebook. The notebook was blue and had the top and bottom spirals unwounded and untwisted to appear bent. The notebook cover was creased and crumpled and an inch size tear was made at the top right of the notebook and at the bottom.

Stuffed Animal. The stuffed animal was a black and white dog and had two holes cut on the right arm and on the left shoulder causing stuffing to be exposed. The dog's ear was cut off causing stuffing to be exposed. The left eye was cut from the eye socket but still attached to fabric on dog.

Shovel. The shovel was red and was bent and twisted on the arm of the shovel. The handle of the shovel was cut and a chunk was cut out of the base of the shovel.

Bucket. The bucket was blue and was cut beginning at the midline of the bucket extending down to and across the bottom, exposing the interior and not allowing objects to be stored or held inside the bucket.

The objects were then photographed and edited using Photoshop to eliminate any background color. Both the undamaged and damaged objects were photographed at the same angle to minimize any unintended differences between the objects and between conditions. The character or star image was applied to the object using Photoshop to make the image appear as a sticker. Photoshop was used due to the differences in object size to control for the size of the sticker in relation to the object. The stickers covered approximately one-fifth of each object's visible surface area.

Conditions

We manipulated the sticker type on the target object (popular character sticker or star sticker) and the utility of the target object (damaged or undamaged). The four conditions were as follows: (1) *damaged-character*: damaged objects with sticker of popular character, (2)

undamaged-character: undamaged objects with sticker of popular character, (3) *damaged-star*: damaged objects with rainbow star sticker, and (4) *undamaged-star*: undamaged objects with a rainbow star sticker. All four conditions were paired with undamaged objects with no sticker on them. For example, the first object preference trial was as follows: The *damaged-character* condition had an image of a damaged ball with a sticker of a popular character on it next to an image of an undamaged ball with no sticker; the *damaged-star* condition had a damaged ball with a sticker of a star on it next to an image of an undamaged ball with no sticker; the *undamaged-character* condition had an undamaged ball with a sticker of a popular character next to an image of an undamaged ball with no sticker; the *undamaged-star* condition had an undamaged ball with a sticker of a star on it next to an image of an undamaged ball with no sticker.

Procedure

The between-subjects design and procedure was adapted from Danovitch and Mills (2014; 2017). Children were recruited at a local children's museum. After parents agreed to let their child participate in the study, we requested verbal assent by asking the child if they want to play a game.

Object Preference Task. To measure object preference, children in each condition were shown six sets of object pairs (ball, shovel, car, notebook, stuffed animal, and bucket). After giving assent, children in the *damaged-character* and *undamaged-character* conditions were asked to indicate their favorite of four characters (Elsa, Mickey, Moana, and Ryder). Children were asked to identify the name of the character and what the character did in the show/movie to determine if they were truly familiar with the character. Children were excluded from analyses if they could not answer one of the two questions correctly. Children were presented with a picture

of the experimental object corresponding to their condition and a plain, undamaged object side-by-side in a binder. Each object pair was printed in color on an 8.5x11 inch paper (see Appendix A for stimuli). Children were asked, "Out of these two things, which one would you want?" The question was repeated with the six object pairs. Children's object preferences were recorded.

Utility Task. To measure object choice for the utility task, children were asked to carry several small erasers from one table to another table using only one of the two buckets. The two buckets were the same two buckets from the last object preference trial. The experimenter said, "*For the next part, we need to go get some other materials. Let's go over here*" and lead the child to a table approximately 7 feet away from where the interview took place. The experimenter positioned the two buckets on the table that was slightly lower than eye level of the average three- to four-year old. Then the experimenter placed 14 pencil-cap erasers onto the table and said, "*Can you help me carry these erasers over to the table. Which bucket should we use?*" The experimenter recorded which of the two buckets was used to carry the erasers. To code for any hesitation or changes in their object choice, the experimenter recorded a score from 0-4 for the utility task: 0: carried erasers with sticker bucket, 1: placed erasers in sticker bucket, attempted to carry, switched to plain, undamaged bucket, 2: initially placed erasers in sticker bucket, then switched to plain, undamaged bucket before attempting to carry, 3: initially touched or picked up sticker bucket, then placed erasers in plain, undamaged bucket to carry, 4: carried erasers with plain, undamaged bucket.

Inhibitory Control Task. The Day-Night Task (Gerstadt et al., 1994) was used as a measure of inhibitory control. The Day-Night Task has been validated and used previously with preschool-age children to assess inhibitory control (Carlson, 2005). In the task, children were asked to respond opposite to a cue to measure their inhibition of a common impulsive or

automatic response. The task began with a training trial in which the child was shown a flashcard size picture of a sun and blue sky and told, “*When you see this card, I want you to say night.*” Then the child was shown a picture of a moon and dark sky and told, “*when you see this card, I want you to say day.*” The child needed to say the correct response in the training trial before proceeding to the test trial. The test trail had six trials: three day and three night. For the test trials, the experimenter held up the card without verbal instructions and then recorded the child's response. If the child did not answer, the experimenter said, “*What do you say to this card?*” Children received a score of one for each of the six tasks if they successfully responded in an opposite manner of the cue, for a total score ranging from 0-6.

Results

Before analyses, all variables were checked for univariate and multivariate normality, normality, linearity, and homoscedasticity. The assumption of normality was violated for the utility task outcome (Kurtosis = -1.92) and data were bimodal (see Figure 1). Therefore, data were re-coded into a discrete variable to use for a binary logistic regression (see Figure 2).

Character selection. Children in the *damaged-character* ($n = 21$) and *undamaged-character* ($n = 21$) conditions were asked to pick their favorite character out of four well-known TV characters. In total, 18 children selected Elsa as their favorite character, 14 chose Ryder, 7 chose Moana, and 3 chose Mickey. All children in our final sample were shown to be sufficiently familiar with the character of their choice by independently generating the name of the character and/or providing a detailed description of what the character does in its corresponding media program.

Object Preference. Children's object preference scores were calculated as the number of stickered objects children preferred over plain objects from zero to six (Cronbach's $\alpha = .878$).

See Table 2 for object preferences for each object and Figure 3 for average preference across the four conditions. Children in the *damaged-character* condition chose the damaged objects with the popular character sticker 53.2% of the time out of the six trials. Children in the *damaged-star* condition chose the damaged objects with the rainbow star sticker 17.5% of the time out of the six trials. Children in the *undamaged-character* condition chose the undamaged objects with the popular character sticker over the plain-undamaged objects 76.2% of the time out of the six trials. Children in the *undamaged-star* condition chose the undamaged objects with the popular character sticker over the plain-undamaged objects 85.7% of the time out of the six trials.

