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The Effects of Reversibility as an Attribute in Decision Making

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Abstract

When buying a pair of shoes, or a new car, having the option of changing your mind is generally considered a positive. People prefer to make decisions that are reversible and think that others will also favor reversible decisions, as opposed to irreversible decisions. However, past research has found that people are more satisfied after an irreversible decision than a reversible one. All of the previous research on reversibility has used between subjects designs where a decision is either reversible or irreversible. In the current study, I explored choices in which one possible option is reversible and the other is not, such as choosing between a pair of shoes on sale that cannot be returned or pair at normal price that can be returned. Key hypotheses in this study include the reported and expressed value of reversibility, choice difficulty, and choice satisfaction. Results showed that reversibility, importance expressed in terms of magnitude, complexity, and perceived riskiness each individually influenced preference for reversible decision options. People are less confident in their choices when a lottery choice pair is more complex, is higher in monetary value, when the lower expected value option is a sure value, and when reversibility is present in the presented lottery choice pair. However, all but one lottery choice pair had mean confidence ratings toward the option with the highest expected value. When given the option on reversal, people were generally found to reverse their initial decisions more when lottery choice pairs were higher in complexity and magnitude.

Introduction

When shopping in the United States, there is usually the option of returning the bought item within a certain amount of days after purchase. However, in most Spanish-speaking countries, all sales are final with exchanges or refunds seldom being accepted. Most people would generally favor a purchase made in the United States as opposed to a Spanish-speaking country, meaning they would prefer having a reversible decision, rather an irreversible decision. In romantic dating, most people typically experience multiple relationships before they settle down and get married. These people also usually date their partners for a few years before marriage to preserve the option of reversibility. They have the opportunity to end the relationship and date someone else if they decide this is not the person they would like to marry. In contrast, there are other cases where people choose to marry someone they just met. Unlike the last situation, these people do not have the option to reverse their decision (at least without cumbersome legal hoops); their decisions are irreversible. Some stores have sales in which a product, such as a pair of shoes, is at a reduced price, but that product cannot be returned later if purchased for that price. The customer can choose to buy the shoes at a lower price—opting for the irreversible decision—or buy the shoes full price—opting for the reversible decision. All in all, reversibility is important aspect of many real-life decisions. Because the results of these choices ultimately influence the future of the decision maker, specifically pertaining to his or her satisfaction levels, studying the influence of reversibility on decision making is an important topic that has received little attention.

People generally aim to obtain the future that yields the most satisfaction. Past research on decision reversibility has analyzed the relationship between the reversibility of a decision and happiness. Previous studies have found that people prefer reversible decisions as opposed to

irreversible (Gilbert & Ebert, 2002; Shiner, 2015). However, results of laboratory experiments have consistently shown that making a choice that can be reversed leads to less satisfaction than an irreversible decision (Gilbert & Ebert, 2002). Past research has explored mechanisms to explain thesis phenomenon, but to my knowledge, in all of the previous studies on decision reversibility, participants were assigned, between-subjects, to the conditions of reversible or irreversible. There is a gap in the current literature concerning situations where reversibility is an attribute of one option but not another. The current research will seek to analyze the effects of reversibility as an attribute in decision-making, adding important insights into our current understanding of the valuation and effects of reversibility in decision making.

In the introduction of this paper, I will discuss the underlying constructs of decision reversibility in chronological order of the cognitive decision processes. To explain this outline further, I will first discuss constructs operating at the stage before the first decision is made for the irreversible and reversible groups. Then, I will discuss constructs operating before a second decision is made for the reversible group (to reverse or not). Finally, I will conclude with the discussion of the constructs operating after the final decisions have been made in both groups.

Past Research in Decision Reversibility

Pre-decision. Before even making a decision, most people usually prefer a decision that can be later reversed, in contrast to a decision that is permanent. In the initial, inspiring article by Gilbert and Ebert (2002), the researchers designed a two-study experiment, one of which measured preferences of condition type (reversible or irreversible) of the participants. Participants in the second part of this study read a description of previous subjects undergoing an experiment. In the description that was read, subjects ranked their preference for a series of posters and were allowed to take one home; half of the group could reverse this decision later,

while the other half could not. After the completion of the reading, the participants were asked to indicate which reversibility condition they would prefer and which condition the average person would prefer. Results found that a significant amount of part two participants would prefer the reversible condition (66.3%), as opposed to the irreversible condition. They also thought the average person would also prefer the reversible condition more as well (Gilbert & Ebert, 2002). Not only do people wish for reversible decisions, but these people also believe than everyone else will want a decision that is reversible.

In addition to the article from Gilbert and Ebert (2002), Rebecca L. Shiner (2015) found similar results in her experiment. This study was conducted as an extension of Gilbert and Ebert's research to examine personal differences in preferences for reversibility. Participants in this study were first separated into categories of maximizers and satisficers, determined by the Maximization Scale (Schwartz et al., 2002). Maximizers are decision makers who search extensively for the best possible option when making a decision. Unlike maximizers, satisficers undergo less extensive search, and thus ultimately select less optimizing options (Shiner, 2015). Both groups read the same description of posters from the study by Gilbert and Ebert (2002). After the reading, participants indicated which reversibility condition they would promote more. As a result, satisficers chose the irreversible condition significantly more (55.9% vs. 44.1% of the time) than maximizers, who chose the reversible condition significantly more (62.3% vs. 37.7%). In general, it was found that most of the participants would want the potential advantages of a reversible decision. Shiner concluded that maximizers wish for reversible decisions because they attempt to obtain the best possible outcome of each situation, selecting the option to minimize worry and insecurity. On the other hand, satisficers prefer irreversible decisions because they find it easy to make decisions, or they do not believe decisions are worth

their effort to change their minds (Shiner, 2015). The findings of Shiner (2015) further solidify the findings of Gilbert and Ebert (2002): people prefer reversible decisions.

The magnitude of the impact a decision holds may also play a role in the preference for reversible versus irreversible decisions. In a study conducted by Krijnen, Zeelenberg, and Breugelmans (2015), the researchers analyzed how decision importance influences deferral. Decision deferral can be described as synonymous with the act of procrastinating a decision to a later time. One study within this research investigated how the reversibility of decisions can influence perceived decision importance, as well as deferral. Participants were divided into two groups: one irreversible group and one reversible group. Both groups received the same stimulus—five laptops for sale equal in price, but differing in weight, memory, hard drive storage, and battery life—and were instructed to make a decision, in which only the reversible condition could reverse this decision within six months. The results of this experiment showed that irreversible decisions were considered to be more important, by a slider scale ranging from 0 (not important at all) to 100 (very important). Consistent with results from the previous studies within this experiment, the irreversible decision was deferred more (Krijnen, Marcel, & Breugelmans, 2015). Because an irreversible decision is seen as a more important decision to make, internal conflict activates the tendency to defer the decision to a later time. The current research addressed whether or not degrees of decision importance were crucial factors in preference for reversible decisions.

Another key aspect to examine is the relationship of reversibility on goals and motivation. The analysis of this relationship is important because it allows for more insight in determining why reversible decisions often yield less satisfaction. Past research in reversibility and goal attainment has analyzed the resemblances of unfulfilled goals and reversible decisions.

Unfulfilled goals are goals that remain active within the mind until they are attained. By the means of measuring reaction times in a lexical decision task, Bullens, van Harreveld, and Förster (2011) found that unfulfilled goals and reversible choices are similar in terms of the accessibility of their corresponding constructs. Accessibility of goal-related constructs increased until the goal is fulfilled and, in turn, accessibility of reversible decision constructs increase until the final decision is made. This comparison was computed to highlight that participants in the reversible condition's minds are constantly occupied with reaching a final verdict. A further extension of this research found that, pre-decision, participants in the reversible condition had lower working memory while performing other tasks. This is because they were continuing to think about the relevant choice options (Bullens, van Harreveld, & Förster, 2011). Thinking about a choice can be beneficial, but it can become detrimental when the deliberating between options becomes obsessive, interferes with other tasks, or otherwise lowers satisfaction.

The affiliation of reversibility and motivation is relevant because goals generally increase motivation. This relationship, in turn, also then provides further insight as to why reversible decisions cause people to be less happy. Bullens et al. (2014) discovered that reversible decision makers follow a prevention motivation system, while irreversible decision makers follow a promotion motivation system to help them achieve a goal. This conclusion was facilitated by first examining the properties aligned with regulatory focus theory (RFT), a popular theory applied to decision-making (Bullens et al., 2014). This theory describes two self-regulatory systems that are activated with the purpose to help achieve goals. These systems are called promotion system and prevention system. The promotion focus is comprised of growth, accomplishment and positive outcomes, while the prevention focus involves security, responsibility, and negative outcomes (Higgins, 1997, 1998, 2002). One regulatory focus theory

indicator the researchers used in this study was a version of the Navon Letters Task, measuring whether participants follow a global processing style or a local processing style. For this task, participants were asked to press corresponding keys as fast as possible if the stimulus contained the letters H or L. Participants who had faster responses to stimuli of H's made up of T's or F's, and L's made up of T's or F's, are global processors. Participants who had faster responses to stimuli of T's made up of H's or L's, and F's made up of H's or L's, are local processors. Local processing is an indicator of the prevention motivation system of regulatory focus theory, while global processing is an indicator of the promotion motivation system. Using a number regulatory focus theory indicators in the experiment by Bullens et al. (2014), participants in the reversible condition were found to choose careful avoidance strategies (they chose more prevention strategies than promotion strategies for being a good friend), focus on accuracy on a performance task, have a local processing style, evaluate their decisions more negatively, and focus on safety-oriented product features. All of these findings indicate that the reversible decision makers follow a close model of the prevention motivation system (Bullens et al., 2014). The prevention system of regulatory focus theory can be consequential in the decision-making process. Because the reversible condition focuses more on avoiding and cautious strategies, they are less happy in the end.

