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Choice-induced preferences in the absence of choice:

Evidence from a blind two choice paradigm with young children and capuchin monkeys

Louisa C. Egan

Northwestern University

Paul Bloom

Yale University

Laurie R. Santos

Yale University

Author Note: The authors would like to thank Jeffrey Brown, Hillary Ruhl Duenas, and Turner Smith for their help in running the child study, with special thanks to Hillary for extra help with the children, and Rebecca Czyrnik, Regina Goldman, Margarita Gorlin, and Stephanie Marton for help in running the capuchin study. Thanks also to Adam Galinsky for valuable feedback on drafts of this paper. This work was supported by Yale University, and was approved by the Yale Institutional University Care Animal Committee, and conforms to federal guidelines for the use of animals in research.

Address Correspondence: Louisa C. Egan, Ford Motor Company Center for Global Citizenship, Kellogg School of Management, 2001 Sheridan Rd., Evanston, IL 60208, (847) 491-4976 (phone), (847) 467-1220 (fax), [louisa-egan@kellogg.northwestern.edu](mailto:louisa-egan@kellogg.northwestern.edu)

## Abstract

In two studies, we provide a test of the revealed-preferences account of choice-induced preferences. To do so, we introduce a blind two choice task in which preferences cannot guide choices. Children chose between two similar objects while ignorant of the objects' identities, and then chose between the rejected alternative and a third similar object. Monkeys were given an illusion of choice between two similar objects, and then chose between the rejected object and a third similar object. Both children and monkeys preferred the third object, indicating that they devalued the rejected object. This response pattern did not occur when the children and monkeys were not given the opportunity to choose between the two initial items. These results provide evidence against a revealed preferences account of choice-induced preferences and demonstrate that the process of making a choice itself induces preferences.

### Choice-induced preferences in the absence of choice:

Evidence from a blind two choice paradigm with young children and capuchin monkeys

Common sense suggests that people make choices based on their preferences, but a long literature in social psychology suggests that choices might actually induce preferences. After choosing between equally-attractive alternatives, an individual's liking for the chosen option apparently increases (e.g., Brehm, 1956; Jarcho, Berkman, & Lieberman, submitted; Lieberman, Ochsner, Gilbert, & Schacter, 2001; Lyubomirsky & Ross, 1999; Steele, 1988) and liking for the rejected option apparently decreases (e.g., Brehm, 1956; Egan, Santos, & Bloom, 2007; Jarcho et al., submitted; Lieberman et al., 2001; Lyubomirsky & Ross, 1999; Steele, 1988).

Over the past few decades, the phenomenon of choice-induced preferences has generated much discussion in the field of social psychology, but the debates surrounding this phenomenon have generally taken two rather different forms. The first form of debate over choice-induced preferences has surrounded the nature of the mechanisms that underlie this phenomenon. The original choice-induced preference paradigm was developed as a method for studying the phenomenon of cognitive dissonance reduction (e.g., Brehm, 1956). Since this initial work, a number of other mechanisms have been proposed to account for choice-based preference changes, some of which are consistent with a motivation to reduce cognitive dissonance. However, one of the cleaner ways to distinguish among the explanations is by whether they claim a central role of the self.

Generally, researchers have proposed two classes of candidate mechanistic explanations: those that posit a central role for the self, and those that do not. The first

class of explanations, which includes models like self-consistency theory (e.g., Aronson, 1968) and self-affirmation theory (e.g., Steele, 1988), argues that choice-induced preference changes result from discrepancies between one's self concept and one's decisions. Under this class of explanations (which we refer to here as “self-based models”), bad decisions somehow pose a threat to one's self-concept; people therefore tend to change preferences so that their decisions appear to reflect more a consistent or positive self. The second class of explanations— which we'll refer to as “non-self-based models”— tend to involve processes that don't require sophisticated self-concepts. Instead these models explain choice-induced preferences as the result of other more general kinds of processing. Such models have argued, for example, that choice-induced preferences result from network-level attempts to reconcile preference inputs and behavioral outputs (e.g., Shultz & Lepper, 1996; Van Overwalle & Jordens, 2002) or general processes involved in inferring people's preferences and behaviors (e.g., Bem, 1967; 1972). Critically, this second class of models does not require that decision-makers have either a rich self-concept or advanced meta-representational capacities.

