Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation

Signature:

_____ Jul 12, 2012

Chenying Tang Date

Author of the thesis: Chenying Tang

Approval Sheet

Why do We Like What We Like?

How Choice Shapes Preferences

By

Chenying Tang

Master of Arts

Economics

_____

C. Monica Capra

Advisor

_____

Daniel Levy

Committee Member

Accepted:

_____

Lisa A. Tedesco, Ph.D.

Dean of the James T. Laney School of Graduate Studies

_____

Date

Why do We Like What We Like?

How Choice Shapes Preferences

By

Chenying Tang

B.S., Peking University, 2010

B.E., Peking University, 2010

Adviser: C. Monica Capra, PhD

An Abstract of

A thesis submitted to the Faculty of the

James T. Laney School of Graduate Studies of Emory University

in partial fulfillment of the requirements for the degree of

Master of Arts

in Economics

2012

Abstract

Why do We Like What We Like?

How Choice Shapes Preferences

By Chenying Tang

Modern economic theories have long asserted that choice simply reflects an individual's preferences, whereas a psychological phenomenon called 'cognitive dissonance' suggests that choice may also shape preferences. Cognitive dissonance theory states that making a choice between two equally preferred items creates a psychological discomfort called 'cognitive dissonance', which is then reduced by decreasing preference for the rejected item. There is, however, a serious methodological problem with the measurement of preferences in previous studies, which casts a doubt on the very existence of this choice-induced preference change. To overcome this shortage, I proposed an experimental approach that distinguished choice from the measurement of preferences, thus eliminating the possibility that choice merely yields information about any measurement error of preferences. I hypothesized that self-generated choice would increase preference, as evidenced by the increase in preference for the chosen items and the decrease in preference for the nonchosen ones.

`

Why do We Like What We Like?

How Choice Shapes Preferences

By

Chenying Tang

B.S., Peking University, 2010

B.E., Peking University, 2010

Adviser: C. Monica Capra, PhD

A thesis submitted to the Faculty of the

James T. Laney School of Graduate Studies of Emory University

in partial fulfillment of the requirements for the degree of

Master of Arts

in Economics

2012

Acknowledgements:

I hereby thank my main adviser Professor C.Monica Capra, Professor Daniel Levy for their encouragement, support and guidance throughout the whole process of working on this thesis. I also would like to thank Professor Gregory Berns, Professor Maria Arbatskaya, Professor Hugo Mialon, Professor Andrew Francis, for their constructive suggestions and helpful comments. In addition, I would like to express my appreciation to all the faculty members in the department of economics. It is through their wonderful courses and unreserved assistance that I am able to fulfill the requirements for the degree of Master of Arts.

Table of Contents

Research Problem

Preference, known as a greater liking for one alternative over another or others, is believed to play a crucial role in virtually every decision-making process. Though of general interest to various disciplines, it still remains a question what mechanisms underlie the shaping of preferences. In particular, how are preferences modulated by various cognitive processes such as decision making and choices? Remarkably, there is still controversy over whether choices, traditionally considered a behavioral manifestation of preferences, may in turn affect preferences. Research exploring this case has used a paradigm where participants are repeatedly faced with a choice between two items that they have given the same initial ratings of liking. Results show that the item not chosen in the first round has a lower tendency of being chosen in subsequent rounds against the alternative item. This tendency is interpreted as evidence for cognitive or post-decision dissonance by cognitive psychologists and neuroscientists.

However, most economists believe that choice merely reveals true preferences, and any change in measured preferences is a result of measurement error. This argument is largely based on the fact that choice, as a reflection of preferences, has also been used to elicit preferences in previous studies. Another problem with previous studies is the hypothetical rewards used in experimental scenarios, which casts doubt on the external validity of previous findings. The answers to these problems are crucial for advancing our understanding of what drives the formation of preferences.