To test the hypotheses that there would be a main effect of Sticker Type on object preference (H1) and to explore if there would be an interaction between Sticker Type and Utility (H2a), a 2 (Sticker Type: popular character sticker vs. star sticker) x 2 (Utility: damaged vs. undamaged) analysis of variance (ANOVA) was conducted. There was no significant effect of age on object preference; therefore age was not included in this analysis. There was a significant main effect of Sticker Type on children's object preferences ($F(1,80) = 4.29, p = .042, \eta_p^2 = .051$), suggesting that children had a greater preference for stickered objects when the sticker was of a popular character ($M = 3.88, SE = .27$) than a star sticker ($M = 3.10, SE = .27$). There was a significant main effect of Utility on children's object preferences ($F(1,80) = 52.07, p < .001, \eta_p^2 = .394$), suggesting that children had a greater preference for stickered objects when the object was undamaged ($M = 4.86, SE = .27$) than damaged ($M = 2.12, SE = .27$).

There was a significant interaction between Sticker Type and Utility on object preference ($F(1,80) = 12.79, p = .001, \eta_p^2 = .138$). A simple effects analysis revealed a significant difference between the popular character sticker conditions and star sticker conditions on object preference when the objects were damaged ($F(1,80) = 15.95, p < .001, d = 1.20$), but not when the objects

were undamaged ($F, (1,80) = 1.13, p = .290, d = 0.33$). This suggests that when the target objects were undamaged, children preferred the stickered objects regardless of sticker type (*undamaged-character*: $M = 4.57, SD = 2.04$; *undamaged-star*: $M = 5.14, SD = 1.28$). However, when the target objects were *damaged*, children preferred stickered objects bearing a character ($M = 3.19, SD = 2.21$) more than stickered objects bearing a star ($M = 1.05, SD = 1.20$). A second simple effects analysis revealed a significant difference between the damaged and undamaged conditions on object preference both when the objects had popular character stickers ($F, (1,80) = 6.62, p = .012, d = 0.65$), and when the objects had star stickers ($F, (1,80) = 58.24, p < .001, d = 3.30$). Both hypotheses H1 and H2a were supported.

Object Choice for Utility Task. Children's object choice for the utility task was recorded using a five-point scale to code for any hesitation. Due to issues of normality, data were re-coded into a discrete variable: 0, 1, and 2 were re-coded into 0 = chose the sticker bucket to carry the erasers; 3 and 4 were re-coded into 1 = chose the plain bucket to carry the erasers. See Figure 1 for the frequency of 0-4 scores and Figure 2 for the frequency of 0-1 scores.

In the *damaged-character* condition, a total of seven children (33.3%) received a score of zero and a total of fourteen children (66.7%) received a score of one. In the *damaged-star* condition, a total of two children (9.5%) received a score of zero and a total of nineteen children (90.5%) received a score of one. In the *undamaged-character* condition, a total of nineteen children (90.5%) received a score of zero and a total of two children (9.5%) received a score of one. In the *undamaged-star* condition, a total of twenty children (95.2%) received a score of zero and one child (4.8%) received a score of one.

A binary logistic regression analysis assessed whether Sticker Type (0 = character, -1 = star) and Utility of the sticker bucket (0 = damaged, -1 = undamaged) significantly predicted if

children would pick the sticker bucket (0) or plain bucket (1) to carry the erasers (H2). Additionally, a Sticker Type x Utility of the bucket interaction term was added in block two to test for an interaction effect (H2a). There was no significant effect of age on utility scores; therefore age was not included in this analysis. When all predictor variables were considered together, they significantly predicted if the participant would pick the sticker bucket or the plain bucket to carry the erasers $\chi^2(3, N = 84) = 53.53, p < .001$, Nagelkerke $R^2 = .63$. The model with all predictors accurately predicted 85.7% of cases; 81.3% of sticker bucket were accurately predicted and 91.7% of plain bucket. When children were asked to pick an object to carry several small items, the Sticker Type did not predict if they would pick the sticker object or the plain object ($\chi^2(1) = 1.57, p = .211, OR = 0.43, 95\% CI = 0.12, 1.61$). However, the Utility of the sticker object (damaged or undamaged) significantly predicted which object they would pick ($\chi^2(1) = 29.08, p < .001, OR = 53.99, 95\% CI = 12.67, 230.06$). According to the odds ratio, children were 54 times more likely to choose the plain, undamaged object when the stickered object was damaged. The Sticker Type x Utility interaction term in block two did not predict if children would pick the sticker bucket or the plain bucket ($\chi^2(1) = 2.24, p = .135, OR = 0.10, 95\% CI = 0.01, 2.04$). Hypothesis H2 was supported and H2a was not supported.

Inhibitory control. Children received a score from zero to six on the Day-Night Scale (Gerstadt et al., 1994). Children received a score of one on each of the six trials they correctly said the opposite of the card shown (Cronbach's $\alpha = .887$). Nine three-year-old and six four-year-old children did not finish the task or did not follow the instructions; therefore only 69 children had inhibitory control scores. On average, three-years-olds ($n = 30$) responded correctly on 55.5% of trials and four-years-olds ($n = 39$) responded correctly on 62.8% of trials. There was no significant difference in inhibitory control scores between three- and four-year-old children $t(67)$

= $-.77$, $p = .442$, $d = .19$. Partial correlations controlling for age in months were conducted to examine if inhibitory control scores were related to object preferences and object choices on the utility task (RQ1). Inhibitory control scores were not related to object preference scores, $r(66) = -.16$, $p = .207$, or object choice on the utility task $r(66) = .05$, $p = .694$.

To test if there was a three-way interaction between Sticker Type, Utility, and Day-Night score on object choices (RQ2), moderated moderation analyses were performed using the PROCESS bootstrapping plugin (Model 3; Hayes, 2017) for SPSS; five-thousand resamples with 95% bias corrected standardized bootstrap confidence intervals were simulated for the model. Object preference score (0-6) was entered into the model as the outcome variable, Utility (damaged vs. undamaged) as the independent variable, Sticker Type (character vs. star) as the moderator variable, and Day-Night score as the proposed moderator W variable. As shown in Table 4, there was no significant relationship between inhibitory control scores and object preference and there was no three-way interaction.

The same model was conducted but with utility task score as the dependent variable. Utility task score (0,1) was entered into the model as the outcome variable, Utility (damaged vs. undamaged) as the independent variable, Sticker Type as the moderator variable, and Day-Night score as the proposed moderator W variable. As shown in Table 5, there was no significant relationship between inhibitory control scores and the utility outcome and there was no three-way interaction.

Discussion

The current study was designed to investigate the influence of popular cartoon characters on preschool-age children's object choices. Specifically, we sought to examine children's choices based on the value of object utility and the value of an added popular character by

manipulating the utility of the target object (damaged or undamaged) and what type of sticker was on the target object (popular character or star). Similar to Danovitch and Mills (2014; 2017), we measured children's object preferences for a target object or a plain version of that object on six object pairs (ball, car, notebook, stuffed animal, shovel, bucket). Additionally, in a novel paradigm, we asked children to move several small items to a distant location using one of two objects (target bucket or plain bucket) to investigate whether children would change their object choice if forced to directly consider object functionality. We also wanted to investigate if children's object choices on each task were related to inhibitory control.