In order to distinguish between these two classes of models, researchers have recently begun investigating whether two populations whose self-concepts appear to be less elaborated than those of human adults— non-human primates and young children (e.g., Egan et al., 2007)<sup>1</sup>— exhibit choice-induced preferences. If self-concepts are required for choice-induced preferences, as self-based models maintain, then non-human

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<sup>1</sup> Although a lengthy discussion of the self-concepts of non-human primates and children is outside the scope of this paper, see Egan et al., 2007 and Egan, 2008 for a discussion of these issues.

primates and children should not demonstrate such preferences. In contrast to this prediction, Egan and colleagues (2007) observed that children and nonhuman primates devalue alternatives that they have previously rejected, changing their preferences to fit with their choices. These results therefore provide support for the second class of models, ones that explain choice-induced preferences without requiring rich self-concepts. In this way, comparative-developmental evidence has provided a novel and useful window into the debate regarding the mechanisms underlying choice-induced preferences.

The present paper attempts to use similar comparative-developmental evidence as a window into a second (and more recent) kind of debate that has surrounded choice-induced preferences: namely, whether this behavioral phenomenon actually exists in the first place. In the past two years, Chen and colleagues (Chen, 2008; Chen & Risen, 2009) have argued that choice-induced preferences are actually methodological artifacts of the experimental procedures typically used in preference studies. They argue that rather than inducing preferences, the act of making a choice merely reveals preexisting preferences towards choice alternatives. To illustrate how this revealed-preference account works, consider the specific methods used by Egan et al. (2007). In this study, children and monkeys were presented with three items (A, B, and C) that were assumed to be equally-preferred based on prior testing. Participants were first offered a choice between A and B, and then a subsequent choice between the rejected alternative (for instance, B) and C. Participants tended to choose C, consistent with the view that the act of rejecting B lowered its value. But suppose now that participants actually had a ranked preference ordering for the three items, one that was not revealed through prior pre-testing. Under this scenario, an individual would choose A over B because of a prior

preference for A over B. If so, then her preference ranking must be either [A, B, C], [A, C, B], or [C, A, B]. With such preexisting preferences, there is in fact a 2/3 probability that the individual will select C over B in a subsequent test condition. In this way, Chen and colleagues' revealed preference account can explain the results of Egan et al. (2007) without positing any effect of choice on preference. Chen (2008) and Chen and Risen (2009) have argued that the results from a range of studies on choice-induced preferences fall prey to the same alternative explanation; such results, it is argued, reflect an individual's true preferences between the available alternatives rather than derogation of unchosen alternatives (but see Sagarin & Skowronski, 2009, for a critical discussion).

In the current paper, we attempt to use comparative-developmental evidence to empirically refute this revealed preferences account. To do so, we develop a "blind" two choice paradigm, modeled on the two choice paradigm used with children and monkeys described above (Egan et al., 2007). The key feature of the blind two choice paradigm presented here is that an individual's initial choice is designed such that *preferences cannot play a role in choice behavior*. We predict that if the mere act of making a choice creates preferences, then participants should choose the third object over the one they rejected, albeit blindly. This effect should be present relative to a parallel No Choice condition in which individuals are given either A or B, but do not choose between the two.

In the first study, we investigate children's preferences for a blindly rejected toy compared with a third toy. In the second study, we investigate capuchin monkeys' preferences for blindly rejected food items. Note that both of these two populations are

useful for this sort of “blind” test because they lack the demand characteristics that might make similar procedures problematic in adult human populations.

### Experiment 1: Do young children devalue alternatives they have blindly rejected?

#### Method

Participants. Ninety-six four-year-olds ( $M = 48.4$  months,  $SD = 7.1$ ; 44 girls, 52 boys) participated in this study. Children were recruited from preschools and day-care centers in and around New Haven, Connecticut.

Materials & Procedure. We used brightly colored plastic toys, each roughly 5 inches in diameter, as stimuli. The toys differed only with respect to color: each toy was red, yellow, or blue. Children were run in a between-subjects design. Each condition consisted of a trial in which the child either had a choice or did not have a choice (Phase 1) and a test trial (Phase 2).

The experimenter first displayed an opaque gray stocking to the child, and sequentially extracted the three toys (described as some of the experimenter’s “favorite things”, which were “really fun, but you have to be creative with them”). The toys distended the stocking such that the contours of each could be seen, but the color could not be discerned. The experimenter extracted and displayed the three toys to the child, described them as some of her favorite things, then shuffled them as she lifted them behind an occluder, and announced that she would hide the toys. She removed the occluder to display two stockings, one dotted and one argyle. The experimenter pointed out that the outlines of two toys were visible within one of the stockings, and that the

outline of the third toy was visible in the second stocking. In the *Choice* condition, the experimenter held up the stocking with two toys and asked the child to reach in, without peeking, and choose a toy. In the *No Choice* condition, the experimenter reached into the stocking with two toys, pulled one closer to the mouth of the stocking, held up the stocking, and asked the child to remove the toy “on top,” again without peeking. In Phase 2, a second experimenter, blind to which stocking originally contained two toys, indicated the two stockings and asked the child to choose a toy to play with. Children were instructed not to peek before making their selection.

### Results

A chi-square test revealed a significant difference across the two conditions ( $X^2(1, N = 96) = 9.379, p = 0.002$ ). In the *Choice* condition, children reliably preferred the toy in the second stocking, which was the “novel” option (32 of the 48 children, 66.7%, binomial probability:  $p = 0.029$ ). In the *No Choice* condition, children marginally preferred the toy in the original stocking; only 17 of the 48 children (35.4%) chose the toy in the second stocking (binomial probability:  $p = 0.059$ ).

#### Experiment 2: Do capuchin monkeys devalue alternatives they have blindly rejected?

Because capuchin subjects cannot be instructed not to “peek” as children were in Experiment 1, we changed the nature of our blind two-choice task. Instead of making a blind choice, monkeys had the illusion of choosing freely when, in fact, their choice was predetermined by the experimenter. If choices create preferences, then even the illusion



of choice in a two choice paradigm may cause a monkey to devalue an option that it believes it has rejected—even if the monkey himself has no influence over what alternative is originally chosen and which is rejected. In this way, we hypothesized that if we tricked capuchin monkeys into believing that they had chosen one option over another, that they should devalue the option they had ostensibly rejected.

### Method

Participants. We tested 7 capuchins (*Cebus apella*) from the Comparative Cognition Laboratory at Yale University. This group included six adults and one adolescent, all of whom had previous experience with searching tasks.

Materials & Procedure. We used novel Skittles® candies as stimuli. Monkeys were run in a within-subjects design, with three different Skittles colors used in each condition. Each condition consisted of a trial in which the monkey either had a choice or did not have a choice (Phase 1) and ten test trials (Phase 2).

In Phase 1, the experimenter first displayed two different-colored Skittles, one in each hand. In the *Choice* condition, the experimenter lowered both hands into a transparent box of wood shavings and ostensibly hid both Skittles inside the box, one on each side. The experimenter covertly removed one Skittle, leaving only one Skittle in the box. The experimenter then allowed the monkey to search for the Skittles, and removed the box once the monkey found the Skittle. The experimenter appeared to withdraw the second Skittle from the shavings, and displayed this Skittle. This presentation therefore gave the monkey *the illusion that it had chosen one of the two options* (since the monkey

should think that both objects were in the box) even though the monkey never had an actual choice.

In the *No Choice* condition, after displaying two Skittles, the experimenter lowered only one hand and hid only one of the Skittles inside the box. The monkey searched until finding the Skittle, and the experimenter removed the box. The experimenter then displayed the Skittle that had not been placed in the box. In this way, monkeys tested in the No Choice condition should think that they were *given* one of the two Skittles, in contrast to monkeys in the Choice condition, who should feel that they had a *choice* between two Skittles.

In Phase 2, a second experimenter, who was blind to the condition, gave the monkey a series of ten choices between the unreceived Skittle color from the first phase of the experiment and a novel third Skittle. This experimenter administered these choices inside a familiar testing enclosure (82.5 cm x 82.5 cm x 82.5 cm), with one wall that contained two openings spaced to prevent a monkey reaching from both openings simultaneously. The experimenter placed one tray before each opening. One tray displayed a Skittle of the color that the monkey had not received in Phase 1, and the other tray displayed a Skittle of a novel color. For each of the ten test trials, the experimenter presented the monkey with the two trays such that the monkey could see the Skittles on the trays beyond two metal sliders that completely covered the openings in the wall. After the monkey had seen each Skittle, the experimenter removed the sliders so that the monkey could choose one of the Skittles. When the monkey made a choice, the experimenter removed the second option. The experimenter delivered ten choices

between instances of the originally unreceived Skittle and the novel Skittle, alternating sides on which the Skittles were presented after every trial.

### Results

In the Choice condition, monkeys preferred the novel option 60% of the time, which was marginally greater than chance,  $t(6) = 1.87, p = 0.055$ . In the No Choice condition, they chose the novel option 49% of the time, which was not different from chance,  $t(6) = 0.42, p = 0.69$ . The difference between Choice and No Choice condition was significant,  $t(6) = 2.25, p = 0.03$ .

### General Discussion

Two experiments suggest that young children and nonhuman primates exhibit choice-induced preferences in tasks in which preferences cannot guide choices. In Experiment 1, children tested in the Choice condition devalued the rejected toy, even though they could not perceive its unique attributes when they rejected it. Children devalued the rejected toy both relative to chance performance, and relative to a corresponding No Choice condition. Similarly, in Experiment 2, monkeys tested in the Choice condition devalued the rejected item. Unlike the children, the monkeys were not ignorant of the identities of the two alternatives in the Choice condition, but crucially, they were unable to determine which of the two options they “chose” by comparing the attributes of one alternative with those of the other. Taken together, our results cannot be accounted for by Chen and colleagues’ revealed preference approach; our findings instead support the view that choices can in fact induce preferences.

In addition to refuting a revealed preferences account, our results also illustrate another interesting pattern, one reflected in children's pattern of performance in the No Choice condition. Curiously, we observed a marginally significant effect in which children in the No Choice condition preferred the toy that the experimenter did not give them (see Egan et al., 2007 for a similar effect in capuchins). Although we had originally hypothesized that children would be at chance on this condition, the observed pattern of performance hints that children's preferences may change not merely because of their choices, but also because of their *lack of choices*. Consistent with Brehm's (1966) reactance theory and S.S. Brehm and Weintraub's (1977) research on reactance in two-year-olds, children's preferences may reflect psychological reactance when choice freedom is denied.

Although we performed our study for the purpose of refuting the revealed-preferences account of choice-induced preferences, our results also bear on the debate regarding the mechanisms that underlie this phenomenon. The fact that we observe choice-based preferences even in children and monkeys, suggests — along the same lines as previous work (e.g., Egan et al., 2007) — that the mechanisms underlying choice-induced preference may not require cognitively-elaborate self-based processes, as some self-based models have argued. Indeed, our present results go even further than previous studies, demonstrating that even blind choices may induce preferences.

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