In order to avoid these limitations, I used an experimental approach that distinguishes choice from the measurement of preferences so as to eliminate the possibility that choice merely yields information about any measurement error of preferences. Instead of intentionally make a choice as was commonly practiced in previous studies, participants were asked to make a random choice between two identically-preferred items so as to reveal their preferences. Therefore, the outcome of choice was independent of preference. Also, instead of using hypothetical rewards in a simulated choice scenario, I used real rewards in a self-generated choice scenario. Measurement error of preferences was quantified to the extent that the preference systems before and after choice correspond with each other. I hypothesize that choosing will increase preferences while not choosing will decrease preferences, as evidenced by the increase in preference for the chosen items and decrease in preference for the nonchosen ones.

Introduction

Preference, as the foundation of behavior, is believed to play a crucial role in virtually all areas of social sciences, including economics, sociology, psychology, anthropology, biology, law and political sciences. A basic assumption that has enjoyed tremendous popularity among economists for decades is that individual preferences are stable and exogenously determined. This assumption provides a solid ground for understanding how individuals and institutions perform economic functions and generating predictions about their responses to various changes in the environment. However, with the overwhelming amount of evidence from the real world as well as from laboratory experiments, it has been argued that preferences could rather be endogenously affected by individual internal responses to the external state of affairs, and thus should not be taken as given.

The terms ‘preferences’ and ‘choice’ are used in a variety of related, though not identical, ways in the scientific literature. Neoclassical economic theory postulates that an individual’s preferences indicate how he would choose to do in all conceivable situations (Caplan, 2000) and that preferences must be well-ordered and stable (Arrow, 1958; Becker, 1962).

From the late twentieth century, there has been a raging debate over how preferences are formed between behavioral economists/constructed preference theorists and neoclassical experimental economists/discovered preference theorists. The constructed preference hypothesis (CPH) suggests that preferences do not exist prior to any choice but rather are created at the moment

of choice (Slovic, 1995). The discovered preference hypothesis (DPH), on the other hand, suggests that preferences do exist but that they need to be uncovered through a process involving practice, repetition and experience (Plott, 1996). The primary difference between CPH and DPH is the assumed stability of estimated preferences. The CPH suggests that preferences are malleable to the variants of the choice environment, such as framing effect and endowment effect. In contrast, the DPH indicates that preferences are stable as revealed in the process of discovery, which are consistent with economists' assumption that individual preferences are rational and consistent with neoclassical expectations.

Similar to CPH, several psychological theories postulate that shifts in preferences are possible. Prospect theory, for example, suggests a reversal of preferences when the same decision problem is framed in different ways (Kahneman & Tversky, 1979).

A most long-standing debate though, is that choice may not only reflect individual preferences (Lichtenstein & Slovic, 2006), but also shape preferences (e.g., Brehm, 1956; Gerber & Jackson, 1993; Sharot, De Martino, & Dolan, 2009;), even in an unconscious way (see Coppin, Delplanque, Cayeux, Porcherot, & Sander, 2010). The underlying assumption is that choice may be considered as a means of exercising personal control (Langer, 1975; Langer & Rodin, 1976; Leotti & Delgado, 2011), which plays an adaptive role in the regulation of cognition, emotion, and even physical health (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Ryan & Deci, 2006; Shapiro, Schwartz, & Astin, 1996). Psychologist Festinger (1957) proposed cognitive dissonance

theory to account for this choice-induced preference change, suggesting that after making a difficult choice between two equally preferred items, the act of rejecting a favorite item induces an uncomfortable feeling called ‘cognitive dissonance’, which is then reduced by decreasing preference for the rejected item (Chen & Risen, 2010).

To study whether choice has any effect on individuals subsequent preferences, psychologist Jack Brehm (1956) invented the free-choice paradigm (FCP) where participants were faced with a task of choosing freely between two similarly valued items. It was found that participants tend to rate the selected item better than they initially did, and the rejected option worse (Brehm, 1956). Since then, this idea has enjoyed widespread acceptance over decades (Ariely & Norton, 2008), and this choice-induced preference change has been replicated numerous times under variations of Brehm’s seminal free-choice paradigm (Egan, Santos, & Bloom, 2007; Lieberman, Ochsner, Gilbert, & Schacter, 2001; for a review, see Harmon-Jones & Mills, 1999), even in an unconscious way (Coppin et al., 2010).