Similar to Danovitch and Mills (2014; 2017), we found that the presence of popular cartoon characters influenced children's object preferences. First, not surprisingly, when the target objects were undamaged, children preferred the stickered object regardless of sticker type, choosing stickered objects more often than plain objects. However, when damaged objects with stickers were contrasted with plain, undamaged objects, children showed a greater preference for objects bearing the character sticker than they did for objects bearing the star sticker. In fact, when children chose between damaged objects bearing a popular character and plain, undamaged objects, they chose the damaged objects an average of about half of the time, and 85.7% of children chose a damaged object at least once. The colorful star sticker, however, did not have the same effect on children's object preferences. When children chose between damaged objects bearing a star sticker and plain, undamaged objects, they chose the plain objects more often than damaged stickered objects. These results suggest that the presence of popular characters, not simply the addition of a sticker, influence children to prefer damaged objects.

Why did children show a preference for damaged over undamaged objects? It could be that children are mentally weighing the value added from the sticker against the value lost from

the object being damaged. Perhaps children value the added popular character sticker on the object so much that they are willing to overlook the brokenness around half of the time (Danovitch & Mills, 2014). Children's preferences in the current study support past research suggesting that the presence of popular characters influence children's perceptions of products (e.g., Danovitch & Mills, 2014; 2017; Letona et al., 2014; Roberto et al., 2010). Additionally, the current study replicated findings from Danovitch and Mills (2014; 2017) suggesting that children view damaged objects bearing popular characters as more desirable than an undamaged version of the same object.

Why is the presence of a popular character so influential? It is possible that the parasocial relationship children have with popular media characters might play a role in children's product decisions (Horton & Wohl, 1956; Kotler et al., 2012). Researchers in the past have suggested that children start to develop a parasocial relationship with characters after only a brief exposure (Giles, 2002). Because of this relationship, perhaps children feel connected to the character sticker and may feel a stronger draw towards the damaged object, comparable to how children are influenced by characters they view in advertisements (Kotler et al., 2012). Similar to past research that examined food preferences based on the parasocial relationship children had with familiar characters (Kotler et al., 2012), future research should examine if preferences for damaged objects bearing popular characters is dependent on the child having a strong parasocial relationship with the character.

We also examined children's object choices when functionality was made more salient. When children were forced to think more about the object's functionality, the utility of the object influenced children's object choices more than the presence of a sticker. When children chose between a damaged bucket bearing a popular character and a plain, undamaged bucket, 33% of

children still selected the damaged bucket to carry the items. In the comparison *damaged-star* condition, only 9.5% chose the damaged bucket bearing a star over the plain, undamaged bucket. This difference suggests that although children might be paying more attention to the utility of the object when making their decision, the presence of a popular character appears to influence children to choose the damaged object at least some of the time, and more so than the star sticker. As expected, when the target object was undamaged and bore a character or a star, children primarily chose the stickered object over the plain object to carry the items. This high rate suggests that children are drawn to the stickered objects, regardless of sticker type, when the utility of the object is not a factor in the choice.

Why did the influence of the popular character change between children's object choices on the preference task and the utility task? It could be that children recognize the value of utility when asked to think about an object's functionality, as this leads them to choose the plain, undamaged object to carry items during the utility task. The difference in results between the preference and utility tasks might suggest that children are able to focus on different features of an object and are able to weigh different factors depending on what factor is relevant to the current decision. Danovitch and Mills (2017) concluded that children are highly persuaded by the presence of characters in their object decisions. However, in addition to this, our results suggest that children might be capable of overriding their preferences in specific contexts when superficial qualities are not as important.

Another possible explanation for children's choices being swayed by the presence of popular characters involves a lack of inhibitory control—children may have impulsively selected the corresponding object as soon as they saw the character, without considering any other features of the object. To test this explanation, we also examined whether inhibitory control

scores impacted children's object choices. We found that children's inhibitory scores, as measured on the Day-Night Task, were not related to their object preferences or their choice on the utility task. This lack of a relationship suggests that children's choices may not be due to lack of impulse control, suggesting that children ages three-to-four might be capable of weighing context-specific information regarding objects to best solve specific problems. Thus, children may be placing less weight on object utility when asked about their *preferences* than when asked to select an object to carry out a specific task.

The difference in object choices between tasks might suggest that children were mentally weighing the value of object's utility and the added sticker when making different decisions. It seems from our results that children may genuinely view the popular characters as added value to the objects, but when forced to use the object they understand that the utility of the undamaged object provides more value.

Given that children in the current study might be able to weigh context specific information regarding objects, an important avenue for future research would be to test if children will make similar decisions related to food. Specifically, future research should examine if children can override their preference for sugary and salty foods bearing a popular character and instead select healthy food options when asked to make a slightly different decision, for example: "which food should you eat to give you energy?" or, "which food should you eat to grow big and strong?" The results from this study predict this strategy for helping children think about different factors of food and packaging might help children make better food decisions when faced with persuasive advertising messages, and may reduce the emphasis children place on popular characters in their decision-making.

The current study suggests that children ages three-to-four are capable of weighing context specific information regarding objects. Correspondingly, the current study also suggests that inhibitory control may not impact children's object choices. Although children have a preference for damaged objects bearing popular characters, they seem to be capable of weighing the utility of the object against the added sticker when an object's functionality is made more salient. We found that children more often chose damaged objects bearing popular characters when asked, "Which one would you like?" than when asked, "Which bucket should we use to carry the erasers?" These results inform previous research by suggesting that children may change their decisions about objects based on what they are being asked to solve for. Because it appears children are not making an impulsive decision about the presence of the character, it might help for adults to guide children on which characteristics to attend to and what the intended purpose of the object/food is for. Along with past research (e.g., Danovitch & Mills, 2014; 2017; Letona et al., 2014; Roberto et al., 2010), the current research suggests that children are highly influenced by the marketing strategy of using characters to appeal to children's preferences. As the current study implies, children may be highly influenced by popular cartoon characters when making decisions about their preferences, but they can focus on different elements of an object if there is added context.

