SYMPATHETIC MAGICAL THINKING IN DECISION MAKING: DIFFERENCES FOR ANIMATE AND INANIMATE DECISION TARGETS

By

Lennea R. Bower

Submitted to the

Faculty of the College of Arts and Sciences

of American University

in Partial Fulfillment of

the Requirements for the Degree of

Master of Arts

In

Psychology

Chair: Z. Peynircioglu

Zehra F. Peynircioğlu, Ph.D.

S.H.R.

Scott Parker

Paula E. McCabe

Paula McCabe, Ph.D.

Dean of the College of Arts and Sciences

April 22, 2014

Date

2014

American University

Washington, D.C. 20016

SYMPATHETIC MAGICAL THINKING IN DECISION MAKING: DIFFERENCES FOR ANIMATE AND INANIMATE DECISION TARGETS

BY

Lennea R. Bower

ABSTRACT

Sympathetic magical thinking is a decision-making heuristic. The two most commonly studied versions are similarity ("appearance equals reality") and contagion ("once in contact, always in contact"). Several studies on contagion have shown that individuals will change their opinion about an object or food item if they believe it has come into contact with an undesirable person (e.g., a murderer) or disgusting thing (e.g., a sterilized, dead cockroach). The experiments described in this paper looked at the potential for a "pity effect", empathy with the target, counteracting magical thinking in regards to decision making about animate targets. In both experiments, there were lower selection rates and lower likeability ratings for targets (children, dogs or objects) that were presented with negative information about a parent or owner. However, although the contagion effect was extended to animate targets in both experiments, it was weaker for animate targets than for inanimate targets in Experiment 2. Further, expertise with animal shelters also moderated the strength of magical thinking in judgments about dogs. Results are discussed within the framework of the magical thinking heuristic in decision making and research on prosocial behavior and empathy.

ACKNOWLEDGEMENTS

Thanks to Jordan R. Wyatt for his assistance with Experiment 1.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

People's lives include a constant stream of decisions. Decisions are made based on available information, and may involve analyzing many pieces of this information even for a simple decision, although the relevant factors are not always well-defined. For instance, a theoretical decision-making scenario about buying peanut butter might present unit size and price as the relevant factors; however, other factors, such as growing method, ingredients, and brand preference, might all influence one consumer, while only the cost-per-jar factor might influence another consumer. Thus, in general, people may extend purportedly simple questions (e.g., "Should I buy this peanut butter?") to encompass a wide variety of additional avenues, such as implications for health, social acceptance, or global ethics, and further complicate the decision-making process (Ariely & Norton, 2009).

Advocates of rational decision-making models claim that people balance information through rational strategies, often explained with algorithms, that analyze all available information and which decision makers can generally consciously articulate (Glöckner & Betsch, 2008). One such rational decision-making model, for instance, is the use of weighted additive strategies where decision makers incorporate all the given information, including information about cues of varying value. The information is then weighted based on the relative value of the cue and the final decision is based on the sum of the weighted values of all cues. For example, if the factors for selecting a brand of peanut butter are price, jar size, and salt content, each option would have a calculated value based on how the decision maker combines these three factors, which would lead to a ranked favorite. However, research into decision making indicates people often rely on heuristics or shortcuts, to make complicated decisions, which may then lead to not fully logical decisions (Garcia-Retamero & Dhami, 2009; Marewski, Gaissmaier, & Gigerenzer, 2009, 2010).

Some commonly identified and studied heuristics are availability, anchoring, framing, illusory control, sunk cost, and take-the-best. By eliminating the need for complex analysis or calculations, heuristics make possible the series of rapid decisions that people often make. As opposed to the weighted additive strategy described above, then, a heuristic such as the take-the-best strategy can simply let a person base the decision on the most salient cue that distinguishes between the various options (Garcia-Retamero & Dhami, 2009). Thus, a person can order the relevance of all factors and then base the final decision on the most relevant factor on which one option is clearly superior. For example, when deciding between two brands of peanut butter using a take-the-best model, a consumer who prioritizes organic growing methods would eliminate options first using this criteria and then, if multiple options remained, by using the next most relevant cue (e.g., brand or cost).

Heuristics can often be beneficial, by allowing individuals to make good decisions faster. Perhaps more importantly, they provide a framework for decision making even when some information is unknown. However, heuristics can also lead decision makers to ignore important information, resulting in wrong or non-optimal decisions. Indeed, the same heuristics may be harmful or helpful in different circumstances. For example, the anchoring heuristic states that when people are not sure of the answer to a question, they will arrive at the answer by calculating it based on another available piece of information, specifically a date or value. This may be helpful if the original value used to anchor is relevant to the question at hand (e.g., “on my last shopping trip, I bought two jars of peanut butter and the bill was about $8”), but would not be helpful if the anchoring information was irrelevant (e.g., “on my last shopping trip, I bought four bananas and a loaf of bread and the bill was about $8”).

One factor that has been shown to affect an individual's decision-making strategy is relative expertise in the decision area. In one study, for instance, Garcia-Retamero and Dhami (2009), recruited participants from three groups: university students, police officers, and burglars. All three groups made decisions about how likely a variety of properties were to be burgled. The results showed that experts' (police and burglars) decisions were best explained by take-the-best strategies (i.e., use of a heuristic)—using the differences between the targets on the variable the decision makers rated most relevant—while the novices' (students) decisions were best explained by a strategy of weighting and analyzing several pieces of information (i.e., use of a rational model). Interestingly, although both types of experts (police and burglars) used take-the-best strategies, they did not place the same importance on the same cues. For instance, burglars rated presence of security systems, property location, and type of property as much more important than did police officers, while police officers rated access to the property as significantly more important than did burglars. As a result, the two groups reached different conclusions about the likelihood of burglary for a given property. This finding emphasizes that the specifics of expertise influence the implementation of heuristics.

Another factor that may influence the likelihood that a decision maker will employ a heuristic is the presentation format of the information. In one study, for example, participants were asked to look at a number of factors and then decide which vendor provided a higher quality product (Glöckner & Betsch, 2008). Data presentation was manipulated so that some participants saw all the information at once, while others had to individually click on each piece of information before it was presented. The results showed that participants who were presented all of the information simultaneously made decisions that were best explained by a weighted additive strategy (i.e., use of a rational model), while participants who had to click on each piece

of information made decisions that were best explained by use of a take-the-best strategy (i.e., use of a heuristic).

Sympathetic magical thinking is a subset of heuristics that promote decision making based on resemblances or associations between objects. The name derives from the parallels between these heuristics and the principles of "primitive" belief systems, but the phenomenon has been observed in many cultures, including among adults in the United States (Rozin, Millman, & Nemeroff, 1986). The two most-studied magical thinking heuristics are *similarity* and *contagion*. Similarity is often explained as "like causes like" or "appearance equals reality" (Rozin & Nemeroff, 2002). This heuristic provides a useful shortcut in certain circumstances, such as promoting the quick categorization of plants and animals based on resemblance to other known plants and animals. For example, when gathering food, people can base their decisions on resemblance to known safe or unsafe foods, rather than sampling each individual plant.

Contagion, the heuristic explored in the present study, can be summarized as "once in contact, always in contact" (Rozin & Nemeroff, 2002). This heuristic simplifies decisions by basing them not on the object in question, but rather on its past associations or connections to liked or disliked (safe or dangerous) people or things. Again, this can be a useful decision-making shortcut; for example, it might help people to avoid foodstuffs that have come in contact with known poisons.