These findings, however, have been faced with the problem that preferences are measured imprecisely, giving rise to the possibility that any change in measured preferences is a result of measurement error (Chen, 2008; Chen & Risen, 2009; Holden, forthcoming; Izuma et al., 2010). This argument is largely based on the fact that choice, as a behavioral manifestation of preferences, is at the same time used to elicit preferences. This fact also gives rise to the problem that the effects of choosing and not choosing on preferences

have not been separately studied. Therefore, an independent measure of preferences is critical to demonstrate the true effects of choosing and not choosing on preferences, respectively.

Despite these methodological debates, the existence of this choice-induced preference change is further supported by converging evidence that choice may be rewarding in and of itself (Leotti & Delgado, 2011). For example, animals and humans demonstrate a preference for having a choice over not having a choice, even when the choice confers no additional reward (e.g, Bown, Read, & Summers, 2003; Suzuki, 1997, 1999; see Leotti & Delgado for a review). Recent neuroimaging studies also suggest that either the exercise of choice or the mere anticipation of choice recruits reward-related circuitry, such as the anterior and ventral striatum (Izuma et al., 2010; Leotti & Delgado, 2011). As such, choice may be intrinsically rewarding even when it does not carry any preference information. Therefore, a further step is to investigate whether the rewarding experience of having a choice in itself will extend to preference for what is chosen.

In the current study, I investigated the very existence of this choice-induced preference change under the random-choice paradigm (ACP) that distinguishes choice from preferences. Two contrasting hypotheses were made:

Hypothesis 1:

If postchoice changes in preferences (i.e., increased preferences for chosen items and decreased preferences for nonchosen ones) are merely an artifact of true preferences, one would not expect to observe them under this

design constraint.

Hypothesis 2:

If, however, this choice-induced preference change does exist, this effect should be significant even under the stringencies of making random choices.

Methods

Rationale: To eliminate the possibility that choice merely yields information about any measurement error of preferences, I used a random-choice paradigm (ACP) that distinguishes between choice and preferences to study whether making a random choice between two similarly-valued items will bring about any preferences change.

Participants: 40 undergraduate or graduate students from Emory University aged from 19 to 25, of which 20 are males and 20 are females, are recruited as participants for the study.

Stimuli: 40 regular-edition CDs with a price range of 10~20 dollars will serve as the stimuli for this experiment. These CDs covered a variety of genres of music as a control for individual tastes.

Procedure: Participants were informed beforehand that this study was part of a marketing research project conducted on behalf of a recording company.

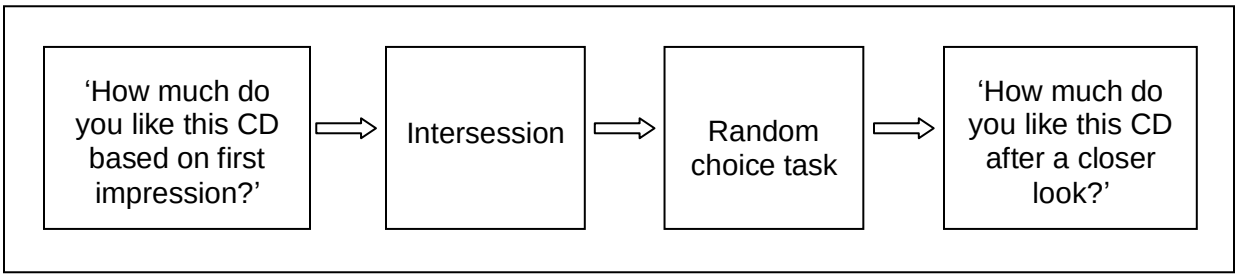

Fig. 2. Procedure flow chart

Participants were first asked to indicate how much they like each CD on a 10-point liking scale based on their first impression. The corresponding task was to pre-sort 40 pieces of sample CDs into 10 baskets based on their general impression. Each basket was tagged with a number from 1 to 10 representing an escalating degree of preferences.