References

- American Academy of Pediatrics (AAP) Council on Communications and Media. (2016). Media and young minds. *Pediatrics*, *138*(5):e20162591
- American Psychological Association (APA) Task Force on Advertising and Children. (2004). Retrieved from <https://www.apa.org/pi/families/resources/advertising-children.pdf>
- Austin, E. W., & Meili, H. K. (1994). Effects of interpretations of televised alcohol portrayals on children's alcohol beliefs. *Journal of Broadcasting & Electronic Media*, *38*(4), 417. <https://doi.org/10.1080/08838159409364276>
- Carlson, S. (2005). Developmentally sensitive measures of executive function in 0 children. *Developmental Neuropsychology*, *28*, 595–616.
- Carlson, S., & Moses, L. (2001). Individual differences in inhibitory control and children's Theory of Mind. *Child Development*, *72*(4), 1032-1053.
- Connor, S. (2006). Food-related advertising on preschool television: Building brand recognition in young viewers. *Pediatrics*, *118*, 1478–1485.
- Danovitch, J., & Mills, C. (2014). How familiar characters influence children's judgments about information and products. *Journal of Experimental Child Psychology*, *128*, 1–20.
- Danovitch, J., & Mills, C. (2017). The influence of familiar characters and other appealing images on young children's preference for low-quality objects. *British Journal of Developmental Psychology*, *35*(3), 476-481.
- Dempster, F. N. (1992). The rise and fall of the inhibitory mechanism: Toward a unified theory of cognitive development and aging. *Developmental Review*, *12*, 45–75.

- Diamond, A. (1990). Developmental time course in infants and infant monkeys, and the neural bases of inhibitory control in reaching. *Annals of the New York Academy of Sciences*, 608, 637–676.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64(1), 135-168.
- Diamond, A., & Taylor, C. (1996). Development of an aspect of executive control: Development of the abilities to remember what I said and to “Do as I say, not as I do.” *Developmental Psychobiology*, 29, 315–334.
- Dixon, H., Scully, M., Kelly, B., Chapman, K., & Wakefield, M. (2014). Can counter-advertising reduce pre-adolescent children's susceptibility to front-of-package promotions on unhealthy foods?: Experimental research. *Social Science & Medicine*, 116, 211-219.
- Frye, D., Zelazo, P. D., & Palfai, T. (1995). Theory of mind and rule-based reasoning. *Cognitive Development*, 10, 483 – 527.
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: Performance of children 31/2–7 years old on Stroop-like day–night test. *Cognition*, 53, 129–153.
- Giles, D. (2002). Parasocial interaction: A review of the literature and a model for future research. *Media Psychology*, 4, 279–305. doi: 10.1207/s1532785xmep0403_04
- Gleason, T., Theran, S., & Newberg, E. (2017). Parasocial interactions and relationships in early adolescence. *Frontiers in Psychology*, 8, 255.
- Gunter B, Oates C, Blades M. (2004). *Advertising to children on TV: Content, impact and regulation*. Mahwah, NJ: Routledge.

- Harris, J., Schwartz, M., & Brownell, K. (2010). Marketing foods to children and adolescents: Licensed characters and other promotions on packaged foods in the supermarket. *Public Health Nutrition, 13*(3), 409-417.
- Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: The Guilford Press.
- Horton, D., & Wohl, R. (1956). Mass communication and para-social interaction: Observations on intimacy at a distance. *Psychiatry, 19*, 215–229.
- Kidd, C., Palmeri, H., Aslin, R.N. (2012) Rational snacking: Young children's decision-making on the marshmallow task is moderated by beliefs about environmental reliability. *Cognition, 126*(1), 109-114.
- Kochanska, G., Murray, K., Jacques, T. Y., Koenig, A. L., & Vandegest, K. A. (1996). Inhibitory control in young children and its role in emerging internalization. *Child Development, 67*, 490–507.
- Koenig, M. A., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development, 76*, 1261–1277. doi: 10.1111/j.1467-8624.2005.00849.x
- Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology, 18*, 199–214.
- Kotler, J., Schiffman, J., & Hanson, K. (2012). The influence of media characters on children's food choices. *Journal of Health Communication, 17*(8), 886-898.
- Kraak, V., & Story, M. (2015). Influence of food companies' brand mascots and entertainment companies' cartoon media characters on children's diet and health: A systematic review and research needs. *Obesity Reviews, 16*(2), 107-126.

- Landrum, A. R., Mills, C., & Johnston, A. M. (2013). When do children trust the expert? Benevolence information influences children's trust more than expertise. *Developmental Science, 16*(4), 622-638.
- Lapierre, M., Fleming-Milici, F., Rozendaal, E., Mcalister, A., & Castonguay, J. (2017). The effect of advertising on children and adolescents. *Pediatrics, 140*, S152-S156.
- Lapierre, M. A., Vaala, S. E., & Linebarger, D. L. (2011). Influence of licensed spokes-characters and health cues on children's ratings of cereal taste. *Archives of Pediatric and Adolescent Medicine, 165*, 229–234.
- Letona, P., Chacon, V., Roberto, C., & Barnoya, J. (2014). Effects of licensed characters on children's taste and snack preferences in Guatemala, a low/middle income country. *International Journal of Obesity, 38*, 1466–1469. <https://doi.org/10.1038/ijo.2014.38>
- Li, Q. G., Heyman, G. D., Xu, F., & Lee, K. (2014). Young children's use of honesty as a basis for selective trust. *Journal of Experimental Child Psychology, 117*, 59-72.
- Lister, K., Lawrence, N., Henley, C., Wadman, J., & Whiteman, B. (2014). Can advertising ruin our self-control? The effects of inhibitory control training and food advertising on snack food consumption. *Appetite, 83*, 356.
- Livesey, D. J., & Morgan, G. A. (1991). The development of response inhibition in 4- and 5-year-old children. *Australian Journal of Psychology, 43*, 133–137.
- LoBue, V., & DeLoache, J. S. (2011). Pretty in pink: The early development of gender-stereotyped colour preferences. *British Journal of Developmental Psychology, 29*, 656–667. <https://doi.org/10.1111/j.2044-835X.2011.02027.x>

- LoDolce, M., Harris, J., & Schwartz, M. (2013). Sugar as part of a balanced breakfast? What cereal advertisements teach children about healthy eating. *Journal of Health Communication, 18*(11), 1293-1309.
- Longacre, M., Drake, K., Titus, L., Harris, J., Cleveland, L., Langeloh, G., . . . Dalton, M. (2017). Child-targeted TV advertising and preschoolers' consumption of high-sugar breakfast cereals. *Appetite, 108*, 295-302.
- Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition, 112*, 367-380.
- Montgomery, D. E., & Koeltzow, T. E. (2010). A review of the day-night task: The Stroop paradigm and interference control in young children. *Developmental Review, 30*(3), 308-330.
- Moses, L. J., & Baldwin, D. A. (2005). What can the study of cognitive development reveal about children's ability to appreciate and cope with advertising?. *Journal of Public Policy & Marketing, 24*(2), 186-201.
- Neeley, S. M., & Schumann, D. W. (2004). Using animated spokes-characters in advertising to young children: Does increasing attention to advertising necessarily lead to product preference? *Journal of Advertising, 33*, 7-23.
- NPD Group. (2012). U.S. toy industry retail sales generated \$21.18 billion in 2011. Retrieved from <https://www.npd.com/wps/portal/npd/us/news/press-releases/pr_120131a>.
- Piaget, J. (1964). *The child's conception of number*. (International library of psychology, philosophy, and scientific method). London: Routledge & Paul.
- Reed, M., Pien, D., & Rothbart, M. (1984). Inhibitory self-control in preschool children. *Merrill-Palmer Quarterly, 30*(2), 131-147.