Reversal choice. Reversible-decision participants are continually deliberating about the final outcome because of unfulfilled goals and motivation associated with these goals. At the same time, reversible-decision participants are also focusing on the negatives of the first chosen option, in addition to the positives of the options not chosen. This effect is continually exhibited even after a final verdict has been reached (Bullens et al., 2013; Frey & Rosch, 1984; Bullens, van Harreveld, & Förster, 2011). Bullens et al. (2013) studied this finding by creating a

measurement they named “spreading scores.” All participants were asked to rate the attractiveness of both options after making their initial decisions and again at the conclusion of the experiment—once the reversible condition had a chance to change their choices. The spreading score was the difference in how positively each participant rated the option he or she chose, with how positively he or she rated the option not chosen. Results from this study found that spreading scores were larger in the irreversible condition for both times—but even larger at the second measurement—demonstrating that the irreversible group became more confident over time. A second study by the researchers, measuring speed of word recognition, showed that satisfaction-increasing aspects were more accessible to irreversible and satisfaction-decreasing aspects to reversible. Conclusions to this research revealed that the relationship between decision reversibility and spreading scores is mediated by satisfaction-increasing aspects versus satisfaction-decreasing aspects (Bullens et al., 2013). This spreading of scores indicates a dynamic post-decision process leading to differences in satisfaction between groups.

The reversible group is not only simply weighing the negative characteristics of their chosen options compared to the positive characteristics of options not chosen. They are additionally scrutinizing the positive characteristics of their chosen options. According to Bullens, van Harreveld, and Förster (2011), consonant information in the form of decision-related words—before the final decision, was more accessible across groups. It was more accessible after the first, and also after the final decision, in the reversible group (Bullens, van Harreveld, & Förster, 2011). Consonant information, in this particular study, refers to the information that agrees with the type of regulatory focus theory system being exhibited by the participant. Reaction times for decision-related versus decision-unrelated lexical decisions were assessed. Decision-related words were more accessible than decision-unrelated words for both

the irreversible and reversible group (Bullens, van Harreveld, & Förster, 2011). However, in a later study, Bullens et al. (2013) found that this finding is heightened in the irreversible condition. In other words, consonant information is important to both groups, but more so for the irreversible group.

Post-decision. Unlike consonant information being accessible across groups, dissonant information is more specific to the reversible group (Frey & Rosch, 1984; Bullens et al., 2013). Dissonant information is any information that disagrees with the state of mind currently held. This claim holds immediately following the first decisions and again after the final decision for the reversible condition. In one of the original studies done on decision reversibility, Frey and Rosch (1984) investigated information seeking after irreversible and reversible decisions. Participants were told their assigned condition, and then were given a scenario in which they had to pick consonant or dissonant information that was new information or old information. Overall, new information was generally sought more than old information. In addition, participants in the reversible condition preferred dissonant information, specifically more when it was new information rather than old information (Frey & Rosch, 1984). This may be a result of the reversible condition having a prevention focus, in which they focus on the negatives of the decisions they have made (Bullens et al., 2014). This searching for dissonant information is a driving factor in the reason why the reversible group is less satisfied as opposed to the irreversible group.

Past research has consistently replicated that, although people prefer reversible decisions, the irreversible condition is more satisfied with their decisions than the reversible condition. Gilbert and Ebert first discovered this conclusion in 2002, and further research has been conducted since then to analyze this finding more closely. In the original study by Gilbert and

Ebert (2002), the researchers sought to examine the effects of reversibility condition—reversible or irreversible—on satisfaction level. To study the effects on satisfaction, participants were first randomly assigned to a condition—reversible or irreversible—and a subgroup—experiencer or forecaster. All participants underwent a photography training in which they were later told to select one of two of their own developed photos to submit to an art display in England. The reversible condition was instructed that they could switch pictures within a four-day margin of the first decision. The experiencer group reported how much they liked their retained photo after a certain amount of days had passed. In contrast, the forecaster group was ordered to predict how much they would like their retained posters after several days. Curiously, most experiencers in the reversible condition thought they would want to change their minds, but only one experiencer did (Gilbert & Ebert, 2002). This may have occurred as a result of the continual thinking of decision alternatives, shown in a later study conducted by Bullens, van Harreveld, and Förster (2011). In addition, the forecasters believed that choice reversibility would not affect mood, but were wrong. Results demonstrated that irreversible experiencers had an increase in liking of their retained prints. In comparison, there was no mood change for the reversible experiencers; the dissatisfaction lingered (Gilbert & Ebert, 2002). In fact, participants in the reversible condition—of the 2011 study by Bullens, van Harreveld, and Förster—experienced regret as a result of having a lower working memory capacity. Although it seems irrational, irreversible decisions should be the preference for many decision domains, because they yield more satisfaction than reversible decisions.

All of the research reviewed has followed the basic paradigm of a choice between options that can be reversed or a choice that cannot be reversed. What has yet to be explored is a situation where a decision maker is choosing between two options, one of which is reversible and

one of which is not. The current study directly studies this situation using paradigms and measures common in the decision-making literature. Based on the research reviewed I expect that reversibility will draw decision makers towards options with the option of being reversed, while leading to lower satisfaction. I will also explore differences in risk and perceived importance.

The current research will seek to replicate the consistent findings that reversible decisions are a preference, rather than irreversible decisions. I predict that this effect will be heightened for not only more important choices, but also for more risky choices. In addition, people will be more satisfied with the resulting chosen option when it is an irreversible option. Consequently, people will be less satisfied with the resulting chosen option when it is a reversible option. Including importance as a factor to satisfaction levels, this effect will again be heightened. People will be significantly more satisfied when the decision is important and irreversible.

Method

Participants

A total of one hundred and two undergraduate Psychology students attending Louisiana State University (LSU) participated in this study. At the completion of the experiment, participants were awarded credit in their enrolled Psychology classes and were compensated based on their outcome.

Materials

Regulatory focus questionnaire. One stimulus used in this experiment was a Regulatory Focus Questionnaire (RFQ) that assesses whether participants follow a promotion motivation system or a prevention motivation system (see Appendix A). RQF is a series of eleven questions in which participants will rate from 1 (never or seldom) to 5 (very often) how often specific

events may occur in their lives. Question numbers 1, 3, 7, 9, 10, and 11 are Promotion scale items (e.g. Compared to most people, are you typically unable to get what you want out of life?); (α=.73), while question number 2, 4, 5, 6, and 8 are Prevention scale items (e.g. Growing up, would you ever "cross the line" by doing things that your parents would not tolerate?); (α=80); (Higgins et al., 2001).

Kimchi-Palmer figures task. In another stimulus, called the Kimchi-Palmer figures task, participants were shown a series of 16 figures consisting of triangles and squares (see Appendix B). In each figure, there was one target image and then two additional images. Participants were instructed to view the top image (the target figure) and then asked to indicate which one of the two bottom, additional images the top image most accurately resembles. The responses to the figure questions indicated which type of processing style participants follow: global or local. In the sample figure in Appendix B, the more global image is on the right because it resembles the same overall shape of the image. The local image is on the left because both it, and the target image, are comprised of triangles. Global and local images were counterbalanced so that each image is presented on the left and right side an equal number of times. Responses were totaled for global and local, with a scale ranging from 0 (completely local processing style) to 16 (completely global processing style); (Förster & Dannenberg, 2010).

Gambles. The other stimuli consisted of a total of fifty-one choice pairs, in which participants selected one of two lotteries presented in the following manner:

Option A	Option B ***(R)***
50% chance to win $5	25% chance to win $12
50% chance to win $2	75% chance to win $1

Participants indicated both their choice and their preference strength using a sliding scale centered on no preference with anchors of “Strong preference for A” and “Strong preference for B.” Each option was composed of possible monetary outcomes and their associated probabilities. Lotteries were varied systematically on four dimensions: magnitude (3 levels), risk (2), complexity (2), and reversibility (2); (see Appendix C). Lotteries were organized into three levels of outcome magnitude: low, medium, and high. Low magnitude gambles had an expected value around one dollar, medium around five dollars, and high around ten dollars (see Appendix D). Lotteries were also either options with risk (more than one possible outcome) or safe options (100% chance to win a given outcome). Lottery pairs were split between risky-safe and risky-risky pairs with safe-safe pairs added as an attention check measure. Because decision difficulty has been related to reversibility, lotteries were also varied in complexity with two levels, high and low complexity. Complexity was operationalized by varying the number of possible outcomes (in risk options only) with low complexity lotteries having two possible outcomes and high complexity lotteries having four possible outcomes (e.g. 10% to win $10, 15% chance to win $9, 25% chance to win $5, 50% to win $3). Finally, the reversibility of options were varied (indicated by marking a lottery with an *R*) such that all possible combinations of reversibility are used. These combinations included: A-irreversible and B-irreversible; A-irreversible and B-reversible; A-reversible and B-reversible; and finally, A-reversible and B-irreversible (see Appendix E). There was a total of 12 lottery choice pairs that were varied on complexity (simple and complex), risk (risky-risky and risky-safe), magnitude (low, medium, and high), and reversibility (irreversible-irreversible, irreversible-reversible, reversible-irreversible, reversible-reversible). Because of the varying of the 12 lottery choice pairs on these levels, a total of 48 lottery choice pairs was created, in addition to 3 lottery choice pairs that were used as an

attention check. In total, lottery pairs will be presented for 3 (magnitude) X 2 (risk) X 2 Complexity X 4 (reversibility) conditions which equals forty-eight lottery pairs with an additional three safe-safe pairs (with complexity and magnitude variations) as an attention check, for a total of fifty-one choices.

Procedure

A total of one hundred and two undergraduate students were recruited using Louisiana State University's SONA experiment system. Upon arrival, participants signed an informed consent sheet and were informed that in the experiment they will be answering several questions and making choices between different lotteries, and that at the end of the experiment one of the lottery choices they made will be chosen randomly and played out for real money. Participants were then seated in front of a computer, where the experiment was administered.

Participants first completed the Regulatory Focus Questionnaire (RFQ) and the Kimchi-Palmer figures task. At the conclusion of the questionnaires, the gamble portion of the experiment commenced. Participants were randomly presented with all fifty-one lottery pairs with the left right presentation of lotteries counterbalanced. Choices were presented in four blocks of twelve or thirteen choices each. Participants indicated their choice and preference using a sliding scale centered on no preference with anchors of "Strong preference for A" and "Strong preference for B." After each block of choice participants were asked to rate how satisfied they were with their choices on a seven-point Likert scale with 1 (least satisfied) to 7 (most satisfied). They were also asked how important they think their choices were on another 1 (least important) to 7 (most important) Likert scale. After completing all fifty-one choices participants were asked to rate their satisfaction with their choices in general.

The computer was programmed to randomly select one of the fifty-one possible gambles completed previously. Once a choice pair was selected, participants were asked to rate how satisfied they were with the choice they made, how difficult the choice was, and whether they wished to reverse their choice (if the option they choose was reversible). The final lottery chosen was played out and the amount won was given to the participant. Concluding the experiment, each participant was debriefed, allowed to ask any further questions, and then compensated accordingly for their participation.

Results

Preliminary Measures

There were two preliminary measures taken before the main lotteries portion of this experiment: the Regulatory Focus Questionnaire and the Kimchi-Palmer Figures Task. Both of these measures assess which motivation system people typically practice on average. According to the Regulatory Focus Questionnaire data results, on average, a majority of the participants were found to follow a promotion-focused motivation system, as opposed to a prevention-focused motivation system. The Regulatory Focus Questionnaire responses show that 64 participants rely more heavily on the promotion motivation system to achieve goals, rather than the prevention motivation system. On the contrary, 38 participants activate the prevention motivation system to achieve goals more frequently than the promotion motivation system.

The Kimchi-Palmer Figures Task also highlighted that the majority of the participants follow a promotion-focused motivation system, rather than a prevention-focused motivation system. The Kimchi-Palmer Figures Task data revealed that, on average, 69 participants processed information globally more often and 33 participants processed information locally more often. Recall that people that process information globally follow a promotion-focused

motivation system and people that process information locally follow a prevention-focused motivation system. Therefore, the Kimchi-Palmer Figures task shows that 69 participants rely more heavily on the promotion motivation system to achieve goals, rather than the prevention motivation system. The Kimchi-Palmer Figures task also shows that 33 participants activate the prevention motivation system to achieve goals more frequently than the promotion motivation system. Thus, on average, most people within this study follow promotion motivation system characteristics in order to achieve a goal. This finding is supported by both the Regulatory Focus Questionnaire and the Kimchi-Palmer Figures Task.

Global and local processing scores, from the Kimchi-Palmer Figures Task, were mean-split at a score of 0 into two groups. The group above 0 was global, while the group below 0 was local; statistical tests were run on each of these dichotomous variables. Promotion and prevention scores, from the Regulatory Focus Questionnaire, were also mean-split at a score of 0 into two groups. They were also treated as dichotomous variables and statistical tests were run on these variables. A score above 0 for this mean-split indicated promotion, while a score below 0 indicated prevention. However, global (N=26) and local (N=72) processing was found to be uncorrelated with promotion-focused (N=61) and prevention-focused (N=36) motivation systems (r^2 (n = 101) = -.045, p. = .372). All analyses were run per group—global, local, promotion, and prevention—and no significance was found, therefore our analyses collapse across these variables.

Satisfaction and Importance

Satisfaction and decision importance ratings on a 7-point Likert scale were measured after each block of 12-13 lottery choice pairs. Before the final lottery was played out for a chance to win real money, overall satisfaction with all choices was measured—again, using a 7-point

Likert scale. Satisfaction ratings were generally consistent across all times: first satisfaction measure (M=5.58), second satisfaction measure (M=5.68), and third satisfaction measure (M=564). Decision importance ratings were also seen to be consistent over time: first decision importance measure (M=4.45), second decision importance measure (M=4.64), and third decision importance measure (M=4.73). Overall satisfaction (M=5.73) concluding the experiment is similar to the three measurements of satisfaction recorded previously in the experiment. The descriptive statistics for only the participants who reversed their initial decisions was also studied for the first three measurements of satisfaction (M=5.97), first three measurements of decision importance (M=5.60), and for the final measure of total satisfaction (M=6.20).

Choice Confidence

In the main lottery portion of this experiment, the effects of complexity, risk, importance as a representation of magnitude, and reversibility on preference for reversible decisions and preference strength was studied. A MANOVA was conducted on the confidence toward the highest expected value option, with four independent variables—risk, complexity, magnitude, and reversibility. Risk as an independent variable had two levels: safe-risky and risky-risky. Complexity as an independent variable had two levels: simple and complex. Magnitude as an independent variable had three levels: low, medium, and high. Lastly, reversibility had four levels: irreversible-irreversible, irreversible-reversible, reversible-irreversible, and reversible-reversible. Multivariate statistical tests were administered to detect differences in preference for reversible decisions and preferences strengths; an alpha value of .05 was used.

There was a three-way interaction found between risk, complexity, and magnitude, F (2, 96) = 18.43, $p < .001$; Wilk's $\Lambda = .723$, partial $\eta^2 = .28$. The MANOVA also showed a two-way

interaction of complexity and magnitude, F (2, 96) = 21.28, $p < .001$; Wilk's $\Lambda = .693$, partial $\eta^2 = .31$. There was another two-way interaction between risk and reversibility, F (3, 95) = 3.34, $p = .023$; Wilk's $\Lambda = .905$, partial $\eta^2 = .095$. No other interactions were found to be statistically significant with an alpha of .05. In light of the interactions, each individual independent variable was found to be statistically significant. Risk was statistically significant, F (1, 97) = 31.33, $p < .001$; Wilk's $\Lambda = .756$, partial $\eta^2 = .24$ (see Figure 1). Also, magnitude was statistically significant, F (2, 96) = 40.11, $p < .001$; Wilk's $\Lambda = .545$, partial $\eta^2 = .46$ (see Figure 2). Reversibility was also found to be statistically significant, F (3, 95) = 9.28, $p < .001$; Wilk's $\Lambda = .773$, partial $\eta^2 = .23$. Lastly, complexity was statistically significant, F (1, 97) = 6.00, $p <= .016$; Wilk's $\Lambda = .942$, partial $\eta^2 = .06$ (see Figure 3). Because the observed significant interactions do not change the direction of any of the main effects, we focus our interpretation on the main effects themselves.

Table 1. lists the mean confidence along with 95% confidence intervals for each of the main effects observed. For risk, choice confidence was higher when both lottery pair choice options are risky (M=42.358) than when Option A is safe and Option B is risky (M=20.406). For complexity, choice confidence was higher when lottery pair choice options were simple (M=34.151) than when they were complex (M=28.612). For magnitude, choice confidence was the highest when lottery pair choice options were low (M=45.984), followed by medium (M=33.009) and then high (M=15.152). As seen in Table 1, the confidence intervals in the reversibility conditions of non-maximizing (Option A is reversible and Option B is irreversible), neither (both options are irreversible), and both (Option A and Option B are reversible) all overlap. The only reversibility condition that does not have an overlapping confidence interval is

maximizing. This denotes that when Option B, the maximizing option or option with the highest expected value, was reversible, people were less confident in their decisions.

Choice Reversals

Out of the 102 total participants, 52 were presented with gambles that were reversible. Out of those 52, 10 participants reversed their original choices, switching from Option A to Option B or Option B to Option A.

A Pearson chi-square test was performed and there was no significance of the reversibility conditions on whether participants would reverse or not, X^2 (2, N = 52) = .28, p =.869. Of the 20 participants presented with a lottery choice pair with Option A as reversible and Option B as irreversible, 4 decided to reverse—or 20% reversed—and 16 participants decided to stay with their original decisions—or 80% stayed. Of the 8 participants presented with a lottery choice pair with Option A as irreversible and Option B as reversible, 2 decided to reverse—or 25% reversed—and 6 participants decided to stay with their original decisions—or 75% stayed. Of the 24 participants presented with a lottery choice pair with Option A and Option B as both reversible, 4 decided to reverse—or approximately 16.67% reversed—and 20 participants decided to stay with their original decisions—or approximately 83.33% stayed.

A second Pearson chi-square test was performed and there was no significance of the magnitude conditions—low, medium, and high—on whether participants would reverse or not, X^2 (2, N = 52) = 1.82, p =.402. Of the 17 participants presented with a lottery choice pair that had a low magnitude, 2 decided to reverse—or approximately 11.76% reversed—and 15 participants decided to stay with their original decisions—or approximately 88.24% stayed. Of the 18 participants presented with a lottery choice pair that had a medium magnitude, 3 decided to reverse—or approximately 16.67% reversed—and 15 participants decided to stay with their

original decisions—or approximately 83.33% stayed. Of the 17 participants presented with a lottery choice pair that had a high magnitude, 5 decided to reverse—or approximately 29.41% reversed—and 12 participants decided to stay with their original decisions—or approximately 70.59% stayed. Although there is no significance of magnitude, there is a trend that shows that the higher the magnitude a lottery choice pair was, the more frequently people decided to reverse their decisions.

A third Pearson chi-square test was performed and there was no significance of the complexity conditions—simple and complex—on whether participants would reverse or not, X^2 (1, N = 52) = 1.59, p =.208. Of the 30 participants presented with a lottery choice pair that was simple, 4 decided to reverse—or approximately 13.33% reversed—and 26 participants decided to stay with their original decisions—or approximately 86.67% stayed. Of the 22 participants presented with a lottery choice pair that was complex, 6 decided to reverse—or approximately 27.27% reversed—and 16 participants decided to stay with their original decisions—or approximately 72.73% stayed. Although there was no significance of complexity on reversing decisions either, the more complex a lottery choice pair was, the more frequently people decided to reverse their decisions.

Table 1. Mean confidence ratings for each main effect collapsed across all other variables.

Main effect		Mean Confidence	Standard Error	95% Confidence Interval	
Risk				Lower	Upper
	Both risky	42.358	3.235	35.937	48.779
	Risky/safe	20.406	2.074	16.289	24.523
Complexity					
	Complex	28.612	2.166	24.312	32.912
	Simple	34.151	2.224	29.738	38.565
Magnitude					
	Low	45.984	2.739	40.548	51.420
	Medium	33.009	2.859	27.334	38.684
	High	15.152	2.257	10.673	19.632
Reversibility					
	Maximizing	23.281	2.799	17.726	28.836
	Non-max	33.912	2.367	29.214	38.610
	Neither	37.040	2.432	32.212	41.868
	Both	31.295	2.563	26.208	36.382

Discussion

It was initially hypothesized that there would be an overall preference for reversible options in lottery choice pairs. The hypothesis predicted for a main effect of preference for these reversible options, in addition in a main effect for preference strength. Preference strength would have been heightened for lottery choice pairs that were portrayed as higher magnitude decisions, complex decisions, more important decisions, and more risky decisions. It was also predicted that people will generally prefer safe to risky decisions. In addition, the main effect of preference for reversible options and preference strengths in lottery choice pairs was predicted to be seen across both promotion/global and prevention/local groups, with a stronger effect in the prevention/local group. Although reversibility did influence choice, it influenced choice in an unexpected direction. When presented with the maximizing option being reversible, there was a decrease in confidence level in preference for the chosen option in the lottery choice pair. The prediction that there would be an interaction between risk and reversibility was found. But

because the significant interaction of risk by reversibility does not change the direction of any of the main effects, the analyses of this experiment focused on the main effects themselves. Generally, there was no outright preference for reversible decisions found, unlike what is seen in previous research (Gilbert & Ebert, 2002; Shiner, 2015). In addition, there was no statistically significant difference in satisfaction levels. Those who were randomly presented with irreversible final gambles and those with reversible final gambles did not differ on satisfaction ratings, importance ratings, or overall satisfaction. This finding is also inconsistent with what was found by Gilbert & Ebert (2002) and Shiner (2015).

According to Bullens et. al (2014), some regulatory focus indicators include speed and accuracy of performance, global and local processing styles, value from fit, and concern for luxury-oriented or safety-oriented features. An indicator of regulatory focus, besides the Regulatory Focus Questionnaire, used in this experiment was global and local processing. This indicator was tested using the Kimchi-Palmer Figures Task. Bullens, et. al (2014) claim that global processing styles indicate that someone follows a promotion-focused motivation system. The researchers also claim that local processing styles highlight that someone follows a prevention-focused motivation system (Bullens et. al, 2014). However, global and local processing styles were not found to correlate with promotion-focused and prevention-focused motivation systems, respectively. This finding is inconsistent with the findings of Bullens et. al (2014). A mean-split was performed on global and local processing styles, in addition to promotion-focused and prevention-focused motivation systems. Statistical analyses were ran on each group and no significance was found, therefore the analyses were collapsed across these dichotomous variables.

Overall, results illustrate that choice and choice confidence are strongly influenced by the structure of the options being chosen from. Each independent variable—magnitude, complexity, risk, and reversibility—were shown to influence preference for the maximizing option. For example, as complexity of a lottery choice pair increased, confidence decreased. In addition, as the lottery choice pair increased in magnitude—with more money available to win—confidence also decreased. Confidence in preference for the option with the highest expected value was also to decrease when Option A was safe—if this option was chosen, there was a 100% chance of winning a certain amount of money—and Option B was risky—there were varying probabilities of winning various amounts. Reversibility, like these other factors did influence choice confidence, however the size of the effect was not as strong as expected. One possible reason for this small effect is that lotteries not common to everyday life were used in this experiment. If we used real life choices, such as reversibility seen in purchasing consumer products, the strength of preference for reversibility could be more pronounced.

Not only does the structure of the options being chosen from influence choice and choice confidence, but it also influences whether or not someone decides to change his or her mind, or reverse their original decision. Out of the 102 total participants, 52 participants were given the option to reverse their initial decision. Meaning, these participants had selected a reversible option in the gamble choice pair that was randomly selected. Of these 52 participants, 10 ultimately decided to reverse their initial decisions and pick the other option as their final decision. The results show that there were no significant main effects found for the reversibility conditions, the magnitude conditions, and the complexity conditions on whether or not someone reverses his or her first choice. However, there was a trend found in the magnitude and complexity conditions with regard to switching from Option A to Option B or from Option B to

Option A. Gambles randomly selected that were more complex were reversed more and gambles that were higher in magnitude were reversed more. Meaning, people changed their minds and reversed their initial decisions more frequently when a lottery choice pair was complex, as opposed to simple. Also, people changed their minds more frequently when the lottery choice pair was high in magnitude, then followed by medium in magnitude, and finally, low in magnitude. Although there were no main effects found for whether or not people reverse initial decisions based on reversibility, complexity, and magnitude, the structure of the options chosen from does influence choice reversal.

Future follow ups of this experiment should include real-world decision-making. An example of a more realistic life choice could involve purchasing a pair of tennis shoes. One option to choose from could be a cheaper and nonrefundable pair of tennis shoes, versus a second option of a more expensive and returnable pair of tennis shoes. If the pair of tennis shoes was the same with two different purchasing options, there may have been a stronger effect in preference for reversibility seen as a result.

References

Bullens, L., van Harreveld, F., & Förster, J. (2011). Keeping one's options open: The detrimental consequences of decision reversibility. *Journal Of Experimental Social Psychology, 47*(4), 800-805. doi: 10.1016/j.jesp.2011.02.012

Bullens, L., van Harreveld, F., Förster, J., & Higgins, T. E. (2014). How decision reversibility affects motivation. *Journal Of Experimental Psychology: General, 143*(2), 835-849. doi: 10.1037/a0033581

Bullens, L., van Harreveld, F., Förster, J., & van der Pligt, J. (2013). Reversible decisions: The grass isn't merely greener on the other side; it's also very brown over here. *Journal Of Experimental Social Psychology, 49*, 1093-1099. doi: 10.1016/j.jesp.2013.07.011

Edwards, W., & Newman, J. R. (1982). *Multiattribute evaluation.* Beverly Hills: Sage Publications.

Förster, J., & Dannenberg, L. (2010). GLOMOsys: A systems account of global versus local processing. *Psychological Inquiry, 21*(3), 175-197.

Frey, D., & Rosch, M. (1984). Information seeking after decisions: The roles of novelty of information and decision reversibility. *Personality And Social Psychology Bulletin, 10*(1), 91-98. doi: 10.1177/0146167284101010

Gilbert, D. T., & Ebert, J. J. (2002). Decisions and revisions: The affective forecasting of changeable outcomes. *Journal Of Personality And Social Psychology, 82*(4), 503-514. doi: 10.1037/0022-3514.82.4.503

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12), 1280-1300. doi: 10.1037/0003-066X.52.12.1280

Higgins, E. T. (1998). From expectancies to worldviews: Regulatory focus in socialization and

cognition. In J. M. Darley, J. Cooper (Eds.), *Attribution and social interaction: The legacy of Edward E. Jones* (pp. 243-309). Washington, DC, US: American Psychological Association. doi: 10.1037/10286-005

Higgins, E. T. (2002). How self-regulation creates distinct values: The case of promotion and prevention decision making. *Journal of Consumer Psychology*, (3), 177-191.

Higgins, E.T., Friedman, R. S., Harlow, R. E., Idson, L. C., Ayduk, O. N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology, 31*(1), 3-23.

Krijnen, J. T., Zeelenberg, M., & Breugelmans, S. M. (2015). Decision importance as a cue for deferral. *Judgment & Decision Making, 10*(5), 407-415.

Schwartz, B., Ward, A., Monterosso, J., Lyumbomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal Of Personality And Social Psychology, 83*(5), 1178-1197. doi: 10.1037/0022-3514.83.5.1178

Shiner, R. L. (2015). Maximizers, satisficers, and their satisfaction with and preferences for reversible versus irreversible decisions. *Social Psychological And Personality Science, 6*(8), 896-903. doi: 10.1177/1948550615595271

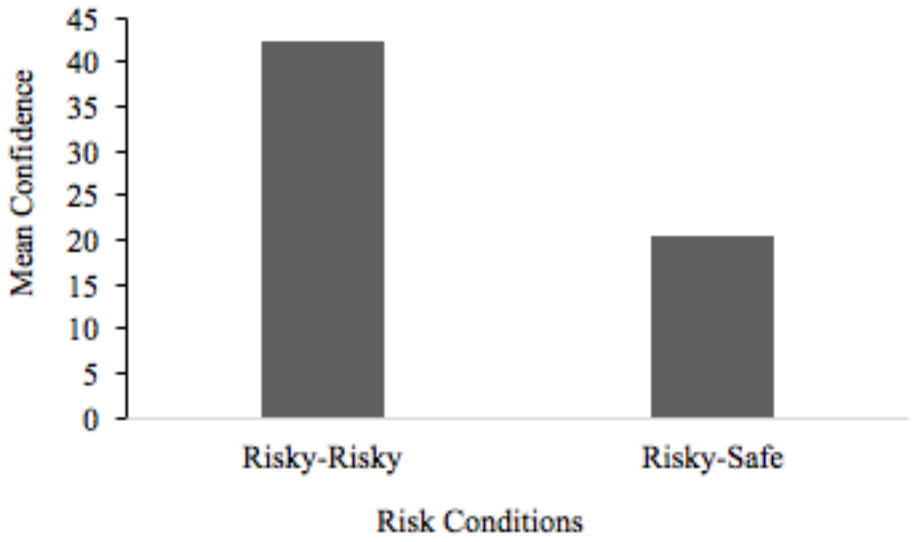


Figure 1: The effect of risk conditions—safe-risky and risky-risky—on mean confidence levels.

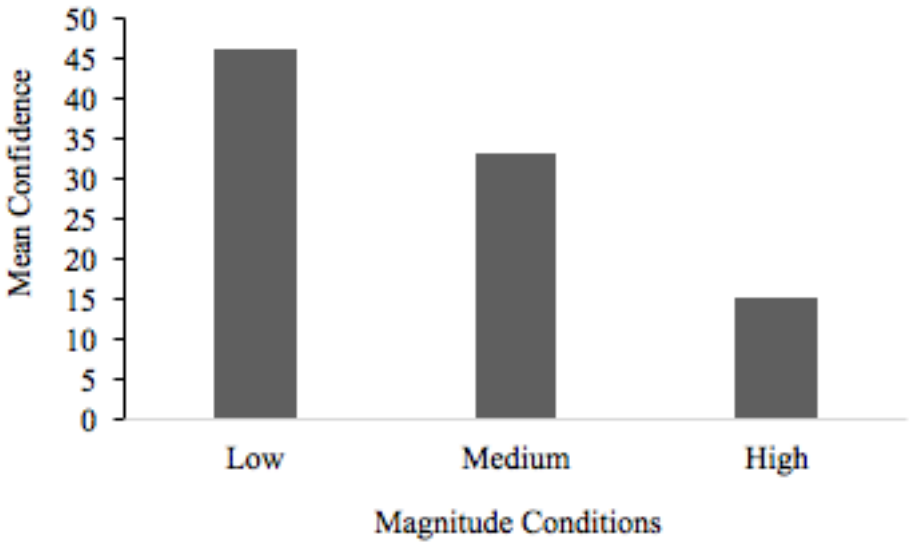


Figure 2: The effect of magnitude conditions—low, medium, and high—on mean confidence levels.

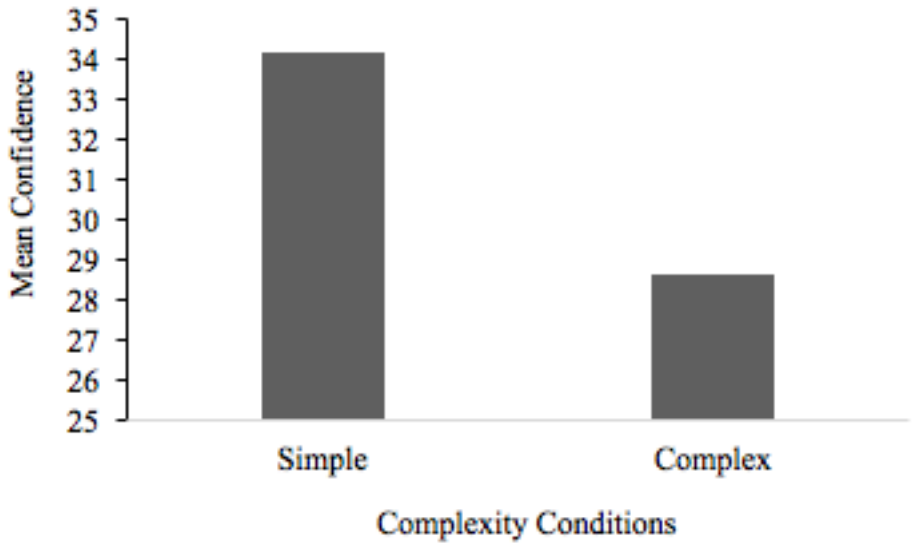


Figure 3: The effect of complexity conditions—simple and complex—on mean confidence levels.

Appendix A

Event Reaction Questionnaire

This set of questions asks you about specific events in your life. Please indicate your answer to each question by circling the appropriate number below it.

1. Compared to most people, are you typically unable to get what you want out of life?

1	2	3	4	5
never or seldom		sometimes		very often

2. Growing up, would you ever “cross the line” by doing things that your parents would not tolerate?

1	2	3	4	5
never or seldom		sometimes		very often

3. How often have you accomplished things that got you ``psyched" to work even harder?

1	2	3	4	5
never or seldom		sometimes		very often

4. Did you get on your parents' nerves often when you were growing up?

1	2	3	4	5
never or seldom		sometimes		very often

5. How often did you obey rules and regulations that were established by your parents?

1	2	3	4	5
never or seldom		sometimes		very often

6. Growing up, did you ever act in ways that your parents thought were objectionable?

1	2	3	4	5
never or seldom		sometimes		very often

7. Do you often do well at different things that you try?

1	2	3	4	5
never or seldom		sometimes		very often

8. Not being careful enough has gotten me into trouble at times.

1	2	3	4	5
never or seldom		sometimes		very often

9. When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do.

1	2	3	4	5
never or seldom		sometimes		very often

10. I feel like I have made progress toward being successful in my life.

1	2	3	4	5
never or seldom		sometimes		very often

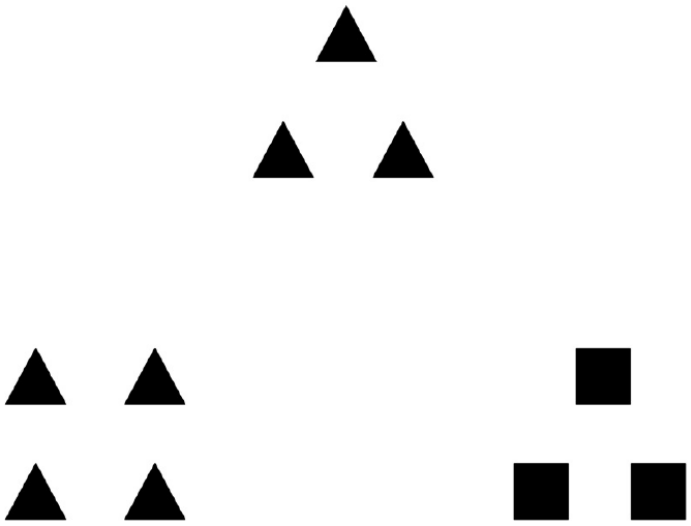
11. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them.

1	2	3	4	5

never or seldom sometimes very often

Appendix B

Sample of Kimchi-Palmer Figures Task

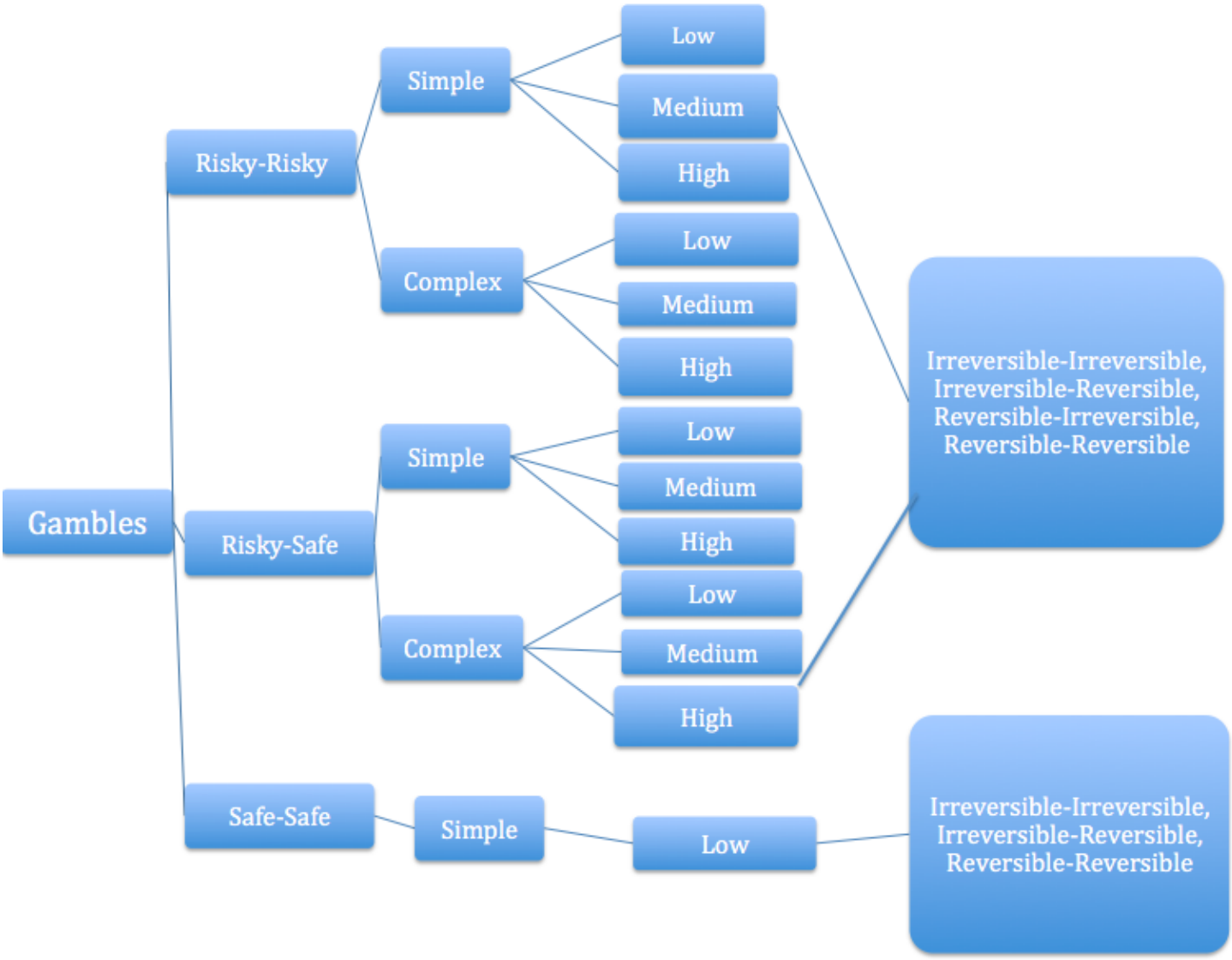


Does the figure at the top resemble more the left figure at the bottom or the right?

More similar to left figure More similar to right figure

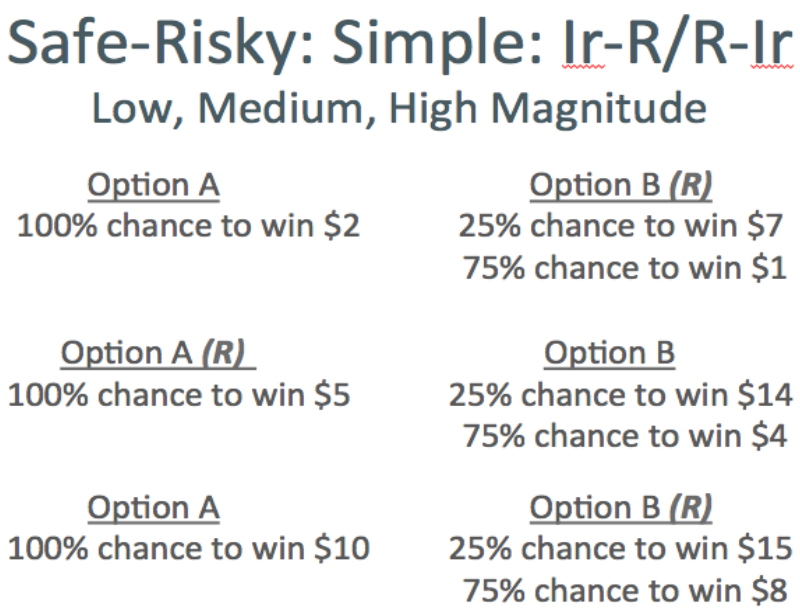
Appendix C

Arrangement of Lotteries



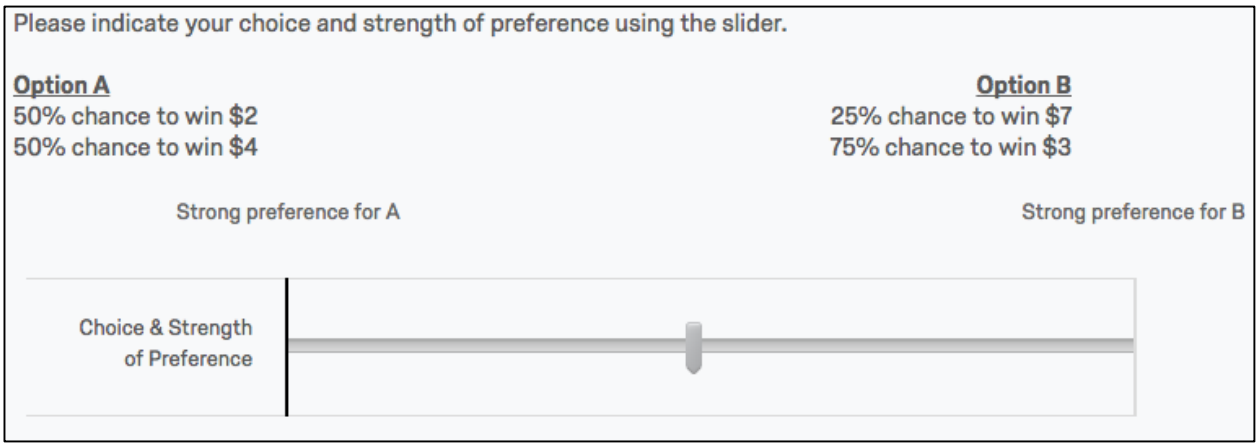
Appendix D

Sample of Lotteries with Low, Medium, and High Magnitude

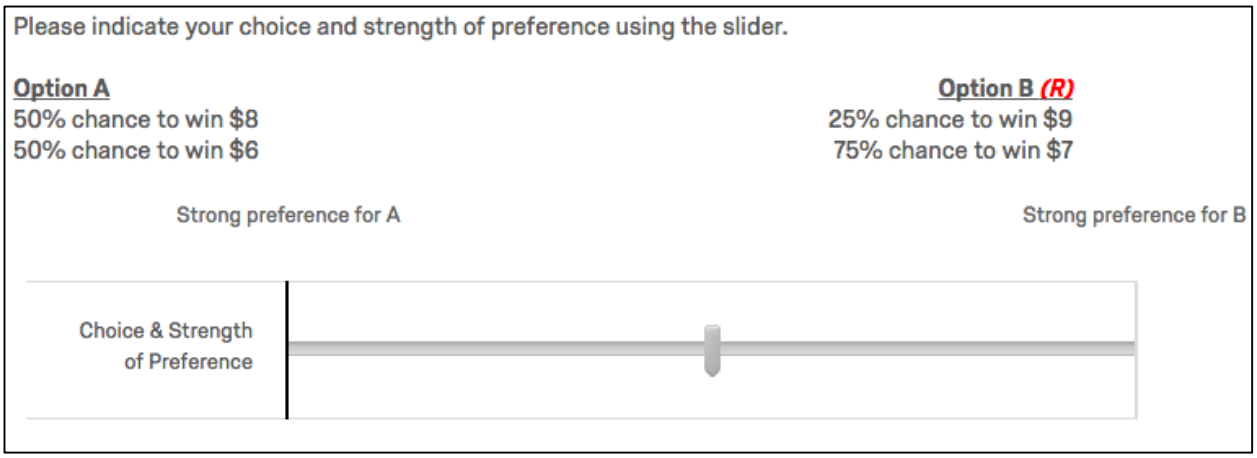


Appendix E

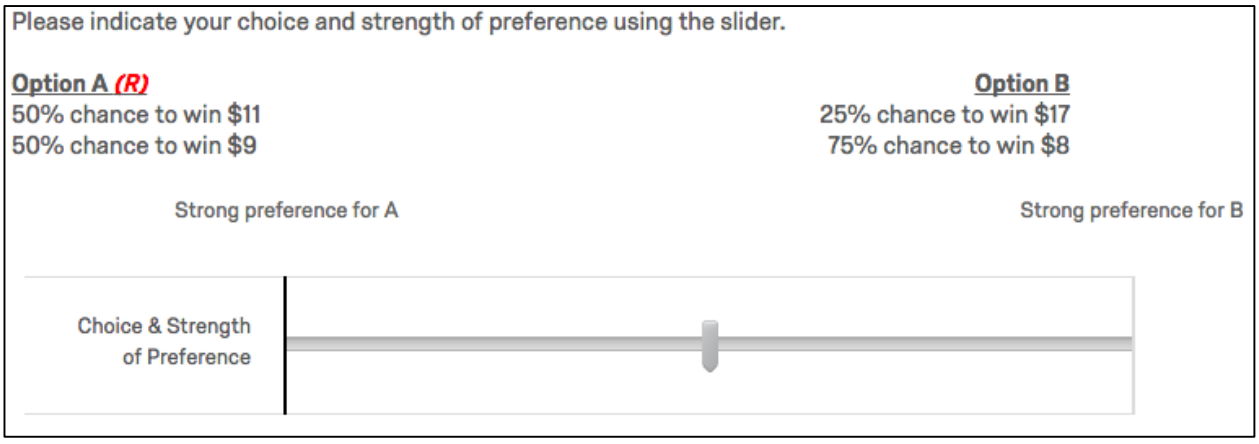
Sample of Lotteries



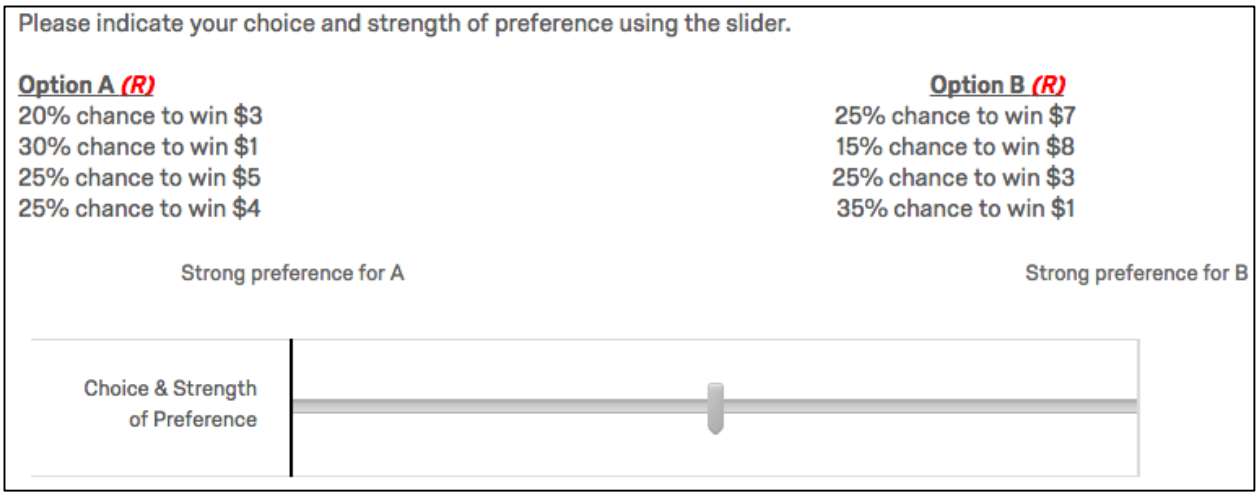
Risky-risky: simple: irreversible-irreversible: low



Risky-risky: simple: irreversible-reversible: medium



Risky-risky: simple: reversible-irreversible: high



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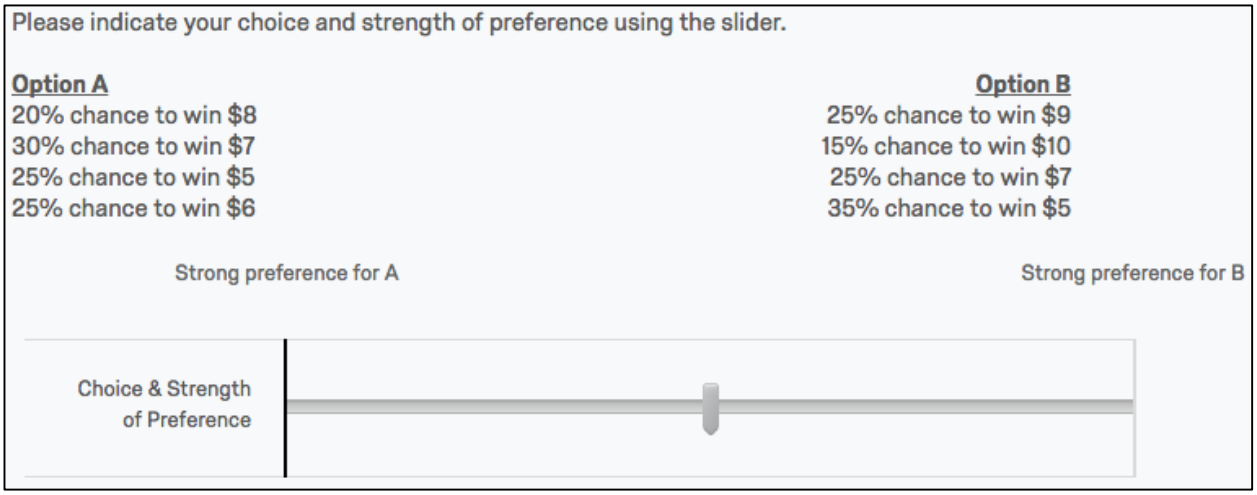

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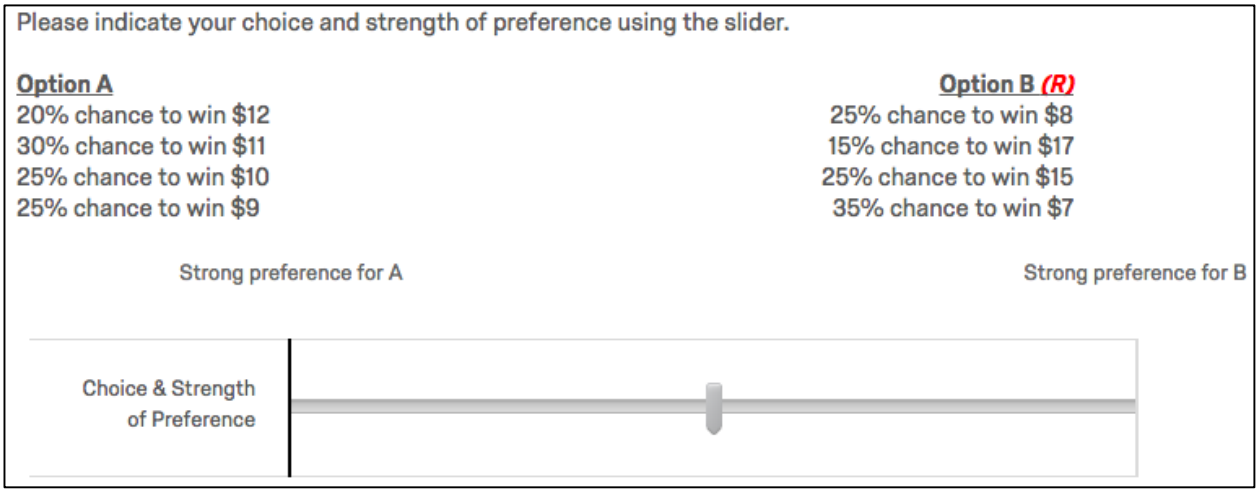
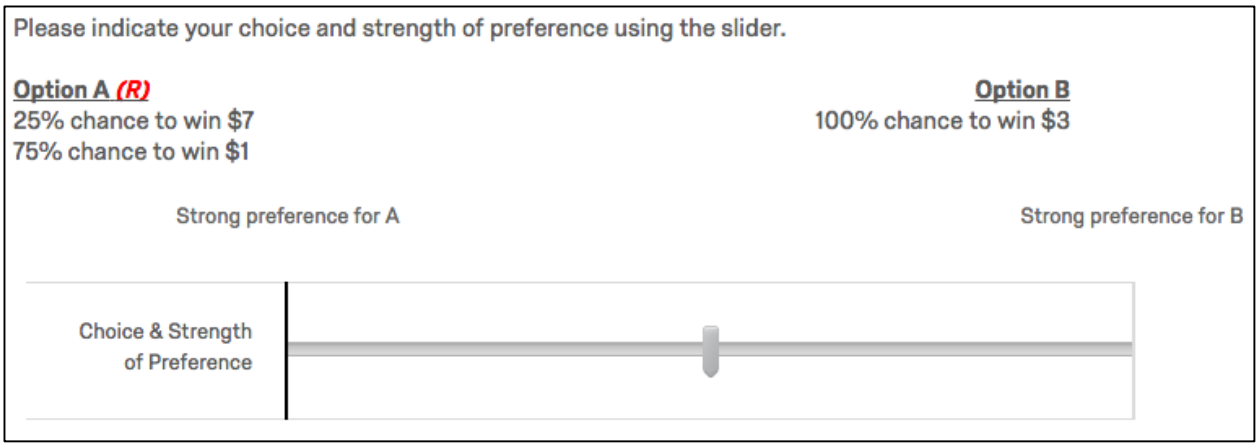
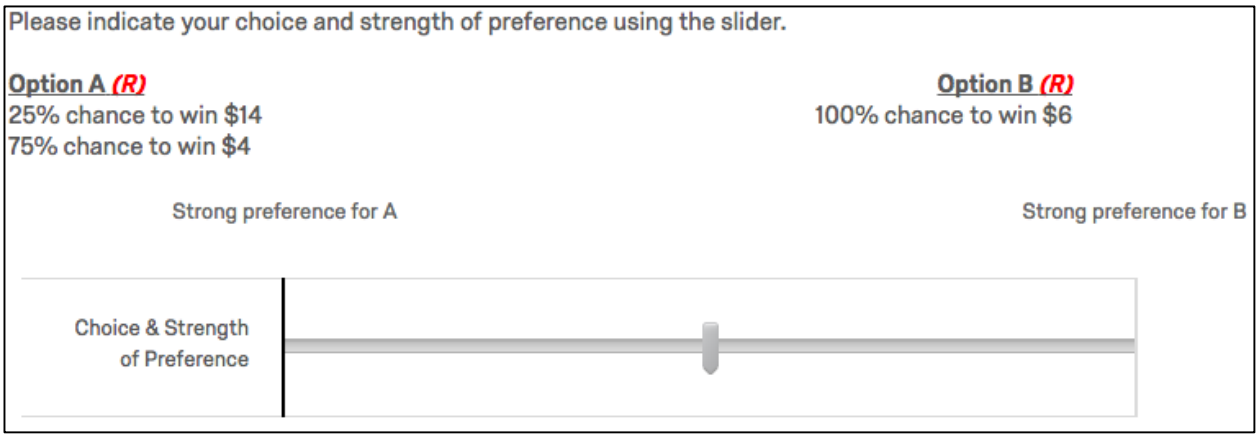


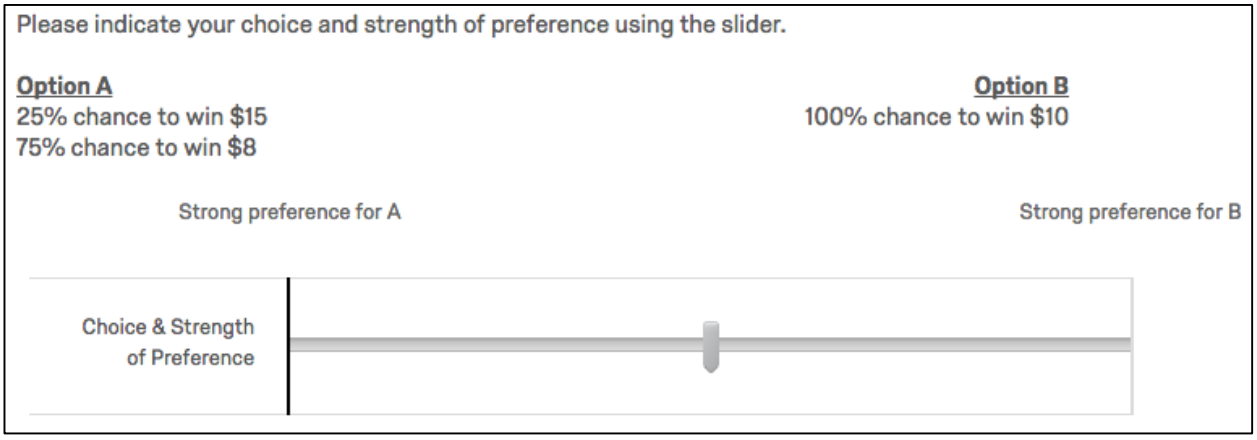
Risky-risky: complex: irreversible-reversible: high



Risky-safe: simple: reversible-irreversible: low



Risky-safe: simple: reversible-reversible: medium



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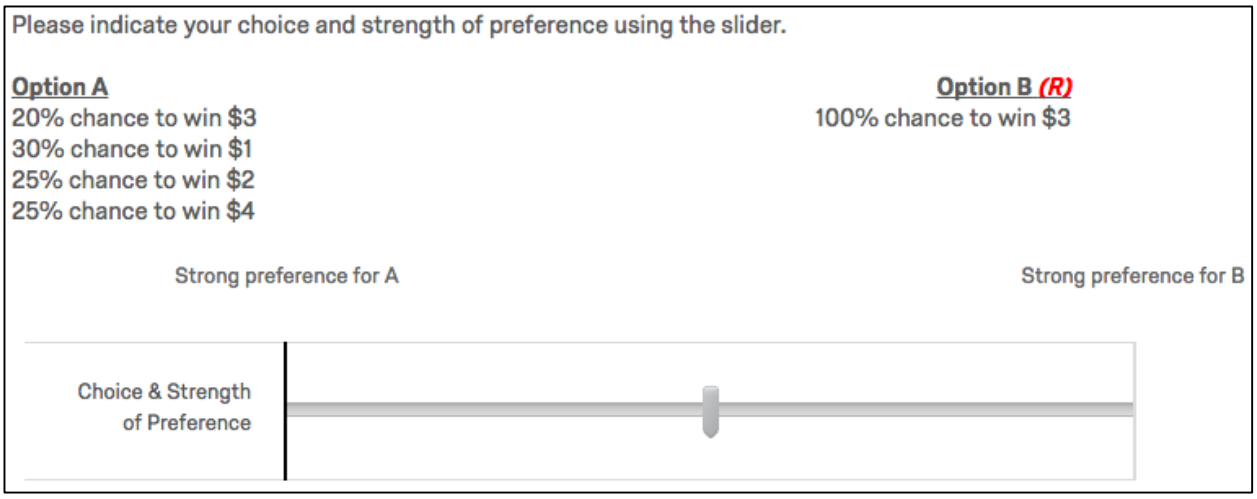

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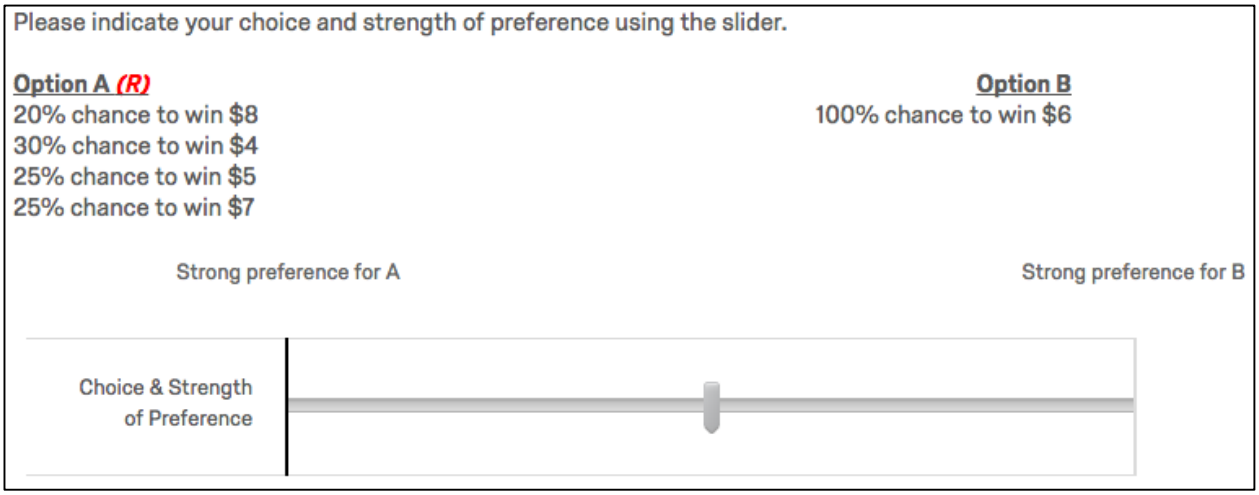

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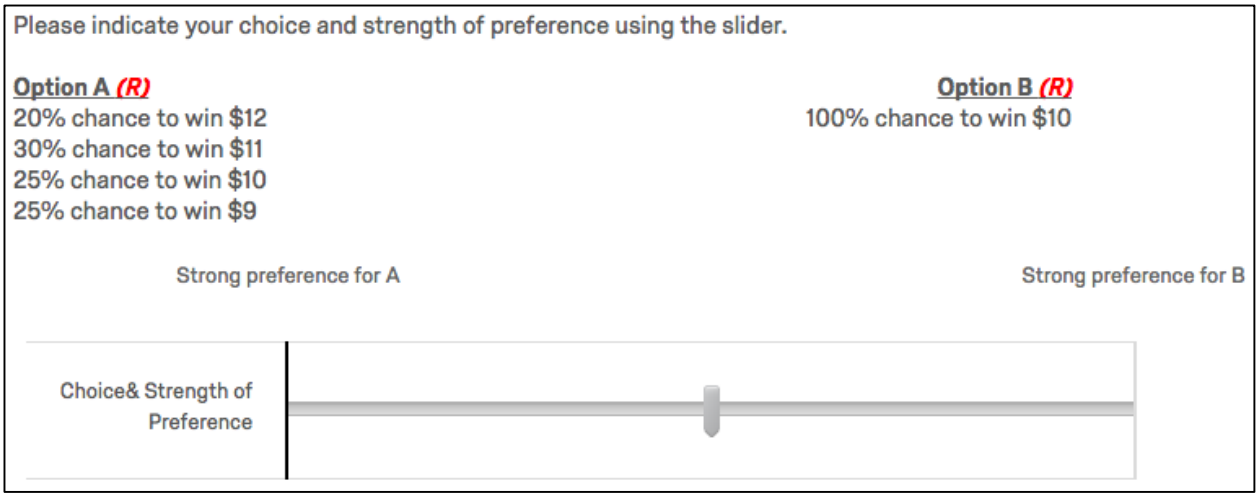
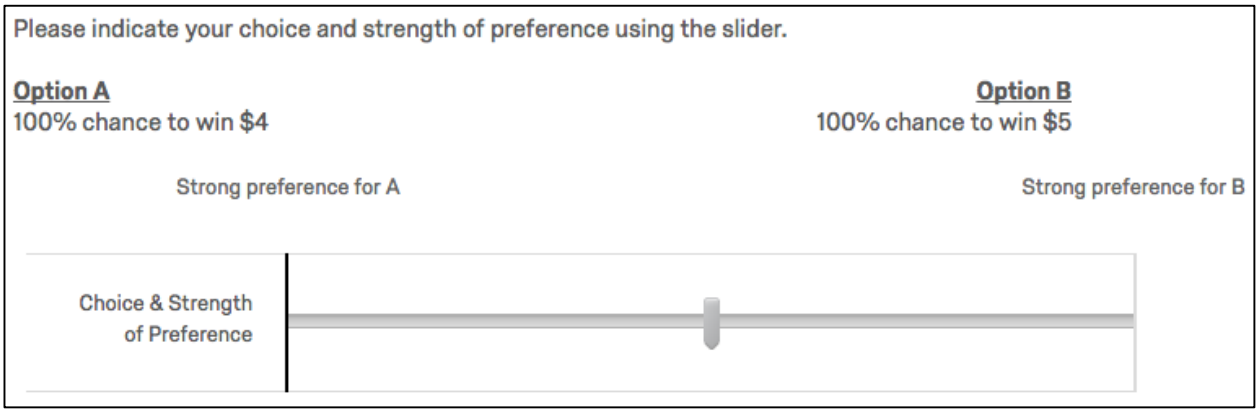


Risky-safe: complex: reversible-reversible: high



Safe-safe: simple: irreversible-irreversible: low