Then participants were asked to finish a questionnaire consisting of the familiarity and preferences for 21 different music genres, followed by some demographic questions. During this period, the experimenter took down the number that each piece of CD was assigned to, indicating initial preferences. Meanwhile, the experimenter re-organized these 40 pieces of sample CDs evenly into the 10 baskets according to their pre-sorted order, therefore balancing the initial preferences for the 4 CDs contained in each basket.

Participants were then asked to arbitrarily choose 2 CDs from each basket, while they were informed that they would receive one random pick (this time by the experimenter) from those chosen CDs as a gift at the outset of this experiment.

Right after this random choice stage, participants were asked to rate their preferences for each piece of CD again on a 10-point liking scale—this time with an instruction to look into as much detail as they like. At last, participants were thanked and debriefed. They were also offered a chance to get either one sample CD from their chosen pool or an equivalent of 10 yuan for their participation.

Analysis: Analysis was conducted in a similar manner as in previous studies (Sharot, De Martino, & Dolan, 2009; Sharot, Velasquez, & Dolan, 2010). For

each participant and stimulus, postchoice shifts in preference were calculated by subtracting the mean-corrected prechoice preferences from the mean-corrected postchoice preferences (i.e., difference scores). The mean-corrected score is the distance of a particular stimulus's rating from the average rating for that participant ($xi - \mu$) and indicates the value of the stimulus relative to all other stimuli within each participant's preference system. Then, for each participant, the average difference scores were calculated for stimuli that have been chosen in the random choice task and those that have not been chosen

A manipulation check was conducted to ensure that prechoice preferences of the two groups of stimuli in the chosen/nonchosen conditions are balanced. Two independent sample *t* tests and one paired sample *t* test will be conducted to examine whether these scores are significantly different from zero and from each other.

Results

Results revealed a choice-induced change in preferences under this random-choice paradigm. Specifically, preference ratings increased significantly for the chosen CDs (M = .2844, SD = .3417), t (31) = -2.114, $p < .05$, but not for the nonchosen ones (M = -.1578, SD = .4196), t (31) = 1.063, $p > .05$ (Fig. 1). The difference in preference ratings between the chosen CDs and the nonchosen ones is also significant, t (31) = 2.943, $p < .05$.