- Richert, R., Robb, M., & Smith, E. (2011). Media as social partners: The social nature of young children's learning from screen media. *Child Development, 82*, 82.
- Roberto, C. A., Baik, J., Harris, J. L., & Brownell, K. D. (2010). Influence of licensed characters on children's taste and snack preferences. *Pediatrics, 126*, 88–93.
- Sabbagh, M. A., & Baldwin, D. A. (2001). Learning words from knowledgeable versus ignorant speakers: Links between preschoolers' theory of mind and semantic development. *Child Development, 72*, 1054–1070. doi:10.1111/1467-8624.00334
- Skolnick, D., & Bloom, P. (2006). What does Batman think about SpongeBob? Children's understanding of the fantasy/fantasy distinction. *Cognition, 101*(1), B9-B18.
- Slutsky, R. & DeShetler, L.M. (2017). How technology is transforming the ways in which children play. *Early Child Development and Care, 18*, 1138-1146.
- World Health Organization (WHO) (2010). *Set of Recommendations on the Marketing of Foods and Non-Alcoholic Beverages to Children*. Geneva, Switzerland. Retrieved from http://apps.who.int/iris/bitstream/handle/10665/44416/9789241500210_eng.pdf;jsessionid=AA279314259BEEC0EA5DAA7EC3F8354F?sequence=1

Table 1.

Explanations for missing data.

Condition	Included	Unfamiliar with Character	Not in Age Range	Experimenter/ Materials error	Parental Interference	Duplicate	Other
<i>Damaged- Character</i>	21	2	1	0	0	0	0
<i>Damaged- Star</i>	21	N/A	0	0	1	0	0
<i>Undamaged- Character</i>	21	3	0	1	0	0	0
<i>Undamaged- Star</i>	21	N/A	1	1	0	1	2

Table 2.

Preference for stickered object on six trials.

Condition	<i>Damaged-Character</i>	<i>Damaged-Star</i>	<i>Undamaged-Character</i>	<i>Undamaged-Star</i>
Ball	47.6%	19.0%	76.2%	90.5%
Car	71.4%	23.8%	81.0%	90.5%
Shovel	42.9%	9.5%	71.4%	81.0%
Notebook	66.7%	23.8%	81.0%	85.7%
Stuffed Animal	42.9%	28.6%	71.4%	85.7%
Bucket	47.6%	0.0%	76.2%	81.0%
Average Percent	53.2%	17.5%	76.2%	85.7%

Table 3.

Frequency of 0-4 utility task scores across condition.

Condition	<i>Damaged-Character</i>	<i>Damaged-Star</i>	<i>Undamaged-Character</i>	<i>Undamaged-Star</i>
0: Carried erasers with sticker bucket	2	0	19	20
1: Put erasers in sticker bucket, attempted to carry, switched to plain bucket	2	0	0	0
2: Put erasers in sticker bucket, switched to plain bucket	3	2	0	0
3: Initially touched sticker bucket, put erasers in plain bucket to carry	1	0	0	1
4: Carried erasers with plain bucket	13	19	2	0

Table 4.

PROCESS Model 3, 5,000 bootstrap samples

IV(X): Utility: Damaged vs. Undamaged

M: Sticker Type: Familiar vs. Star

W: Day-Night Score

DV(Y): Preference for stickered objects

Final model statistics on object preference

Predictor	<i>b</i>	SE(<i>b</i>)	<i>t</i> (df)	<i>p</i>	95% CI
Sticker Type	0.43	1.15	0.37(61)	0.711	[-1.87, 2.73]
Utility	-3.96	1.13	-3.51(61)	0.001	[-6.22, -1.71]
Sticker Type X Utility	0.56	1.55	0.36(61)	0.719	[-2.54, 3.66]
Inhibitory Control	-0.17	0.19	-0.89(61)	0.378	[-0.56, 0.22]
Utility X Inhibitory Control	0.02	0.26	0.06(61)	0.952	[-0.51, 0.54]
Sticker Type X Inhibitory Control	-0.34	0.27	-1.22(61)	0.226	[-0.88, 0.21]
Utility X Sticker Type X Inhibitory Control	0.60	0.37	1.65(61)	0.105	[-0.13, 1.33]

Table 5.

PROCESS Model 3, 5,000 bootstrap samples

IV(X):Utility: Damaged vs. Undamaged

M: Sticker Type: Familiar vs. Star

W: Day-Night Score

DV(Y): Object Choice on Utility Task

Final model statistics on utility task

Predictor	<i>b</i>	SE(<i>b</i>)	<i>t</i> (df)	<i>p</i>	95% CI
Sticker Type	-0.07	3.08	-0.02(61)	0.983	[-6.10, 5.96]
Utility	4.38	2.50	1.76(61)	0.080	[-0.51, -9.28]
Sticker Type X Utility	-0.40	3.41	-0.12(61)	0.910	[-7.08, 6.28]
Inhibitory Control	0.07	0.49	0.14(61)	0.889	[-0.89, 1.03]
Utility X Inhibitory Control	0.18	0.59	0.31(61)	0.760	[-0.98, 1.34]
Sticker Type X Inhibitory Control	0.06	0.68	0.08(61)	0.933	[-1.28, 1.39]
Utility X Sticker Type X Inhibitory Control	-0.30	0.79	-0.36(61)	0.718	[-1.82, 1.26]

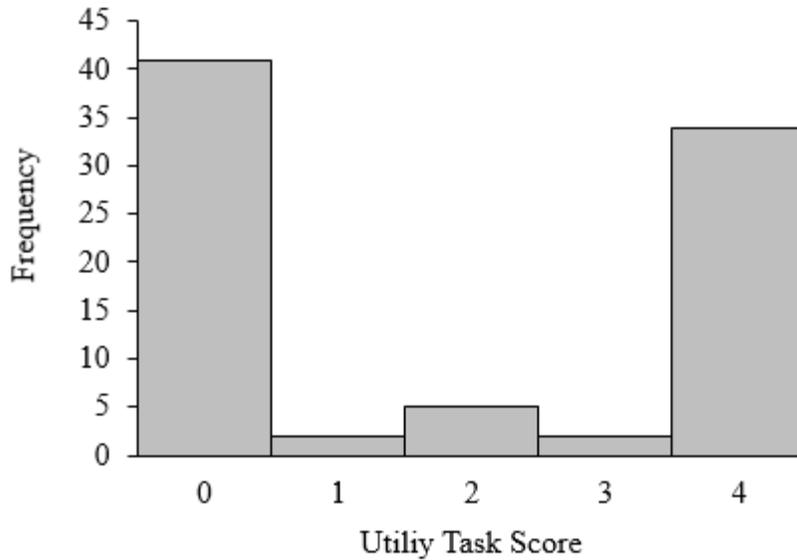


Figure 1. Histogram of utility task scores on the 5-point scale to code for hesitation. 0 = Carried erasers with sticker bucket; 1 = Put erasers in sticker bucket, attempted to carry, switched to plain bucket; 2 = Put erasers in sticker bucket, switched to plain bucket; 3 = Initially touched sticker bucket, put erasers in plain bucket to carry; 4 = Carried erasers with plain bucket.