However, magical thinking heuristics are often applied when the information is logically irrelevant but emotionally salient. Such thinking can occur even when participants are fully aware of and acknowledge the logical inconsistencies in their decisions. For example, in a study by Rozin, Millman and Nemeroff (1986) on the similarity heuristic, participants watched the experimenter pour sugar from the original store packaging into two identical jars. Participants

then placed pre-printed labels reading “Table Sugar” or “Sodium Cyanide” on the jars. Afterwards, a spoonful of the contents from each jar were mixed with water. When participants rated their desire to drink from each cup and their preferred cup, the cup from the bottle labeled sugar was rated as significantly more desirable, even though the participants had labeled the bottles themselves and knew that labeling to be non-informative.

More relevant to present purposes are magical thinking studies based on contagion, which have used a variety of sources of contagion across a variety of decision target types. Contagion in which the target is rated less favorably because of its contact with a disliked source is termed “negative contagion,” whereas situations in which the target is rated more favorably because of contact with a positive source is termed “positive contagion”. Negative contagion is generally considered more potent than positive contagion (Rozin & Nemeroff, 2002; Rozin & Royzman, 2001), and, in fact, can occur even from contact with positive sources. For example, when individuals are asked to rate how much they would like a variety of objects (hairbrush, sweater, etc.) if these objects were new compared to if they were used, but thoroughly cleaned (Rozin, Nemeroff, Wane, & Sherrod, 1989), some degree of negative contagion is indicated for most objects, such as the hairbrush, with participants eschewing the used version regardless of whom it had belonged to (friend, lover, disliked person, etc.).

In addition to contact with unsavory people, contagion can also be caused by contact with undesirable events or objects. For example, participants have rated a bowl of soup as less desirable if they had spit in it themselves or if it was served in a brand-new, unused bedpan than an untouched bowl of soup served in a regular bowl (Rozin et al., 1986). Participants in this study also rated as less desirable a drink that had been exposed to a sterilized dead cockroach than one that had been exposed to a birthday candle holder, even if their previous preference had

been for the type of drink that was then exposed to the cockroach. Furthermore, when participants were offered a new cup of the same flavor juice that had had the roach in it, they rated it as less desirable than before the roach exposure. Interestingly, however, a study by Rozin, Grant, Parker, and Weinberg (2007) showed that an outside factor, money, could counteract the effects of contagion. Participants tended to prefer the idea of wearing a brand-new sweater to wearing one that was previously worn by a convicted murderer, but they were unlikely to agree to pay money to achieve this preference.

To date, magical thinking studies have involved inanimate decision-making targets (hairbrushes, sweaters, condos). Anecdotal evidence suggests that, in terms of contagion, decisions about animate targets, such as pets, wildlife or people, may differ from those about objects. For example, even though animal adoption agencies report a great deal of difficulty placing previously owned animals (ASPCA, 2013), when Michael Vick, the famous Philadelphia Eagles quarterback, was arrested and sentenced to 23 months in prison for dog fighting, many individuals and rescue groups came forward to accept his dogs, even though feelings about Vick were extremely negative in the dog community (Animal Legal Defense Fund, 2011; Wittenauer, 2008).

Some of this interest in adopting such animals may have resulted from empathy for the animal's suffering. Recent research has found that empathy is often greater for targets who evoke pity (Cikara & Fiske, 2011a). Pity is felt most strongly for targets that are high in warmth (tendency towards cooperation) and low in competence (ability to cause harm) (Fiske, Cuddy, & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002). In turn, such empathy and pity can trigger altruistic or helping behavior that attempts to alleviate others' distress or discomfort (Batson & O'Quin, 1983; Carrera et al., 2012). Along similar lines, altruistic behavior can also be initiated

by biological imperatives that trigger responding to distressed others, especially the young or vulnerable (Preston, 2013). Assuming that Michael Vick's dogs fell into this category of objects of pity, the resulting empathy could explain the discrepancy between the rapid rescue of these animals and the typical fate of other previously owned dogs. We have termed the desire to rescue or take responsibility for such animals with high profile vulnerability who also evoke highly salient altruism triggers, the "pity effect".

One interesting question then is whether such a pity effect can be demonstrated empirically within the realm of magical thinking experiments based on contagion. Thus, in the present study, the main purpose was to explore whether the pity effect would act as a moderating factor similar to that observed when participants are asked to stake money on their preference. Such an effect should reduce the strength of, or even eliminate, contagion. However, this effect would be expected only with animate targets that can elicit empathy (dogs in Experiment 1 and dogs and children in Experiment 2).

Another purpose of the study was to see whether relevant expertise would also moderate any contagion effects that might arise. Although expertise has been shown to play a role in the use of heuristics in decision making in general (e.g., Garcia-Retamero & Dhami, 2009), whether it would play a role in the domain of magical thinking, possibly as another moderator, has not yet been examined. Experts may be less prone to magical thinking because they are better able to distinguish relevant information from irrelevant contagion information than non-experts. On the other hand, experts may be more prone to magical thinking than non-experts if experts consider the cue containing contagion information to be particularly relevant and decide that such negative contagion information renders the target less desirable. In the present study, we looked at whether any contagion shown with one of our target types (dogs) would be modified by

participants' expertise with either dogs or animal shelters. As has been found in other areas of decision making (e.g., Garcia-Retamero & Dhami, 2009), it was also possible these two types of experts might weigh the importance of decision factors differently and thus not be equally affected by the contagion information. In addition, expertise specifically in animal shelters could change the perception of people about dogs with previous owners, accentuating the pity effect and thus indirectly moderating magical thinking.

EXPERIMENT 1

Experiment 1 followed up on the anecdotal evidence with Vick's dogs (Animal Legal Defense Fund, 2011; Wittenauer, 2008) and the findings on empathy for objects of pity (Cikara & Fiske, 2011a) to see if magical thinking would be eliminated or weakened with dog targets, using the same type of negative information as applied to the Vick case, namely negative information about the previous owner. In addition, we looked at the possible influences of expertise with animal shelters or with dogs in general.

We also included two types of information presentation (list form versus narrative form), since the method of information presentation has been shown to alter cue access and decision-making strategies in general (e.g., Glöckner & Betsch, 2008). For instance, information presentation that makes cues more difficult to access encourages use of heuristics, whereas presenting information that makes cues more easily accessible makes participants more likely to utilize weighted additive strategies. In the current study, this might mean that participants in the list condition could demonstrate less contagion than participants in the narrative condition because the consistent cue presentation would encourage them to use an algorithmic strategy rather than a heuristic. Finally, we had two methods of assessing decisions, a forced-choice and a free-choice method. Both methods have been successful in showing susceptibility to contagion in previous experiments (e.g., Rozin et al., 2007), but we were interested in seeing whether the pity effect would be more likely to moderate contagion in the free-choice condition. We hypothesize that the contrast between positive and negative information targets would be less obvious in the free-choice condition than in the forced-choice one. As a result, participants might be more likely to give similar ratings to both positive and negative information targets, rather than intentionally maintaining a difference between them.

Method

Participants. Forty adults, either American University students or members of the community who had equivalent educational backgrounds, participated in the study. American University students were offered extra credit toward psychology courses and community members participated for fun. We classified participants as experts or non-experts in two areas—animal shelters and dogs—depending on their responses on a 7-point Likert scale (with 1 corresponding to little experience and 7 corresponding to extensive experience). Those participants with responses of 5-7 were classified as experts and those with responses of 1-3 were classified as non-experts. Fifteen of the participants were thus classified as animal shelter experts (mean 6.07) and 21 as non-experts (mean 1.81). Similarly, 29 were classified as dog experts (mean 6.14) and 8 as non-experts (mean 2.13).

Materials, Design, and Procedure. Materials consisted of 40 photographs of dogs, each with an accompanying text. The photographs were snapshots of dogs from the popular rescue pet website Petfinder (www.petfinder.com). All photographs were cropped to 0.08 in. in width with the dog's face in the center of the photo. They were also changed to gray scale to reduce any quality differences as well as the photographs' salience, so that more attention would be paid to the text. All text was set in 11-point "Times New Roman" font and included eight pieces of information composed for this experiment so that they did not necessarily correspond to actual information about the dogs advertised on Petfinder. This information was written in the style used by shelters and rescue organizations, and included a number (in place of a name), breed, age, sex, surrender reason, description (temperament), other dogs (ability to interact with other dogs), and the type of home desired for the dog. Sample materials are presented in Appendix A. Surrender reason was the key variable for the contagion manipulation and was designated as providing either "positive" or "negative" information. Our main focus was on the negative

information targets, which gave information that reflected negatively on the previous owner, such as “owner abandoned the dog when he moved” or “owner decided having a dog was too much work.” These were pitted against targets with non-negative information related to surrender reasons, either positive or neutral, such as “owner had health problems” or “owner was deployed with the military.” For ease of exposition, we will refer to the non-negative information as positive information. All surrender reasons were selected carefully to avoid giving any specific information about the dog’s temperament or behavior (e.g., we did not use statements such as “owner could not handle destructive behavior”). Further, all other information about the dogs was selected to be equivalent in terms of desirability (e.g., all ages were listed as “young adult”, other dog information was intentionally similar: “likes other dogs” or “enjoys the company of other dogs,” etc.). The texts were counterbalanced such that across participants each photograph appeared equally often with a text containing positive information and with a text containing negative information.

All information was presented in individual booklets comprising 8.5x11 standard printer-quality white paper and printed in black ink. The presentation order of the dog/text items was randomized for each participant except for the initial instructions page. Participants responded by using a pen or pencil to circle number choices. In the directions participants were instructed to imagine they were planning to adopt a dog or assisting someone else to adopt one and were viewing profiles on a website in order to plan which animals to go see in person. The direction page also included the following background questions: “How familiar are you with animal shelters?” with answers given from 1 (not at all) to 7 (very, i.e. volunteer or paid work); “How much experience do you have with dogs?” with answers from 1 (no experience) to 7 (extensive

experience); and “What type of experience do you have with dogs?” with several potential options listed where participants could select multiple answers.

Across two groups of participants, information was presented in two different formats: list and narrative formats. In list format, the information was presented in a categorical fashion, whereas in narrative format the same information was presented as prose comprising three to four sentences (see Appendix A). Further, across two subgroups of participants, two types of decision choices were offered: free-choice and forced-choice decisions. In the free-choice format, each dog/test item was presented individually, followed by the question “How likely would you be to adopt [dog number]?” on a scale of 1 (not at all likely) to 7 (very likely). In the forced-choice format the dog/test items were presented in pairs, followed by the question “Which dog would you prefer to adopt (or recommend that a friend adopt)?” Half of all dogs were paired with a dog with an oppositely-valenced surrender reason (i.e., one positive, one negative) and half were paired with a dog with a similarly-valenced surrender reason (i.e., positive/positive or negative/negative). Both forced- and free-choice versions also included the question “How do you feel about [dog number]?” for each dog, on a scale of 1 (negatively) to 7 (positively). There were thus four between-participant groups: list format, free choice; narrative format, free choice; list format, forced choice; and narrative format, forced choice, with 10 participants in each group. The counterbalancing measure of each item appearing with a positive or a negative surrender reason in each of these four groups resulted in a total of eight separate booklet versions, which were individually randomized with respect to presentation order.

Participants were tested individually or in small groups of up to three at a time. They were randomly given one of the eight versions of the test booklet (five participants completed each version) and told to follow the written instructions on the first page. If participants

requested more information, they were further verbally instructed not to concentrate on specific concerns they might have, such as compatibility with pets they already had at home or on-going shelter searches, but rather to focus on the information provided.

Results and Conclusions

Likeability Ratings. The results are summarized in Tables 1 and 2. *Likeability* was analyzed with a 2 (contagion information: positive vs. negative) x 2 (information presentation format: list vs. narrative) x 2 (decision type: free-choice vs. forced-choice) mixed-design ANOVA. There was a main effect of contagion information, $F(1,36)=7.43$, MSE=0.96, $p<0.01$, but no effects of information presentation format or decision type, or any interactions (all Fs<1). Overall likeability for dogs with positive previous owner information was indeed higher than that for dogs with negative previous owner information. However, information presentation format and whether the likeability ratings were made after targets were presented individually or in pairs, made no difference.

Adoptability Scores. Unlike likeability, participants evaluated *adoptability* differently in the forced- and free-choice conditions. For adoptability, participants in the free-choice condition again used a 1-7 scale, while those in the forced-choice condition indicated a preference between the two dogs displayed by circling the number of the preferred dog. Therefore, for this measure, responses in the two decision-type conditions were analyzed separately.

Free-choice adoptability was analyzed with a 2 (contagion information: positive vs. negative) x 2 (information presentation format: list vs. narrative) ANOVA. There was a main effect of contagion information, $F(1,18)=5.10$, MSE=0.41, $p<0.05$, but no effect of information presentation format. The forced-choice condition was analyzed with a Mann-Whitney U test, which showed that participants were significantly more likely to select dogs with positive owner

information than dogs with negative owner information, U=51, Z=4.02, p<0.01. Thus, in all cases, there was an effect consistent with the magical thinking phenomenon of contagion such that negative previous owner information reduced the adoptability and likeability of the dogs despite identical information about the dogs themselves.

Unlike in other decision making studies in which information presentation format had been shown to affect various decisions (e.g., Glöckner & Betsch, 2008), in the present study, our information presentation format manipulation did not appear to affect magical thinking. That is, even though one might have expected greater contagion in the list condition because the negative information was more consistently obvious, participants demonstrated comparable contagion in both the narrative and list conditions. In previous studies the presentation-format manipulations were specifically geared towards encouraging different decision-making strategies, which would in turn result in different decisions. In the present study, such manipulations were not of primary interest; thus, the narrative and list conditions, although possibly drawing attention to different aspects of the totality of the information, did not turn out to affect the resulting decisions. Participants may indeed have used different strategies and still arrived at similar responses, as well. For example, both a weighted additive strategy and a take-the-best strategy might have led to selection of the same dog. Decision type did not appear to affect magical thinking either, with participants showing similar magnitudes of contagion in both free- and forced-choice decisions despite the expectation of a greater moderating effect of pity in the free-choice condition. Therefore, information presentation format and decision type were not included in analysis of the effect of expertise.

Expertise. The contagion effect seemed to be moderated by expertise with animal shelters but not by expertise with dogs alone. These analyses were conducted only for likeability

ratings because, as previously discussed, adoptability decisions were not comparable across forced- and free-choice conditions, and there were not enough expert and non-expert participants in each decision-type condition for separate analyses. A 2 (contagion information: positive vs. negative) x 2 (animal shelter expertise: expert vs. non-expert) mixed-design ANOVA showed a main effect of contagion information, $F(1, 34)=6.49$, MSE=.75, $p<0.05$, but not of shelter expertise ($p=0.28$). More importantly, there was an interaction between contagion and expertise with shelters, $F(1, 34)=4.23$, MSE=0.49, $p<0.05$. Animal shelter experts and non-experts gave similar ratings to positive information targets, but non-experts were more susceptible to contagion, giving lower ratings to negative information targets, although, with Bonferroni corrections, this difference did not reach significance. A separate 2 (contagion information) x 2 (dog expertise) mixed-design ANOVA showed no main effect of dog expertise ($p=0.13$), and, more importantly, no interaction ($p=0.42$).

Therefore, expertise with animal shelters seemed to moderate the effect of contagion information, while expertise with dogs did not. This difference may stem from differential emphasis placed on the information about dogs' previous owners. Because dog experts' familiarity is not necessarily with dogs that have had previous owners, the weighting of the contagion information was likely to have been viewed no differently from the non-experts in general. Animal shelter experts, however, may not have placed a similar emphasis on the importance of previous owners because their first-hand experience has likely shown them that this information is less relevant than non-experts judge it to be.

Table 1. Percentage of Selection in the Forced Choice Condition and Mean Preference Ratings (1-7) in the Free-Choice Condition, and Overall Mean Likeability Ratings (1-7) as a Function of Type of Contagion Information (Positive or Negative) in Experiment 1.

Target Type	Preference		Likeability	
	Positive Info	Negative Info	Positive Info	Negative Info
Overall	-	-	5.23	5.01
Forced-Choice	61.5%	38.5%	-	-
Free-Choice	4.46	4.26	-	-

Table 2. Mean Likeability Ratings (1-7), Given by Animal Shelter Experts and Non-Experts, as a Function of Type of Contagion Information (Positive or Negative) in Experiment 1.

Shelter Expertise	Likeability	
	Positive Info	Negative Info
Expert	5.39	5.35
Non-Expert	5.20	4.82

EXPERIMENT 2

In Experiment 1, magical thinking based on contagion was extended to animate targets, namely dogs, but such thinking was not detected in animal shelter experts. One possibility was that such individuals had found the targets more relevant or more emotionally salient, and the proposed "pity effect" might have countered the effect of contagion. Additionally, they may have had relevant experience with dogs with a variety of previous owners, which could have altered their perception of the salience of previous owner information. To explore the differences in contagion between animate and the inanimate targets further, in Experiment 2, we added human children, presumed to be even more relevant and emotionally salient as targets and as such to *all* participants. We also included a category of inanimate targets typically used in all magical thinking experiments (Rozin, Markwith, & Ross, 1990; Rozin et al., 1986) to act as a baseline condition and help gauge any deviations in the strength of the effect of contagion in animate targets.

Further, one might argue with the dog targets that the negative information about the previous owner could in fact taint the target itself in some logical way and the results may not reflect the "magical" thinking heuristic after all. That is, owners who are bad people (drug abusers, neglectful, etc.) could somehow have hurt the dog in other ways that might have long-lasting effects, which in turn might make the dog less desirable to own. Although it would be hard to apply this argument to the "likeability" results, the adoption preference results might have been influenced by the thought that such information should be logically relevant. In Experiment 2, we used a set-up that was similar to those used in previous magical thinking experiments. For example, in a previous study participants were asked how they would feel about wearing a sweater for three hours while alone in their room (Rozin et al., 2007), and how they would feel about caring for the various targets for a weekend. For such shorter-term

commitments, the same level of caution that might have made the contagion information at least appear logically relevant would not be as applicable. Thus, in Experiment 2, we also asked participants to make decisions about short-term commitments where the contagion information would be even more irrelevant. Finally, because neither presentation format nor decision type made a difference in Experiment 1, we used only the narrative format, which was more applicable to the child targets. We also opted for the forced-choice rather than the free-choice decision type because the former took less time, and participant feedback in Experiment 1 indicated that the free-choice tests were less engaging. However, we added a "no-choice" option to make the task have fewer demand characteristics by giving participants the ability to not have to make a choice and not be forced to fall into either a magical thinking or a pity effect mode. Thus, any effect that emerged would do so under more stringent conditions.

Method

Participants. A total of 120 adults, either American University students or members of the community, participated in the study. American University students were offered extra credit toward psychology courses and community members participated for fun. Participants were 28 males and 92 females with at least a high school education. Sixty-nine (20 males and 49 females), were between the ages of 18 and 44, and 51 (8 males and 43 females) were 45 or older. Although previous studies have not found any effects of age or gender in magical thinking, there are reported differences in both empathy and altruism, the possible drivers of the proposed pity effect. For instance, older adults typically report less empathy than younger adults (e.g., Schieman & Gundy, 2000). Further, younger and older adults demonstrate different patterns of motivation for altruistic behavior in that younger adults tend to be more motivated by efficiency while older adults tend to be more motivated by equity (Pelligra & Stanca, 2013). Finally,

females typically report more empathy than males (e.g., Eisenberg & Lennon, 1983). In addition, participants were classified as animal shelter experts or non-experts, as in Experiment 1, with 74 being classified as experts (mean rating of 6.05) and 32 as non-experts (mean rating of 2.13).

Materials, Design, and Procedure. This study was conducted as an online survey, and participants were tested individually or in small groups of up to 4 at a time. Materials consisted of 18 photographs each of children, dogs, and objects, all with accompanying texts. Photographs of children and objects were selected from the free items available on the stock photograph site Stockvault (www.stockvault.com), and photographs of dogs were selected from Petfinder as before (www.petfinder.com). All photographs were cropped to 0.75 inches on their shortest side, with the face (children and dogs) or object in the center of the photo. Cropping reduced any quality differences between the photographs and the salience of the photographs such that people would not be tempted to make their decisions based solely on the photographs without reading the relevant text. All text was set in 14-point "Cambria" font. All targets were presented in like pairs (e.g., child-child) presented side by side. The left-hand target in each pair was designated as "A" and the right-hand target was designated as "B." Target pairs were matched for basic physical features (e.g., gender, age, coloring/breed) or object type (e.g., toy, musical instrument). For example, a female Caucasian child was presented with another female Caucasian child, a retriever dog was presented with another retriever dog, and a musical instrument was presented with another musical instrument.

The text included four pieces of information (none of which corresponded to any actual information provided about the target on the websites), of which one was the critical contagion information. The critical information consisted of owner's occupation for dogs and objects

(parent's occupation for children). The occupations chosen for positive and negative background information were selected from published lists of most admired and most distrusted professions (www.billshrink.com, www.scientificmarketingandadvertising.com, www.onlinedegreeprograms.com). The other information was always positive or neutral and comprised a subset of personality or hobby information (for children and dogs) or usage information (for objects), as well as two of three physical characteristics: coloring (for children and dogs) or color (for objects), size (for all target types), and age (for all target types), which were all selected to be consistent with the photograph and similar to the information for the other target in the pair. The order in which these four pieces of information were presented was randomized across targets, but kept the same for each target. For a given target, only the contagion information and left-right position of the target varied between subjects. In order to minimize how evident the contagion information manipulation was to participants, three of the six pairs for each target type were lure pairs that were similar in every way except for containing neutral information about the target's parent or owner, rather than contagion information.

Across four counterbalancing groups of participants, each target appeared equally often in each of the two positions (A and B) and equally often with a positive and a negative critical information (examples can be seen in Appendix B). Across three further counterbalancing groups, the critical information was rotated through the three types of targets. Each occupation appeared equally often for each target type (child, dog, object), but each participant saw each occupation only once. For example, all participants saw one and only one target whose parent (owner) was described as a drug dealer, but for one-third of participants this target was a child, for one-third a dog, and for one-third an object. Of the one-third of participants who saw the object whose owner was a drug dealer, for half this object was a skateboard and for half a soccer

ball, and the same counterbalancing was done for children and dogs. Similarly, for one-half of participants the target associated with a drug dealer appeared on the right-hand side of the pair and for the other half on the left-hand side of the pair. Thus, there were twenty-four versions of the electronic survey, with five participants completing each version.

Target pairs were transformed into images and uploaded into the electronic survey. Actual appearance size differed depending on computer monitor settings, but their relative sizes were constant across participants. Electronic surveys were loaded on the survey site Survey Monkey (www.surveymonkey.com). All target-related questions were set as *required* questions and participants could not return to a previously submitted page. Target pairs were presented one at a time in a different random order for each participant and were also randomized with respect to target category (i.e., child, dog, or object).

Surveys started with a basic consent page, and one example page that included cartoon figures to introduce participants to the study format and give them the opportunity to make any needed adjustments to their computer monitor. The 18 target pairs followed. Each target pair was followed by the same questions: "Which of the children [dogs, objects] pictures above would you prefer to care for [be in charge of] for a weekend?" with five response options from "Strongly prefer A" to "Strongly prefer B"; and "How do you feel about A [B]?" with responses on a scale from 1 (negatively) to 7 (positively). Participants responded by marking the radio button next to their choice. The final page of the survey gathered demographic information including age, sex, and highest level of education obtained, as well as the same question about animal shelter and dog expertise to see if we would replicate the moderating effects with dog targets, although the last question was used only for determining emotional salience of dogs to participants. Participants accessed the survey via a weblink using their own laptop or desktop

computer. All survey instructions were included in the electronic survey. No additional verbal or electronic instructions were given.

Results and Conclusions

The results are summarized in Tables 3 and 4. We should note that although the demographic variables of age and gender were included in the analyses for all target types, shelter expertise was analyzed only for dog targets.

Likeability Ratings. Each target was given a separate likeability rating, and these ratings were analyzed in a 2 (contagion information: positive vs. negative) x 3 (target type: children, dogs, objects) x 2 (age: under 45 vs. 45 and over) x 2 (gender: male vs. female) mixed-design ANOVA. There was a main effect of contagion information, $F(1, 116)=21.95$, $MSE=8.74$, $p<.01$. Indeed, post-hoc t-tests with Tukey corrections showed that a negative contagion effect was present in each of the target types separately, as well, $ts(119)=4.35$, 3.18, and 5.19 for children, dogs, and objects, respectively, all $ps<0.01$. There was also a main effect of target type, $F(2, 232)=26.06$, $MSE=31.55$, $p<0.01$. Post-hoc t-tests with Tukey corrections indicated that likeability ratings for objects were lower than those for dogs or children, $ts(119)=8.69$ and 6.87, respectively, $ps<.01$; interestingly, likeability for dogs was higher than that for children, $t(119)= 2.37$, $p<.05$. More importantly, there emerged an interaction between contagion information and target type, $F(2, 232)=4.23$, $MSE=1.29$, $p<.05$. Post-hoc t-tests with Tukey corrections indicated that the effect of contagion information was significantly greater for objects than for either dogs or children, $ts(119)=3.47$ and 3.02, respectively, $ps<0.01$. There was no difference in the effect of contagion information between dogs and children ($p>0.10$). There was no main effect of either age or gender ($p=0.48$ and 0.26 for age and gender, respectively). Finally, there was a marginally significant interaction between contagion and age, $F(1, 116)=3.66$, $MSE=1.46$, $p<0.10$. This

interaction resulted from more extreme differences between ratings given to positive and negative information targets for younger participants than older participants. Both age groups showed the same pattern of responding (higher ratings for positive information targets), and the difference in ratings between the two groups was not significant for either positive or negative ratings alone (ps=0.59 and 0.70).

The difference between the critical targets, those for which positive or negative information was provided, and the lure targets (for which no background information was provided) was analyzed with a 3 (contagion information: positive, negative, none) x 3 (target type: children, dogs, objects) repeated measures ANOVA. There were main effects of both contagion, $F(2, 238)=54.351$, MSE=17.46, $p<0.01$, and target type, $F(2, 238)=37.55$, MSE=59.35, $p<0.01$. Post-hoc tests with Tukey corrections showed that the difference in likeability scores (see Table 3) was significantly different not only for positive and negative targets, $t(119)=6.65$, $p<0.01$, but also for neutral targets and both positive and negative information targets, ts(119)=3.72 and 8.97, respectively, $p<0.01$. That is, no information information targets had higher likeability ratings than either positive or negative information targets. Unlike the results above for the likeability averages of critical targets only, when lure targets were included, post-hoc tests with Tukey corrections showed a difference between likeability scores for dogs and children, $t(119)=2.19$, $p<0.05$, as well as between each of children and dogs and objects, ts(119)=6.75 and 8.62, respectively, ps<0.01. That is, likeability was different for each target type, with child targets rated less likeabilty than dogs, but more likeable than objects. There was also an interaction between contagion and target type, $F(4, 476)=7.55$, MSE=1.93, $p<0.01$. Post-hoc tests with Tukey corrections showed that there was no difference between child and dog ratings for any one of the three contagion groups (positive, negative or

none). There was, however, a significant difference between child targets and inanimate targets of each type, ts(119)=4.51, 7.07 and 5.04 , respectively for positive, negative, and no information targets, p<0.05. There was also a significant difference between dog targets and object targets of each information type, ts(119)=6.07, 8.95, and 6.35, respectively for positive, negative, and no information targets, p<0.05. That is, the difference between child and dog targets based on contagion information was less than that for the two types of animate targets and the object targets. Although these results showed that, interestingly, participants preferred neutral targets, regardless of whether they were animate or inanimate, because the critical and lure targets were not counterbalanced, no real conclusions can be drawn. In the present study the purpose of including neutral-information targets was solely to draw attention away from the positive and negative information in the critical targets. However, a future direction might be to explore this suggestive finding further.

Preference Scores. Unlike likeability ratings, where each target was given a separate rating, preference measure involved choosing one of the target pairs over the other or indicating no preference on a 5-point scale. Each preference was thus quantified as a single number ranging from -2 (negative information target strongly preferred) to 2 (positive information target strongly preferred). Preference for the positive information target, indicated by a positive preference score, is thus consistent with a contagion effect, and preference for the negative information target, indicated by a negative preference score, is consistent with the pity effect. The mean scores were 0.24 for children, 0.18 for dogs, and 0.36 for objects. Although small, each of these differences were significantly different from 0, which would have indicated no preference, ts(119)=5.06, 4.26, and 5.46, respectively, all ps<.01, indicating a contagion effect rather than no effect or a pity effect.

Interestingly, there were no differences between preference scores for animate targets and for inanimate targets, with children and dogs compared to objects separately or as collapsed into a single animate category (all ps>.10). There were also no gender or age differences (ps>.10). Once Bonferroni corrections were applied, there was no difference in contagion effect for inanimate and animate targets, t(119)=2.04, p>0.025.

Relationship between Likeability and Preference Judgments. One question that was of some importance was whether Likeability and Preference judgments were at least somewhat independent or whether they were simply alternate phrasings of the same question. To address this question, we first eliminated all pairs for which respondents indicated they had no preference (see Table 3). For the remaining pairs in which decisions were made, we translated the preference score into a positive score of 1 (slightly preferred) or 2 (strongly preferred), regardless of whether the preferred target was the positive or negative information target. Non-preferred targets were given a preference score of -1 or -2, which was the opposite of the score of the preferred target (1 with -1). We then correlated these item preference scores with likeability scores that were given separately to each target. These correlation were indeed significant for all three target types, r=0.33, 0.40, and 0.59, p<0.01 for child, dog, and object targets, respectively, suggesting that the two decisions were being driven by similar influences or that they influenced each other, especially since they were made at the same time. Nevertheless, while there was no difference between the correlations for child and dog targets (p=0.35), there was a significant difference between the correlations for each of the animate target types and the object targets, z=4.49 and 3.51, p<0.01 for child and dog targets respectively. Thus, the two decisions were more independent for animate targets.

Expertise. We also analyzed likeability and preference judgments for dog targets only to look at the effect of expertise. Age and gender were not included in these analyses, however, because there were not enough old/young and male/female participants in the two expertise groups. Likeability was analyzed with a 2 (contagion information: positive vs. negative) x 2 (expertise: shelter expert vs. non-expert) mixed-design ANOVA. There were significant main effects of contagion, $F(1, 104)=7.33$, $MSE=1.15$, $p<0.01$, and expertise, $F(1, 118)=8.69$, $MSE=17.86$, $p<0.01$. The latter was driven by the fact that experts gave higher likeability ratings to all dogs than non-experts, $t(104)=2.95$, $p<0.01$. There were, however, no interactions between contagion and expertise ($F<1$); that is, the same pattern of responding was seen between the two groups with respect to contagion information. Finally, experts and non-experts did not differ with respect to preference scores or with respect to magnitudes of contagion with animate and inanimate targets (all ps>.10).

Table 3. Percentage of Selection and Mean Likeability Ratings (1-7) for the Three Target Types (Children, Dogs, Objects) as a Function of Type of Contagion Information (Positive or Negative) in Experiment 2.

Target Type	Preference		No Preference	Likeability		
	Positive Info	Negative Info		Positive Info	Negative Info	No Info
Child	28.6	11.6	59.7	5.58	5.36	5.71
Dog	27.7	14.4	57.7	5.81	5.65	5.89
Object	45.0	22.2	32.7	5.14	4.58	5.26

Table 4. Percentage of Selection and Mean Likeability Ratings (1-7) for Dogs, Given by Animal Shelter Experts and Non-experts, as a Function of Type of Contagion Information (Positive or Negative) in Experiment 2.

Expertise	Preference		No Preference	Likeability	
	Positive Info	Negative Info		Positive Info	Negative Info
Shelter Expert	25.2	15.3	59.4	5.96	5.85
Shelter Non-Expert	35.4	15.6	48.9	5.38	5.17

DISCUSSION

In this study, we examined contagion, a form of sympathetic magical thinking where decisions about a target are influenced by the target's past associations in a variety of contexts (e.g., Rozin et al., 2007, 1986, 1989). To date, such research has focused on contamination of inanimate targets, including food and clothing. However, one could argue that decisions about animate objects might be different because animate targets have intrinsic properties, such as personality and temperament, which could serve as other pertinent decision-making cues, making past associations less relevant and thus counteracting contagion. Additionally, animate targets with negative past associations may evoke empathy and may influence others in the opposite direction from that usually observed with contagion by making people want to help the target (Batson & O'Quin, 1983; Carrera et al., 2012).

Within this framework, we first investigated whether the magical thinking phenomenon of contagion, which had been observed regularly with inanimate targets, would even affect decisions about animate targets. Given that we did find such an effect, we then investigated whether it would be different from that found with inanimate targets, possibly reflecting the conflicting pressures of contagion and empathy. Finally, we investigated whether the contagion effect for either type of target would be influenced by participants' level of experience in the particular decision-making area, their age, or their gender. Even though all three of these factors had been shown to affect decision making in other contexts (e.g., Besedeš, Deck, Sarangi, & Shor, 2012; Eisenberg & Lennon, 1983; Garcia-Retamero & Dhami, 2009), they had yet to be addressed within the magical thinking context.

The contagion effect was quite robust in decisions about animate targets, dogs (Experiments 1 and 2) and children (Experiment 2). In all cases, targets with positive information were preferred over targets with negative information when participants selected between the

two directly, even though the information conveyed was irrelevant to the choice for all practical purposes. Targets with positive information were also given higher adoptability scores in the free-choice portion of Experiment 1with dogs and higher likeability scores in both experiments. These results were somewhat surprising because we had expected decisions about animate targets to be influenced primarily by other social and personality factors rather than the negative association information that triggers magical thinking.

Individuals tend to feel greater empathy towards targets that can be labeled as objects of pity, that is those that are vulnerable and non-threatening as well as those that are not responsible for their negative situation (Cikara & Fiske, 2011a, 2011b; Hamann, Howell, & McDonald, 2013), and children and dogs certainly fit these criteria for evoking pity. While magical thinking should trigger contempt, disgust, or distancing behaviors (Rozin et al., 1986, 1989; Rozin & Nemeroff, 2002), empathy or pity, should elicit altruistic and helping behaviors (Batson & O'Quin, 1983) for the same reasons. Our results reflected distancing and negative feelings instead of empathy. This finding is perhaps reminiscent of previous research in which participants have been found to distance themselves from stigmatized others, such as individuals with HIV/AIDS or mental illness, and, more pertinently to the present topic, also from the family members of individuals with these stigmatized diseases (Crespo, Pérez-Santos, Muñoz, & Guillén, 2008; Pryor, Reeder, Yeadon, & Hesson-McLnnis, 2004).

When considering the potential influence of pity, it is also relevant to consider the participants' relative degrees of empathy and personal distress triggered by the different contagion scenarios. Research shows that these two emotions often occur together when confronted with another's suffering (Batson & O'Quin, 1983; Carrera et al., 2012). The nature of helping behaviors can be shaped by the relative strength of these two feelings evoked in a

particular instance. When empathy is stronger than personal distress, helping behaviors tend towards altruistic behaviors; the reverse balance is linked to more egoistic helping behaviors. Altruistic behaviors focus on lessening the other's distress (sometimes at cost to the helping individual), while egoistic behaviors focus on lessening the person's own distress. In the present study, altruistic behavior might have taken the form of preferring to adopt (or care for) the negative information target. The set-up of the questionnaire suggests that all the target items (children, dogs, and objects) need care; therefore, selecting either could be construed by the participant as helping behavior. However, if the balance of personal distress and empathy drives decisions about the animate targets, participants who experience more empathy might select to care for the drug dealer's child, while those who experience greater personal distress might select the doctor's child. The first choice helps distance the child or dog from the negative influence, while the second provides this distance for the participant. One would not expect this type of an approach-avoidance conflict to arise with inanimate objects, because empathy would not be evoked.

This may help explain the difference in the degree of magical thinking we observed between likeability and preference decisions in Experiment 2, as well as the greater independence of the likeability and preference judgments for animate targets. The reduced effect of contagion on likeability of animate targets, as compared to inanimate targets, may indicate that participants felt comfortable expressing empathy in likeability ratings possibly because these ratings did not imply the involvement of any "action." This difference then disappeared in preference ratings, possibly because egoistic helping behaviors geared towards distancing the participant from the discomfort of the negative information target predominated over the empathetic impulses indicated by the likeability scores. Although no targets were immune to

magical thinking, the effect of contagion was reduced for animate targets, especially for likeability ratings, possibly by the simultaneous and opposite influence of the pity effect.

We also examined the possibility that age and gender would alter individuals' susceptibility to contagion in general and to the moderating effects of pity on contagion in particular (Experiment 2). Although age and gender differences have not been reported in previous magical thinking studies (e.g., Rozin et al., 1986, 1989), age has often been shown to be a factor in decision making. The extent and direction of the effect of age on decision making depends on the situation; decision making that relies on cognitive processing speed tends to decline in older adults, whereas decision making that depends on experience improves (e.g., Besedeš et al., 2012; Bruine de Bruin, Parker, & Fischhoff, 2012; Hess, 2012). Thus, given that our task relied more on experience and had no processing speed demands, we might have expected a difference in the contagion effect as well as the moderating effect of pity as a function of age. Further, both age and gender differences have been shown in empathy and altruism, the posited drivers of the pity effect. Typically, younger people report greater empathy than older people (Pelligra & Stanca, 2013; Schieman & Gundy, 2000). In terms of gender differences, however, past findings are not as clear-cut; women do self-report greater empathy than men, although observational techniques, such as measuring actions, have found no sex differences (Eisenberg & Lennon, 1983). In contrast with past research showing greater empathy in younger people, in the current study, consistent with the role of age in decision making in general, older participants appeared to be less susceptible to contagion. It is possible that in this study older participants saw the past association information as less relevant than younger participants did, thus making them less likely to react to the contagion element. Another possible explanation comes from recent research on motivations of economic helping behaviors, which found that

older and younger participants tended to make different decisions about helping options, with younger participants favoring efficiency and older participants favoring equity (Pelligra & Stanca, 2013). In the present study, similar to studies using observational techniques (Eisenberg & Lennon, 1983), we found no gender-based differences for either likeability or preference or for the moderating effect of pity.

We also examined the possible influence of expertise on susceptibility to contagion because, even though it had not been looked at in magical thinking studies specifically, it had been shown to affect other decision-making tasks by altering the relative emphasis placed on different cues as well as the decision-making strategies employed (Garcia-Retamero & Dhami, 2009). Since magical thinking depends on unwarranted emphasis being placed on information that is not relevant to the decision being made, experts should be better able to perceive that this information is irrelevant. In both experiments, experts—as measured by reported familiarity with animal shelters—did indeed tend to demonstrate less magical thinking than non-experts for dog targets, at least with respect to likeability judgments.

This pattern of different responses for experts and non-experts may demonstrate different decision-making strategies or different cue weights assigned to contagion information, similar to the findings in the burglary scenario (Garcia-Retamero & Dhami, 2009). Whereas burglars and police officers (experts) used heuristic models, graduate students (non-experts) used a weighted additive strategy. Further, police officers and burglars, although both experts in break-ins and both using heuristics to reach their decisions, arrived at different conclusions as a result of weighting the cues differently. Police officers' decisions were in fact similar to those of the non-expert decision makers, even though the strategies employed were different. A similar reasoning may explain why in Experiment 1 dog experts' responses were no different from those of the

general population while shelter experts demonstrated less contagion than the general population. It could be that both dog experts and members of the general population emphasized the past associations while shelter experts viewed these as irrelevant or it could be that shelter experts utilized a different decision-making strategy that reduced the influence of contagion information, regardless of the importance placed on the cue.

In summary, the first of two main findings in this study was that sympathetic magical thinking, specifically contagion, affects decision making also for animate targets. This finding underscores and extends the prevalence of this phenomenon. Indeed, despite the intentional illogical connection between the contagion information provided and the target—can it really make any difference if a child's parent is a telemarketer or a dog's owner is a TV evangelist?—many participants who asked for more information about the research aims after completing the study, as well as colleagues who discussed the research with us, kept coming around to the fact that they "just felt" or would feel less comfortable with the contagion targets. It appears then that personal distress may lie at the heart of the magical thinking phenomenon for all targets. Indeed, a future direction might be to test whether personal distress might actually be a true mediator of the contagion effect. The second main finding, the moderating pity effect, followed from this construct, and showed that when the feeling of empathy towards animate targets comes into play alongside personal distress, there can indeed be a reduction in magical thinking, though not a complete elimination or reversal.

APPENDIX A

EXPERIMENT 1 SAMPLE MATERIALS

Examples of a given stimulus from Experiment 1 in each of the following conditions: 1) decision type: forced- or free-choice; 2) information presentation format: list or narrative; and 3) contagion information: positive or negative.

1. Forced-choice, list presentation, with positive contagion information.

Number: 567
Breed: Pit Bull
Age: Young Adult
Sex: Female
Surrender Reason: Owner health problems
Description: Fun, playful, athletic
Other Dogs: Loves other dogs
Type of Home: Active home

Number: 660
Breed: Hound mix
Age: Young Adult
Sex: Male
Surrender Reason: Owner developed allergies
Description: Fun-loving sweetie
Other Dogs: Good with other dogs
Type of Home: Loving home

2. Free-choice, list presentation, with positive contagion information.

Number: 567
Breed: Pit Bull
Age: Young Adult
Sex: Female
Surrender Reason: Owner health problems
Description: Fun, playful, athletic
Other Dogs: Loves other dogs
Type of Home: Active home

3. Forced-choice, narrative presentation, with positive contagion information.

567 is a playful young pit bull girl. She came to the shelter because her owner had health problems. She is a fun and playful dog who is also athletic and could be a great running partner. She really loves other dogs. She would love to join an active home where she can be part of the family.

660 is a handsome, young hound mix who was surrendered to the shelter when his owners developed allergies. He may seem shy at first, but he's really a fun-loving sweetie. He is fabulous with other dogs and would make the ideal companion for trips to the local dog park. He is looking for a loving home.

4. Free-choice, narrative presentation, with positive contagion information.

567 is a playful young pit bull girl. She came to the shelter because her owner had health problems. She is a fun and playful dog who is also athletic and could be a great running partner. She really loves other dogs. She would love to join an active home where she can be part of the family.

5. Forced-choice, list presentation, with negative contagion information.

Number: 567
Breed: Pit Bull
Age: Young Adult
Sex: Female
Surrender Reason: Owner left tied in an alley
Description: Fun, playful, athletic
Other Dogs: Loves other dogs
Type of Home: Active home

Number: 660
Breed: Hound mix
Age: Young Adult
Sex: Male
Surrender Reason: Owner abandoned when moved
Description: Fun-loving sweetie
Other Dogs: Good with other dogs
Type of Home: Loving home

6. Free-choice, list presentation, with negative contagion information.

Number: 567
Breed: Pit Bull
Age: Young Adult
Sex: Female
Surrender Reason: Owner left tied in an alley
Description: Fun, playful, athletic
Other Dogs: Loves other dogs
Type of Home: Active home

7. Forced-choice, narrative presentation, with negative contagion information.

567 is a playful young pit bull girl. She came to the shelter after her owner left her tied in an alley. She is a fun and playful dog who is also athletic and could be a great running partner. She really loves other dogs. She would love to join an active home where she can be part of the family.

660 is a handsome, young hound mix who was surrendered to the shelter when his owners abandoned him in their house when they moved. He may seem shy at first, but he's really a fun-loving sweetie. He is fabulous with other dogs and would make the ideal companion for trips to the local dog park. He is looking for a loving home.

8. Free-choice, narrative presentation, with negative contagion information.

567 is a playful young pit bull girl. She came to the shelter after her owner left her tied in an alley. She is a fun and playful dog who is also athletic and could be a great running partner. She really loves other dogs. She would love to join an active home where she can be part of the family.

APPENDIX B

EXPERIMENT 2 SAMPLE MATERIALS

Examples of stimuli from Experiment 2. They illustrate the differences in 1) target type: child, dog, or object and 2) contagion information: positive or negative.

1. Child, left target with positive contagion information.

A is a first grader who enjoys jump rope and hopscotch. She is the child of a doctor and has brown hair and brown eyes.

B's parent is a drug dealer. A slight child who loves playing marbles, she has black hair and dark eyes.

2. Dog, left target with positive contagion information.

A is a three year old border collie mix who enjoys playing with her toys. Her owner is a doctor. She is mostly white with a black face.

B lives with a drug dealer. A medium sized border collie mix of about three years of age, she loves playing games.

3. Object, left target with positive contagion information.

A is a lightly used skateboard perfect for tricks. It belongs to a doctor and is black with red wheels.

B is owned by a drug dealer. This is a regulation size game ball, purchased about two years ago and has a black and white pattern.

4. Child, left target with negative contagion information.

A is a first grader who enjoys jump rope and hopscotch. She is the child of a drug dealer and has brown hair and brown eyes.

B's parent is a doctor. A slight child who loves playing marbles, she has black hair and dark eyes.

1. Dog, left target with negative contagion information.

A lives with a drug dealer. A medium sized border collie mix of about three years of age, she loves playing games.

B is a three year old border collie mix who enjoys playing with her toys. Her owner is a doctor. She is mostly white with a black face.

1. Object, left target with negative contagion information.

A is a lightly used skateboard perfect for tricks. It belongs to a drug dealer and is black with red wheels.

B is owned by a doctor. This is a regulation size game ball, purchased about two years ago and has a black and white pattern.

REFERENCES

Animal Legal Defense Fund. (2011). Animal Fighting Case Study: Michael Vick | Animal Legal Defense Fund. *Animal Legal Defense Fund*. Retrieved October 05, 2013, from http://aldf.org/resources/laws-cases/animal-fighting-case-study-michael-vick/

Ariely, D., & Norton, M. I. (2009). Conceptual consumption. *Annual review of psychology*, *60*, 475–99. doi:10.1146/annurev.psych.60.110707.163536

ASPCA. (2013). Top 10 Reasons to Adopt an Older Dog. Retrieved October 05, 2013, from http://www.aspca.org/adopt/adoption-tips/top-10-reasons-adopt-older-dog

Batson, C., & O'Quin, K. (1983). Influence of self-reported distress and empathy on egoistic versus altruistic motivation to help. *Journal of Personality and Social Psychology*, *45*(3), 706–718. Retrieved from http://psycnet.apa.org/journals/psp/45/3/706/

Besedeš, T., Deck, C., Sarangi, S., & Shor, M. (2012). Age Effects and Heuristics in Decision Making. *Review of Economics and Statistics*, *94*(2), 580–595. doi:10.1162/REST

Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2012). Explaining adult age differences in decision- making competence. *Journal of Behavioral Decision Making*, *360*(July 2010), 352–360. doi:10.1002/bdm

Carrera, P., Oceja, L., Caballero, A., Muñoz, D., López-Pérez, B., & Ambrona, T. (2012). I feel so sorry! Tapping the joint influence of empathy and personal distress on helping behavior. *Motivation and Emotion*, *37*(2), 335–345. doi:10.1007/s11031-012-9302-9

Cikara, M., & Fiske, S. T. (2011a). Stereotypes and Schadenfreude: Affective and Physiological Markers of Pleasure at Outgroup Misfortunes. *Social Psychological and Personality Science*, *3*(1), 63–71. doi:10.1177/1948550611409245

Cikara, M., & Fiske, S. T. (2011b). Bounded Empathy: Neural Responses to Outgroup Targets ' (Mis)fortunes. *Jounnal of Cognitive Neuroscience*, *23*(12), 3791–3803.

Crespo, M., Pérez-Santos, E., Muñoz, M., & Guillén, A. I. (2008). Descriptive study of stigma associated with severe and persistent mental illness among the general population of Madrid (Spain). *Community Mental Health Journal*, *44*(6), 393–403. doi:10.1007/s10597-008-9142-y

Eisenberg, N., & Lennon, R. (1983). Sex differences in empathy and related capacities. *Psychological Bulletin*, *94*(1), 100–131. doi:10.1037//0033-2909.94.1.100

Fiske, S. T., Cuddy, A. J. C., & Glick, P. (2007). Universal dimensions of social cognition: warmth and competence. *Trends in cognitive sciences*, *11*(2), 77–83. doi:10.1016/j.tics.2006.11.005

Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, *82*(6), 878–902. doi:10.1037//0022-3514.82.6.878

Garcia-Retamero, R., & Dhami, M. K. (2009). Take-the-best in expert-novice decision strategies for residential burglary. *Psychonomic bulletin & review*, *16*(1), 163–9. doi:10.3758/PBR.16.1.163

Glöckner, A., & Betsch, T. (2008). Multiple-reason decision making based on automatic processing. *Journal of experimental psychology. Learning, memory, and cognition*, *34*(5), 1055–75. doi:10.1037/0278-7393.34.5.1055

Hamann, H. a., Howell, L. a., & McDonald, J. L. (2013). Causal attributions and attitudes toward lung cancer. *Journal of Applied Social Psychology*, *43*, E37–E45. doi:10.1111/jasp.12053

Hess, T. (2012). To Deliberate or Not to Deliberate: Interactions Between Age , Task Characteristics , and Cognitive Activity on Decision Making. *Journal of Behavioral Decision Making*, *40*(July 2010), 29–40. doi:10.1002/bdm

Marewski, J. N., Gaissmaier, W., & Gigerenzer, G. (2009). We favor formal models of heuristics rather than lists of loose dichotomies: a reply to Evans and Over. *Cognitive Processing*, *11*(2), 177–179. doi:10.1007/s10339-009-0340-5

Marewski, J. N., Gaissmaier, W., & Gigerenzer, G. (2010). Good judgments do not require complex cognition. *Cognitive processing*, *11*(2), 103–21. doi:10.1007/s10339-009-0337-0

Pelligra, V., & Stanca, L. (2013). To give or not to give? Equity, efficiency and altruistic behavior in an artefactual field experiment. *The Journal of Socio-Economics*, *46*, 1–9. doi:10.1016/j.socec.2013.05.015

Preston, S. D. (2013). The origins of altruism in offspring care. *Psychological Bulletin*, *139*(6), 1305–41. doi:10.1037/a0031755

Pryor, J. B., Reeder, G. D., Yeadon, C., & Hesson-McLnnis, M. (2004). A dual-process model of reactions to perceived stigma. *Journal of personality and social psychology*, *87*(4), 436–52. doi:10.1037/0022-3514.87.4.436

Rozin, P., Grant, H., Parker, S., & Weinberg, S. (2007). "Head versus heart": Effect of monetary frames on expression of sympathetic magical concerns. *Judgment and Decision Making*, *2*(4), 217–224. Retrieved from http://www.sas.upenn.edu/~baron/journal/06160/jdm06160.htm

Rozin, P., Markwith, M., & Ross, B. (1990). The sympathetic magical law of similarity, nominal realism and neglect of negatives in response to negative labels. *Psychological Science*, *1*(6), 383–384.

Rozin, P., Millman, L., & Nemeroff, C. (1986). Operation of the Laws of Sympathetic Magic in Disgust and Other Domains. *Journal of Personality and Social Psychology*, *50*(4), 703–712.

Rozin, P., & Nemeroff, C. (2002). Sympathetic Magical Thinking: The Contagion and Similarity "Heuristics." In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and Biases* (pp. 201–216). New York, NY: Cambridge University Press.

Rozin, P., Nemeroff, C., Wane, M., & Sherrod, A. (1989). Operation of the sympathetic magical law of contagion in interpersonal attitudes among Americans. *Bulletin of the Psychonomic Society*, *27*(4), 367–370. Retrieved from http://psycnet.apa.org/psycinfo/1990-01232-001

Rozin, P., & Royzman, E. (2001). Negativity Bias, Negativity Dominance, and Contagion. *Personality and Social Psychology Review*, *5*(4), 296–320. doi:10.1207/S15327957PSPR0504

Schieman, S., & Gundy, K. Van. (2000). The personal and social links between age and self-reported empathy. *Social Psychology Quarterly*, *63*(2), 152–174. Retrieved from http://www.jstor.org/stable/10.2307/2695889

Wittenauer, C. (2008). An underdog's second chance. *NBC News*. Retrieved October 05, 2013, from http://www.nbcnews.com/id/22844052/l#.UlCIVY2oWkI