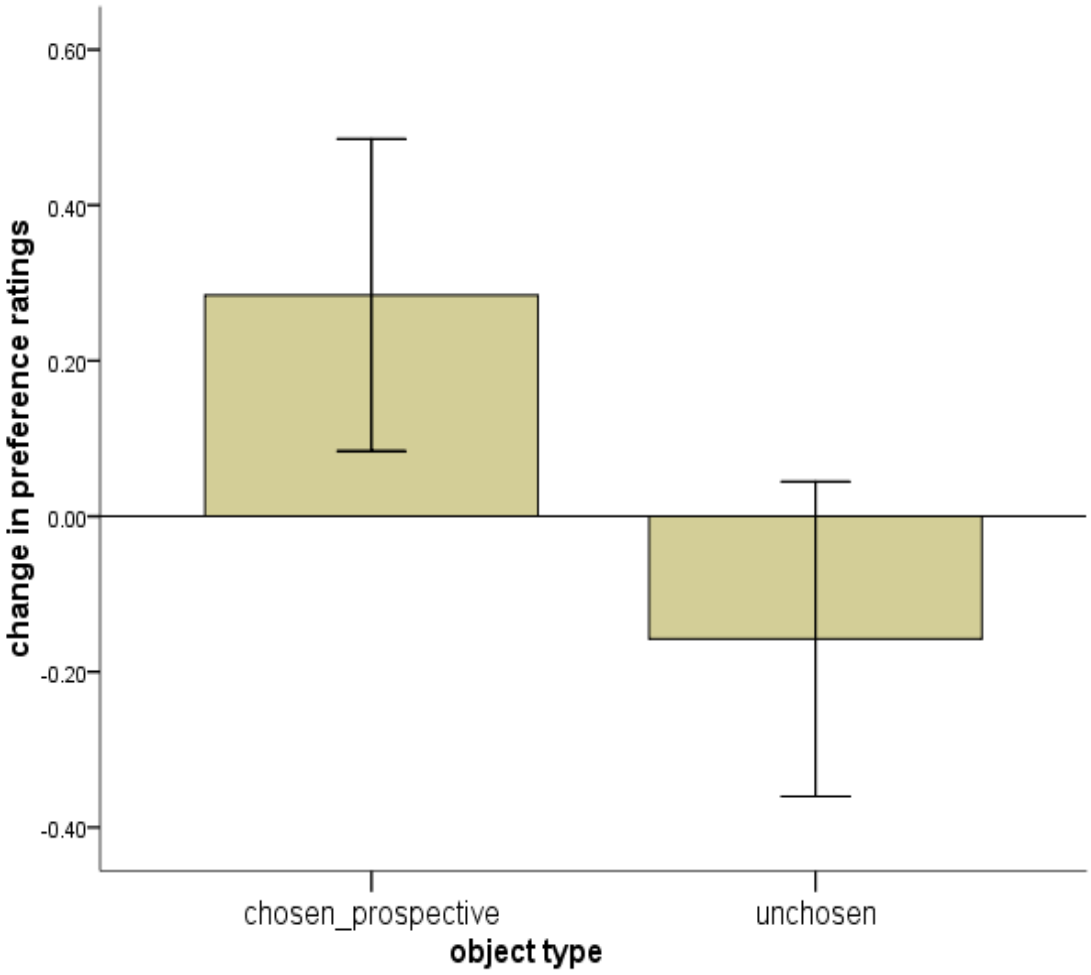

Fig. 1. Preferences changes for chosen and nonchosen CDs in the random-choice task.

Manipulation check for initial preferences for the chosen and the nonchosen CDs showed no difference between the chosen CDs (M = 5.559, SD = .9031) and the nonchosen ones (M = 5.500, SD = .9169), t (31) = 1.168, $p > .05$.

Conclusion: Through this study, I demonstrated a choice-induced preferences change under the stringency that choice was generated in a random way and was therefore independent of preferences.

Discussion

Results from the current study gave further support to the assertion that choices not only reveal preferences, but also shape them. Consistent with previous findings, I demonstrated this phenomenon under the circumstance in which choices were made randomly, and were not guided by preexisting preferences. Identical to previous findings, choice-induced change in preferences was observed only when participants believed they had been instrumental in making a decision (even though the majority of them claimed that they were not aware of that fact), A manipulation check for prochoice preferences also demonstrated that ratings did not differ between unexpected and expected stimuli, thus making it reasonable to compare the measurements of preference between the two conditions with different valences of expectation.

The behavioral finding that preferences can be shaped by choices is backed up by recent functional magnetic resonance imaging data. As is shown in this study, a neurophysiological signal in the caudate nucleus which is responsible for tracking expected hedonic outcome can also be altered by choice (Sharot, De Martino, & Dolan, 2009). These prior results, coupled with the current findings, lead us to the conclusion that choices both reflect and shape the preferences for hedonic outcome. In the future, researchers may investigate further into the mechanism of this preference shaping process. Critically, how expectation may play a moderating role in the relationship between choice and preference.

The implications of these results may be substantial. First, using a

random-choice paradigm, the results further strengthened previous findings on the relationship between choice and preference without even eliciting deliberate decisions in our case. Second, I further demonstrated that expectation could increase people's preference for the same object before and after making a random choice, indicating that endowment effect may even be extended to an expected ownership, i.e., prechoice beliefs about the accessibility of an object.

Otherwise, the limitations of this study are as distinct as followed:

First, it is possible that familiarity and initial preference may play an interactive and restrictive role on the ratings of preference, which may thus lead to ceiling/floor effect, thus diminishing the effect of choice on preference. It is suggested that future researchers use more unfamiliar and ambiguous objects as stimuli, which may in a way act as a control for the initial entitlement of preference, thus eliminating the confounding effect of familiarity.

Second, similar to previous studies, the current study used a 10-point liking scale as measurement of preference. This measurement has been constantly criticized to be imprecise in revealing preferences, while nobody has come up with a more precise way of measuring preferences yet. Therefore, in future studies, I suggest changing the measurement of preference (dependent variable) into valuation of the items, thus roviding a more precise measurement of preferences.

Future Direction

While the preliminary study has laid a foundation for subsequent studies on the effect of choice on preferences, there are improvements to be made in at least the following three aspects:

First, it has been long assumed by psychologists that choice may be considered as a means of exercising personal control (Langer, 1975; Langer & Rodin, 1976; Leotti & Delgado, 2011), and it is this personal control that may have contributed to the choice-induced preference change (Leotti & Delgado, 2011, Sharot, Velasquez, & Dolan, 2010). Recent neuroimaging studies also suggest that either the exercise of choice or the mere anticipation of choice recruits reward-related circuitry, such as the anterior and ventral striatum (Izuma et al., 2010; Leotti & Delgado, 2011). As such, I suggest that future researchers examine the formation of preferences both when the participants make their own choices and when a computer dictates the participants' choices (as a manipulation of personal choice). My hypotheses are that only self-generated choices (more control condition) will increase preferences for the chosen items and decrease preferences for the nonchosen ones, while computer dictated choices (less control condition) will not induce significant changes in preferences between chosen/nonchosen items.

Second, future researchers may specifically address the role of expectation on preference by directly inducing expectation even without a choice. In this study, I operationally defined it either as a 100% probability to get an object or a 0% probability to get it at some future time. In future studies, the levels of probability can be operationally modified. Since there are two sources of

the perception of probability, which can either be obtained from objective experience or generated from subjective judgment, there is plenty of work to be done regarding how certain probability information can be presented to people. As has been proposed by Meredith (2007), there are two distinct forms of expectation: "statistical expectation" and "need expectation". And he argues that both types of expectation imply an anticipation of a future occurrence, whereas "statistical expectation" differs from "need expectation" in that the latter carries an emotionally loaded insistence on a particular outcome of an act, while pure "statistical expectation" - free from need - simply relies on past experience without exigency of any kind. By this definition, what I manipulated in this study is close to “need expectation”, in which each participant was given a chance to pick 2 pieces of CDs out of the 4 pieces in each basket on their own, which served as a manipulation of the sense of control for a future event to occur. Such a manipulation provided a chance for each participant to change their self-relatedness to a certain object, thus creating different degree of perceived ownership of the object, which may finally result in different levels of endowment. Our hypothesis, therefore, is that the effect of expectation on preference is stronger when sense of control is manipulated.

Third, future researchers may further investigate into how outcome will change preferences in the presence of expectation. As demonstrated by Andrade & Boven’s (2010) findings, people usually underestimate their affective reactions to what does not happen. And this effect could be explained by cognitive dissonance theory (Festinger, 1957), which asserts that a choice between two

similarly desirable alternatives engenders a psychological tension mediated by the desirable aspects of the rejected alternative and the undesirable aspects of the selected alternative (Festinger, 1957). Although it has been suggested that this tension can be reduced by reevaluating the options after the choice is made (Bem, 1967, 1972), it may still not be enough to overwhelm the initial effect of the cognitive dissonance induced by a failure of expectation.

Conclusion

The results from this study replicated previous findings that making a choice changes a person's preference. Further, a moderating effect of expectation in the shaping of preferences by choice was shown, which suggested an extended version of endowment effect from real ownership to expected ownership.

References

Arrow, K.J. (1958). Utilities, attitudes, choices: a review note. *Econometrica*, 26 (1), 1–23

Becker, G. S. (1962). Irrational Behavior and Economic Theory. *Journal of Political Economy*, 70, 1-13.

Brehm, J.W. (1956). Post-decision changes in the desirability of choice alternatives. Journal of Abnormal and Social Psychology, 52, 384–389.

Caplan, B. (2000). The logic of collective belief. *Rationality and Society*, 15, 218.

Izuma, et al. (2010). Neural correlates of cognitive dissonance and choice-induced preference change. *PNAS*, 107 (51), 22014-22019.

Leotti & Delgado (2011). The inherent reward of choice. *Psychological Science*, 22 (10), 1310-1318.

Andrade, E.B., & Boven, L.V. (2010). Feelings Not Forgone: Underestimating Affective Reactions to What Does Not Happen. *Psychological Science,* 21, 706-711.

Ariely, D., & Norton, M.I. (2008). How actions create—not just reveal—preferences. *Trends in Cognitive Sciences*, 12, 13–16.

Bem, D.J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review*, 74, 183–200.

Bem, D.J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). New York: Academic Press.

Brehm, J.W. (1956). Post-decision changes in the desirability of choice alternatives. *Journal of Abnormal and Social Psychology*, 52, 384–389.

Chen, M.K. (2008). *Rationalization and cognitive dissonance: Do choices affect or reflect preferences?* Cowles Foundation Discussion Paper No. 1669. New Haven, CT: Yale University, Cowles Foundation for Research in Economics.

Chen, M.K., & Risen, J.L. (2009). Is choice a reliable predictor of choice? A comment on Sagarin and Skowronski. *Journal of Experimental Social Psychology*, 45, 427–429.

Chen, M.K., & Risen, J.L. (2010). How Choice Affects and Reflects Preferences: Revisiting the Free-Choice Paradigm. Journal of Personality and Social Psychology, 99 (4), 573-594.

Egan, L.C., Santos, L.R., & Bloom, P. (2007). The origins of cognitive dissonance: Evidence from children and monkeys. *Psychological Science*, 11, 978–983.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Festinger, L. (1964). *Conflict, decision, and dissonance*. Stanford, CA: Stanford University Press.

Harmon-Jones, E., & Mills, J. (Eds.). (1999). *Cognitive dissonance: Progress on a pivotal theory in social psychology*. Washington, DC: American Psychological Association.

Lieberman, M.D., Ochsner, K.N., Gilbert, D.T., & Schacter, D.L. (2001). Do amnesics exhibit cognitive dissonance reduction? The role of explicit memory and attention in attitude change. *Psychological Science*, 2, 135–140.

Kahneman, D., & Tversky, A., (1979). Prospect theory: An analysis of choice under risk. *Econometrica*, 47, 263-291.

Meredith, B., & Mitchell, (2007). *Expectation*. http://www.herovictim.com /expect.htm

Plott, C. (1996). Rational individual behaviour in markets and social choice processes: the discovered preference hypothesis, in (K. J. Arrow et al, eds.), *The Rational Foundations of Economic Behaviour*, pp. 225–50, Basingstoke: International Economic Association and Macmillan.

Sharot, T., De Martino, B., & Dolan, R. (2009). How choice reveals and shapes expected hedonic reaction. *Journal of Neuroscience*, 29, 3760–3765.

Sharot, T., Shiner, T., Brown, A.C., Fan, J., & Dolan, R.J. (2009). Dopamine enhances expectation of pleasure in humans. *Current Biology*, 24, 2077–2080.

Sharot, T., Velasquez, C.M., & Dolan, R.J. (2010). Do Decisions Shape Preference? : Evidence From Blind Choice. Psychological Science 21, 1231-1235.

Slovic, P. (1995). The construction of preferences. *American Psychologist*, 50, 364-371

Thaler, R. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior and Organization*, 1, 39-60.

Tversky, A., & Kahneman, D. (1981). The framing of choices and the psychology of choice. *Sicence*, 211(4481), 453-458.