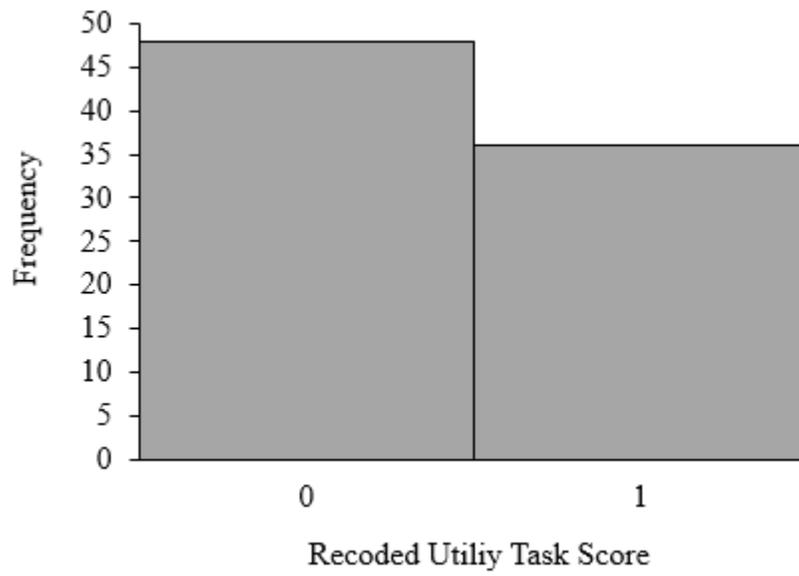


Figure 2. Histogram of recoded utility task scores. 0 = chose the sticker bucket to carry the erasers; 1 = chose the plain bucket to carry the erasers.

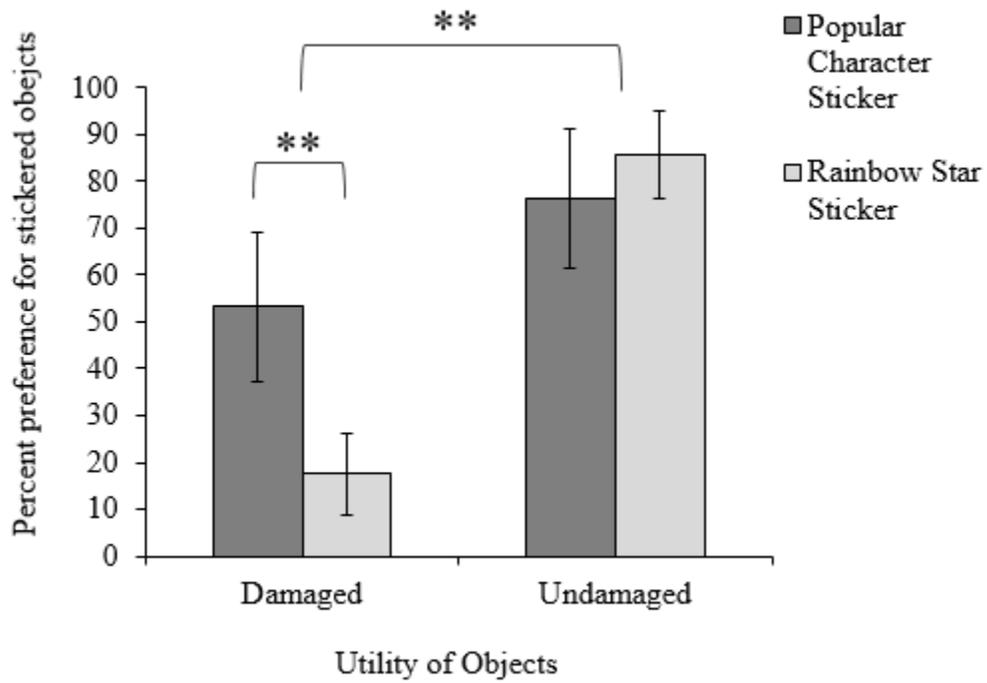


Figure 3. Children's average preference for stickered objects over undamaged plain objects across six trials. (Error bars = 95% CI, ** = $p < .001$).

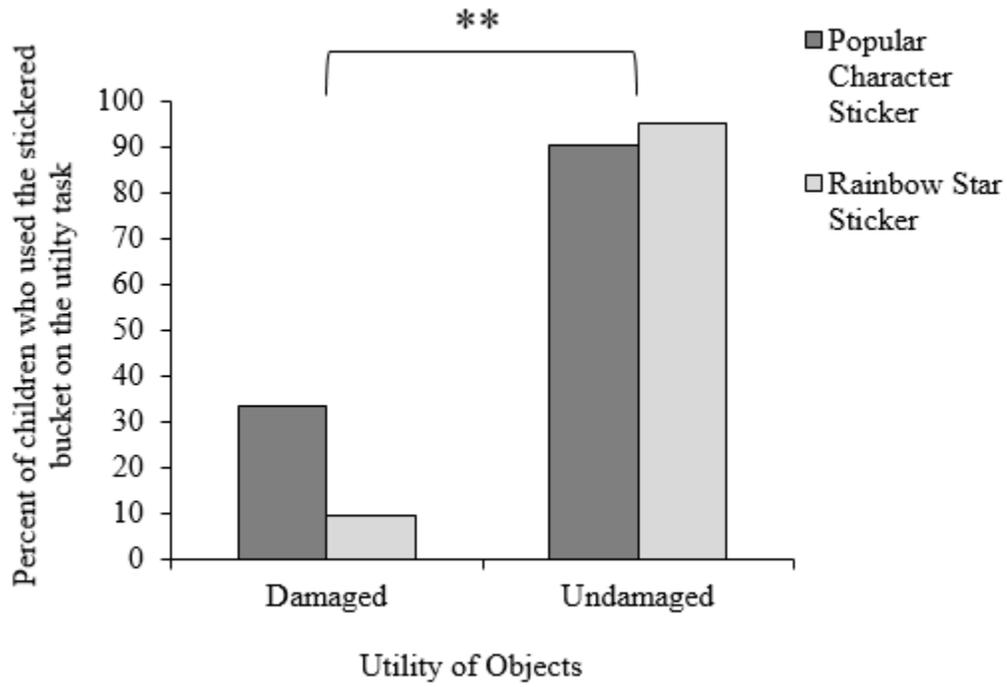


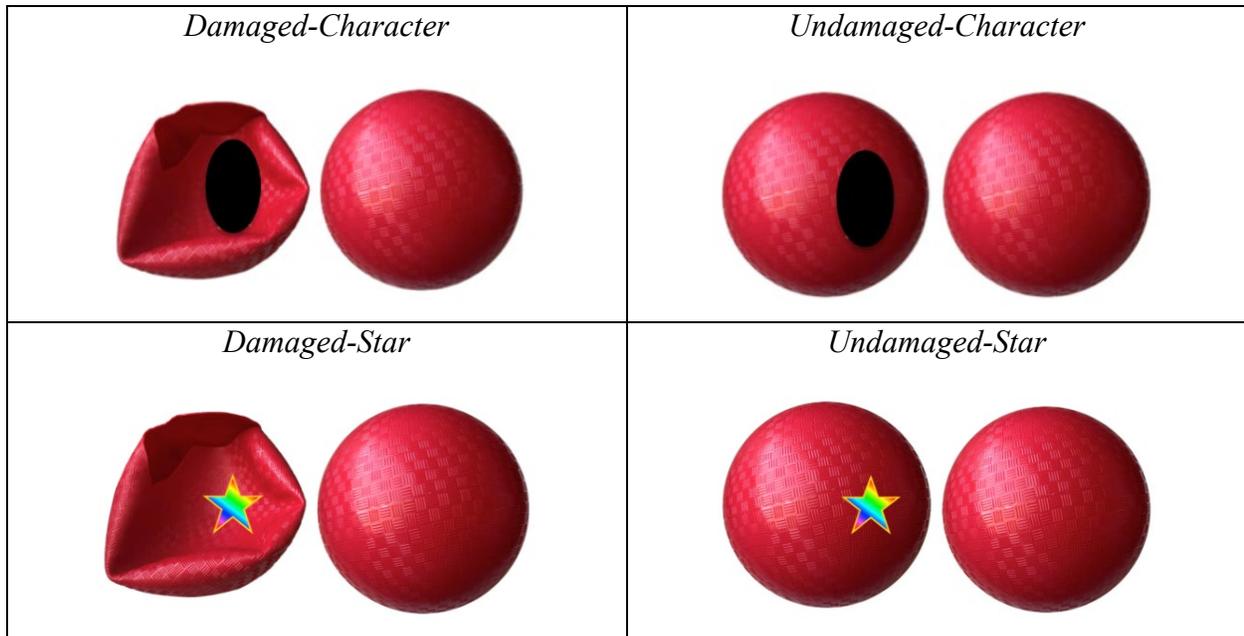
Figure 4. The percentage of children who chose the stickered object for the utility task. (** = $p < .001$).

Appendix A

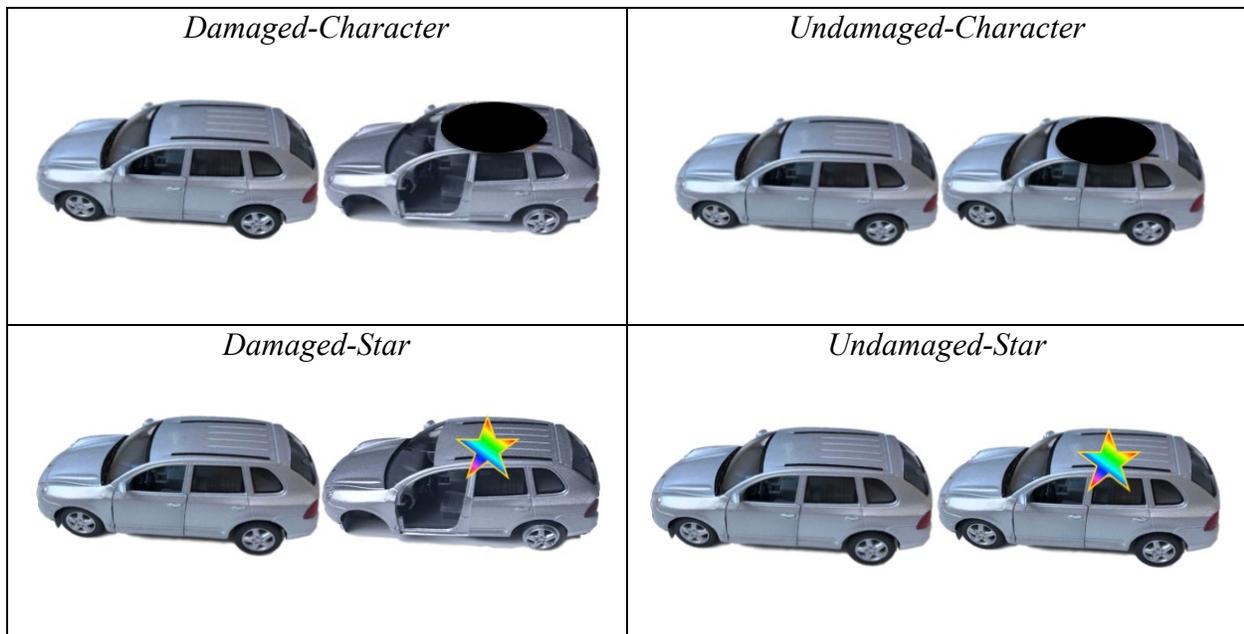
Stimuli for Object Preference Task across conditions

The black oval denotes where the character image would be placed

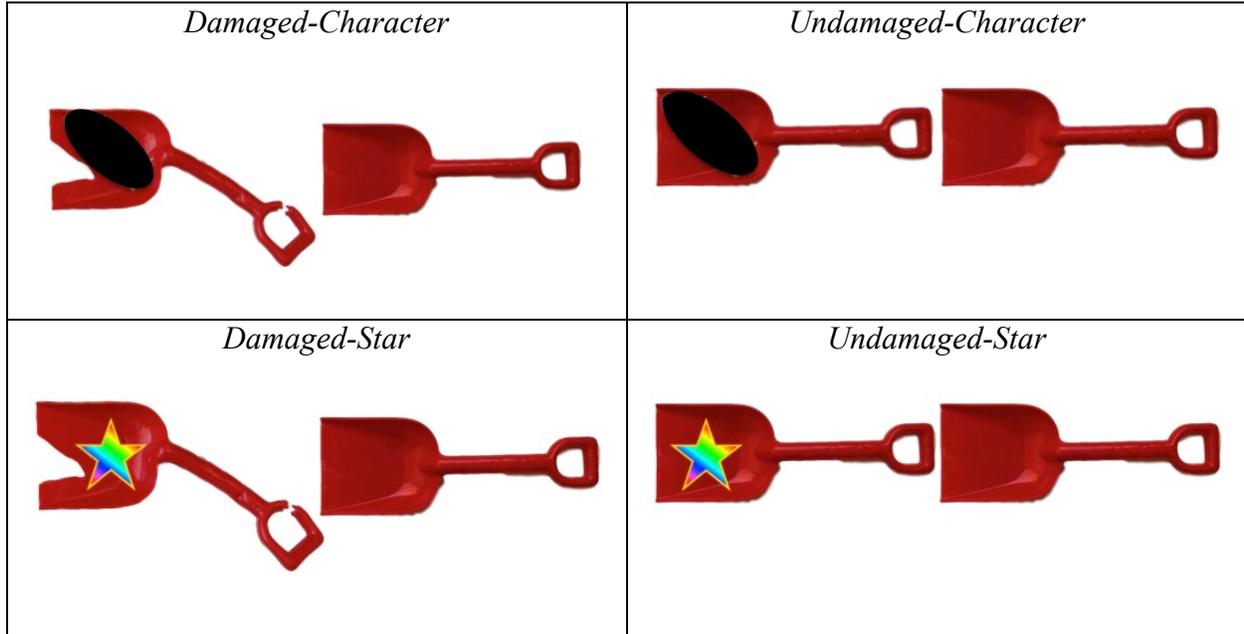
Object Preference Trail 1:



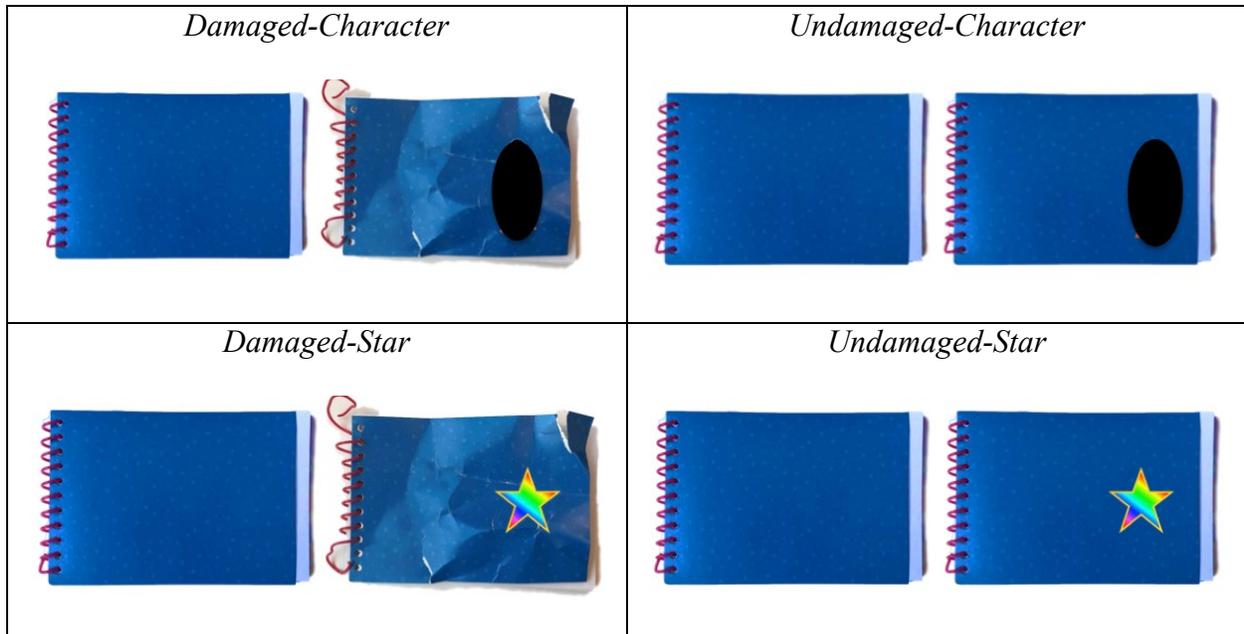
Object Preference Trail 2:



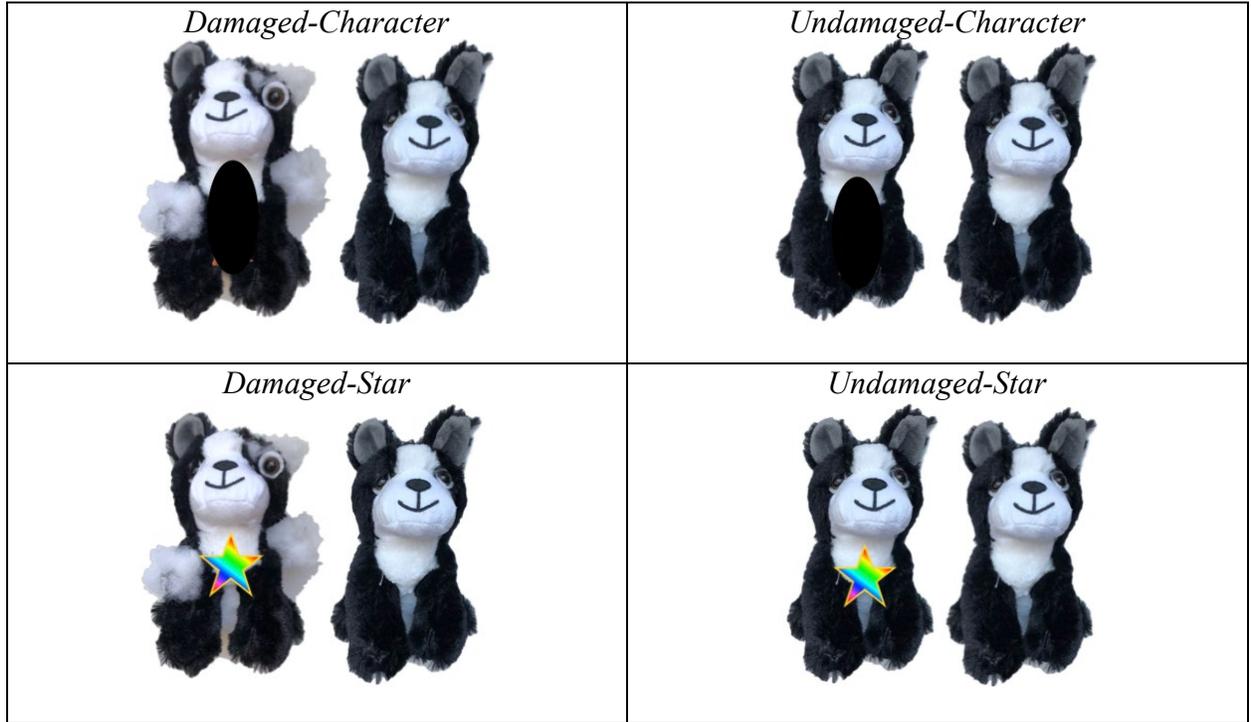
Object Preference Trail 3:



Object Preference Trail 4:



Object Preference Trail 5:



Object Preference Trail 6:

