



Free will is about choosing: The link between choice and the belief in free will[☆]



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HIGHLIGHTS

- Laypersons cognitively associate free will with the concept of choice
- Free will beliefs linked to positive choice attitudes and ability, perceiving actions as choices
- Free will beliefs linked to cognitively associating choice with freedom
- Choice activation strengthens free will beliefs and weakens determinism beliefs
- More choice leads to a stronger activation of the belief in free will in self

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ABSTRACT

Expert opinions have yielded a wide and controversial assortment of conceptions of free will, but laypersons seem to associate free will more simply with making choices. We found that the more strongly people believed in free will, the more they liked making choices, the higher they rated their ability to make decisions (Study 1), the less difficult they perceived making decisions, and the more satisfied they were with their decisions (Study 2). High free will belief was also associated with more spontaneous associating of choice with freedom, and with the perception of actions as choices. Recalling choices (Study 3) and making choices (Study 4) led to a stronger endorsement of the belief in free will, with an additional effect for the level of choice involved. These findings suggest that the everyday social reality of beliefs about free will is a matter of how people think and feel about choice.

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Whether human beings have free will has been discussed and debated for centuries. Free will has been challenged on conceptual grounds from multiple arguments that supposedly render it impossible because the future is fixed and inevitable and therefore impervious to human choice (Kane, 2011). These arguments include theological assertions of divine omniscience that entails foreknowledge of all future events (Calvin, 1559), as well as the relentless ineluctability of scientific causation (Laplace, 1902). Meanwhile, thinkers have objected to assorted concepts of free will on various grounds, such as believing that free will constitutes an exemption from causation (Bargh, 2008), that free will postulates causation by nonphysical entities such as souls

(Montague, 2008), that free will is a psychological illusion (Wegner, 2003), or that it is a logically impossible construct used to rationalize behavior (Miles, 2011).

In recent years, however, attention has turned to layperson concepts of free will and to how that understanding operates in human social life (Baumeister, 2008; Knobe et al., 2012; Nahmias, Morris, Nadelhoffer, & Turner, 2005; Nichols, 2006, 2011). Variations in beliefs about free will have been shown to cause a variety of changes in interpersonal and moral behavior (e.g., Vohs & Schooler, 2008). This has raised the question of how ordinary people understand the concept. Monroe and Malle (2010) found that people spoke about free will as making choices unconstrained by external factors (or even going against external pressures) and doing what one wants, possibly aided by planning and forethought. Stillman, Baumeister, and Mele (2011) found that people's notions of free will were linked to morally responsible behavior, self-control, achieving goals, and high levels of conscious thought and deliberation. Implicit in many of these conceptions is the notion of acting on the basis of deliberate choice (Baumeister, Sparks, Stillman, & Vohs,

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2008). The present investigation was designed to test the hypothesis that beliefs about free will are vitally linked in ordinary understanding to making deliberate, uncoerced choices.

In contrast to the metaphysical conundrums mentioned above, the idea that people associate free will with making choices seems simple and straightforward. However, the present investigation intended to go beyond mere definitional issues. We examined associations between the beliefs about free will and choice to show that there is a positive relationship between people's belief in free will and the extent to which they like and enjoy making choices, their perceived ability to successfully make decisions, their perception of making choices as being less difficult and finally their satisfaction with decisions they have made. Furthermore, we predicted that the more people believe in free will, the more likely they would be to associate the concept of choice with freedom and to perceive their own actions as choices. Last, we sought to show that activating the concept of choice by means of autobiographical memories of choosing or an action task that involves choice would increase people's reported endorsement of the belief in free will. Taken together, we aimed to demonstrate that lay beliefs about free will are cognitively linked to choosing, both within and between persons, and that the associative links likely operate in both directions.

Study 1 - Choice perceptions and attitudes

Study 1 measured individual differences in belief in free will and, much later, assessed perceived ability of choosing, preference for choice, and cognitive associations about choice. We predicted that people who held a stronger belief in free will would express more liking for choice, higher perceived ability to choose, and would display more associations of freedom with choosing.

Method

Participants and procedure

Ninety eight university students ($M_{age} = 19.09$, $SD_{age} = .54$, 51 females) participated for partial course credit. At a mass testing session at the start of the semester, they filled out the belief in free will scale. Two months later, participants took part in another session and completed the choice cognitive association task and answered items regarding perceived ability to choose and preference for having choice.

Measures

Belief in free will. The belief in free will was measured using the eight item belief in self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos, Laurene, Skala, & Slane, 2008). The items refer to oneself having free will, such as "I am in charge of my actions even when my life's circumstances are difficult" and "I have free will".

Choice cognitive association. Adjusting the method developed by Stephens, Fryberg, and Markus (2011) for studying associations, we asked participants to write three words they thought of when faced with the word "choice." The responses were automatically coded according to whether they referred to being free (e.g., free, freedom).

Perceived ability to choose. Two items assessed perceived ability for choice: "It's very hard for me to choose between many alternatives" (reversed) and "When faced with an important decision, I prefer that someone else chooses for me" (reversed) on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*).

Preference for choice. Two items measured liking for choice: "The more choices I have in life, the better" and "In each decision I face, I prefer to have as many options as possible to choose from" on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*).

Results

Correlations between belief in free will, choice cognitive association with freedom, perceived ability to choose and preference for choice are summarized in Table 1. The belief in free will was associated with a higher preference for choice ($r = .26$, $p < .01$) and higher perceived ability to choose ($r = .38$, $p < .001$). Also, those with stronger endorsement of the belief in free will were more likely to associate choice with freedom ($r = .25$, $p < .05$). The correlations between choice association with freedom, preference for choice and perceived ability to choose were weak ($r = .00$ to $.17$, $p = n.s.$).

Semantic analysis

Logistic regression tested the link between scores on the free will belief scale and whether the participant associated choice with freedom. Participants with higher belief in free will were more likely than others to respond with "free" or related words as a spontaneous association to "choice" ($\chi^2(1, N = 98) = 6.46$, $p = 0.011$; $\beta = 1.63$, $w = 5.76$, $p = 0.016$). Thus, belief in free will was linked to whether people spontaneously think of choosing as something related to being free or having freedom.

Perceived ability to choose

We ran a multi-step regression examining the relationship between the belief in free will and the perceived ability to choose, controlling for age and gender. A stronger endorsement of the belief in free will beliefs was positively related to having perceived ability to choose ($F(3, 94) = 8.28$, $p < .001$; $\beta_{FW} = .36$, $p < .001$; $R^2 = .18$; $\Delta R^2 = .13$). The relationship held even without the inclusion of controls.

Liking for choice

A multi-step regression analysis was conducted to test the relationship between the belief in free will and liking for choice, controlling for age and gender. The belief in free will was found to predict a stronger preference for having choice ($F(3, 94) = 2.94$, $p = .037$; $\beta_{FW} = .27$, $p = .008$; $R^2 = .09$; $\Delta R^2 = .07$). The controls did not affect the relationship.

Discussion

As predicted, belief in free will had multiple positive links to making choices. People who expressed higher belief in free will reported enjoying making choices more than other people. They also had a greater sense that they were capable of making choices effectively. The two-months delay between the measures rendered it highly unlikely that filling out the free will scale had any direct (e.g., priming) effect on responses regarding choice. More likely, believing in free will is cognitively associated with a preference for choice and the feeling of being a capable as a decision maker.

The semantic analysis data provided further evidence that free will and choice are linked, even in people's spontaneous responses and thought patterns. The more strongly people believed in free will, the more likely they were to associate choosing with freedom.

Table 1
Study 1 correlations table.

	1	2	3	4
1 - Belief in self free will	(.72)			
2 - Choice associated with freedom	.25*	-		
3 - Preference for choice	.26**	.00	(.60)	
4 - Perceived ability to choose	.38***	.11	.17	(.54)
Age	-.02	.03	.12	-.24*
Gender ^a	-.08	.01	.01	-.13

Note. ^a Gender is dummy coded (0 = male, 1 = female); * $p < .05$; ** $p < .01$; *** $p < .001$. Alpha coefficients are presented on the diagonal.

Study 2 - Recall task, actions as choices and choice attitudes

Study 2 was designed to extend the findings from Study 1 in several ways. Following the growing literature about choice and choice making we sought to examine whether the belief in free will would be associated with a stronger tendency to see everyday life actions as choices. Markus, Savani and colleagues have shown that people differ in the extent to which they perceive choice in their lives and consider their actions to be choices, even if those actions clearly involve selecting between alternatives (Markus & Schwartz, 2010). For example, Americans have a stronger tendency to perceive their actions as choices compared to Indians (Savani, Markus, Naidu, Kumar, & Berlia, 2010; Savani, Stephens, & Markus, 2011). Quite possibly, cultural differences in the perception of choice may be related to the cultural differences in the endorsement of the belief in free will. We therefore asked participants to recall actual behaviors in specified situations and to indicate the extent to which they considered these actions to be a choice.

Also, Study 1 recognized the cognitive association between the belief in free will and choice attitudes using a general choice scale, which - despite the time lag - may share some conceptual similarities with the belief in free will scale. In this study we asked participants to indicate their attitudes (enjoyment, perceived difficulty, and satisfaction) regarding specific situations rather than a general tendency. We also ran a more comprehensive set of free will belief scales which included items regarding determinism, fatalism and chance as to provide a fuller picture of the effect as well as to minimize any possible priming effects one way or the other. Moreover, to show the generalizability of the findings from Study 1, the sample in Study 2 was from a much older working population based in the United States.

Based on the findings from Study 1 we hypothesized that those with stronger endorsement of the belief in free will would be more likely to consider their own actions as choices, to enjoy making selections and to report higher satisfaction with the results of their selection.

Method

Participants and procedure

Sixty three American participants were recruited online using Amazon Mechanical Turk in return for US\$0.3 ($M_{\text{age}} = 38.73$, $SD_{\text{age}} = 12.92$, 40 females). Participants were led to believe that they are participating in two separate studies. In the first part, participants were asked to report their belief in free will. In the second part, participants were asked to recall the last time they engaged in a four specific actions, and for each of these actions they were asked about related attitudes and about the extent to which they perceived these actions to be choices. To make sure participants understood the task, the explanation of the task was followed by a two quiz questions participants had to answer correctly in order to proceed to the task.

Measures

Belief in free will. The belief in free will was measured using two scales. The Free Will and Determinism Scale (FWD scale, Rakos et al., 2008) included two subscales - eight items measured the belief in free will for self (used in Study 1) and 14 items measured a general belief in free will. The Free Will and Determinism Plus Scale (FAD+, Paulhus & Carey, 2011) includes four subscales - free will (7 items), scientific determinism (7 items), fatalistic determinism (5 items) and unpredictability (8 items). The items of the two scales were intermixed and displayed in a random order different for each participant with a scale ranging from 0 (*Not at all true*) to 4 (*Always true*).

Action as a choice. We adapted the recall task in Savani et al. (2010, study 4b). Participants were asked to recall the last instance of four real-life selection situations - purchasing electronics, watching television, eating breakfast and voting. All participants answered questions regarding all

four situations and the order of the situations was randomized. For each of those situations, participants were asked to first recall and describe the situation [e.g. "Please describe the last time that you purchased electronics (a mobile, a computer, etc.). Please indicate - what did you purchase? when did you purchase it? where? and why did you make this purchase?"]. Participants were then asked regarding the number of alternative options they made the selection from, the importance of the decision to them at the time, and whether they believe that this selection constitutes a choice (e.g. "Would you agree or disagree that buying electronics constitutes as a choice?"; 1 - *Strongly disagree that this action is a choice - I had no choice*; 5 - *Strongly agree that this action is a choice*). We averaged the scores across the four scenarios.

Choice ability and attitudes. For each of the four scenarios above, participants were also asked to indicate their perceived ability and attitudes toward the selection process, in terms of difficulty (0 - *Not at all difficult*; 7 - *Very difficult*), enjoyment (1 - *I did not enjoy it at all*; 5 - *I enjoyed it very much*), and satisfaction (1 - *Not satisfied at all*; 5 - *Very satisfied*). For each of these items, we averaged scores of all four scenarios.

Results and Discussion

Correlations among the free will beliefs scales, choice perceptions, choice ability and attitudes, and demographics are presented in Table 2. The three free will subscales were highly correlated ($r = .58$ to $.82$, $p < .001$). Across all free will subscales, the belief in free will was positively correlated with the perception of the selection actions as being choices (FWD general: $r = .56$, FWD self: $r = .51$, FAD+: $r = .49$; all $p < .001$) while beliefs in fatalism were negatively related to perceptions of choice ($r = -.26$, $p < .05$). The two FWD subscales were also positively correlated with perceiving selections as less difficult (FWD general: $r = -.27$, $p < .05$; FWD self: $r = -.34$, $p < .01$) and reporting higher satisfaction with their selection (FWD general: $r = .27$; FWD self: $r = .29$, both $p < .05$). The FAD+ free will subscale was correlated with perceived importance ($r = .34$, $p < .01$) and enjoyment ($r = .33$, $p < .01$). The differences in findings between the free will beliefs subscales might be attributed to the inclusion of items in the FAD+ free will subscale about moral responsibility (e.g. "criminals are totally responsible for the bad things they do"; "people are always at fault for their wrong behavior") and self-control (e.g. "strength of mind can always overcome the body's desires"; "people can overcome any obstacles if they truly want to"). Quite possibly, the enjoyment of the tasks recalled (eating breakfast; selecting a TV show) is related to one's ability to self control (eating healthy and balancing work and leisure).

A multi-step regression analysis controlling for demographics, situation importance and number of alternatives shows all three free will subscales to have a strong relationship with perceiving actions as choices (e.g. FWD self: $F(5,57) = 5.04$, $p = .001$; $\beta_{\text{FW}} = .51$, $p < .001$; $R^2 = .31$, $\Delta R^2 = .25$, $p < .001$; demographics, number of alternatives and situation importance not significant).

We also tested for a mediation model of the belief in free will (with FWD self subscale) predicting higher satisfaction with selection through perceived difficulty, while controlling for age, gender and selection enjoyment. We conducted a series of multiple regression analyses. First, the belief in free will was positively related to satisfaction with choice ($\beta = 1.26$, $t(63) = 2.17$, $p = .034$), and negatively related to perceived difficulty ($\beta = -1.65$, $t(63) = -3.12$, $p = .003$). The mediator, perceived difficulty, was also negatively related to satisfaction ($\beta = -.44$, $t(63) = -3.28$, $p = .002$). We therefore ran the bootstrapping mediation analysis with bias-corrected confidence estimates, using a 95% confidence interval and 5000 bootstrap resamples (Preacher & Hayes, 2008). Results indicate that perceived difficulty mediated the relationship between belief in free will and satisfaction with selection ($\beta = .71$, $CI = .14$ to 1.72), and the direct effect of belief in free will became non-significant ($\beta = .54$, $t(63) = .92$, $p = .359$) therefore

Table 2
Study 2 correlations table.

	1	2	3	4	5	6	7	8	9	10	11	12
1 - FWD general	(.84)											
2 - FWD self	.82***	(.75)										
3 - FAD + FW	.76***	.58***	(.87)									
4 - FAD + determinism	-.12	-.14	.00	(.68)								
5 - FAD + fatalism	-.35**	-.51***	.06	.27*	(.91)							
6 - Unpredictability	-.16	-.24	-.10	.29*	.45**	(.80)						
7 - N of alternatives	-.09	-.15	-.14	-.01	.03	.13	-					
8 - Importance	.09	-.01	.34**	-.06	.25*	.00	.00	-				
9 - Difficulty	-.27*	-.34**	-.15	.21	.19	.04	.16	.00	-			
10 - Enjoyment	.17	.06	.33**	-.03	.12	-.08	.00	.50**	.19	-		
11 - Satisfaction	.27*	.29*	.24	-.10	-.24	-.14	.10	.27*	-.38**	.27*	-	
12 - Is a choice?	.56***	.51***	.49***	-.10	-.26*	-.08	-.02	.18	-.32**	.08	.40**	-
Age	.00	-.17	-.17	-.18	-.02	-.11	.25	-.04	-.10	.01	-.06	-.11
Gender ^a	-.10	.05	.01	-.10	.02	-.19	.10	.17	-.13	.00	.11	.15

Note. ^a Gender is dummy coded (0 = male, 1 = female); * $p < .05$; ** $p < .01$; *** $p < .001$. Alpha coefficients are presented on the diagonal.

indicative of a full mediation (model summary: $R^2 = .29$, $F(5, 57) = 4.69$, $p = .001$; see Fig. 1 for the mediation model). The inclusion of the controls had no effect over the model and the findings were similar for the FWD general subscale.

These findings show support for the link between the belief in free will and the concept of choice. Those who endorse the belief in free will tend to perceive actions involving a selection between alternatives as choices rather than mere actions that involve no choice. Moreover, two of three of the free will subscales also indicated the belief in free will to be associated with perceiving selections as less difficult and with having higher satisfaction with the result of their selection. An analysis of a full mediation model indicated that the belief in free will predicts satisfaction with selection through perceived difficulty.

Study 3 - Choice activation

Studies 1 and 2 showed support for the relationship between the belief in free will and choice. To extend these findings we sought to examine the possible causal activation of the belief in free will using the concept of choice. Study 3 experimentally manipulated the idea of choice. The prediction was that the activation of the idea of choice would influence reported belief in free will.

Method

Procedure and Participants

One hundred and forty four participants were recruited through Amazon Mechanical Turk. Participants were led to believe they are participating in two separate studies. In the first part, participants performed a recall task designed to activate the idea of choice. Next, all participants were asked about their beliefs about free will. Lastly, participants were probed for suspicion as to the ostensible separateness of the two studies or the purpose of the manipulation. As some MTurk

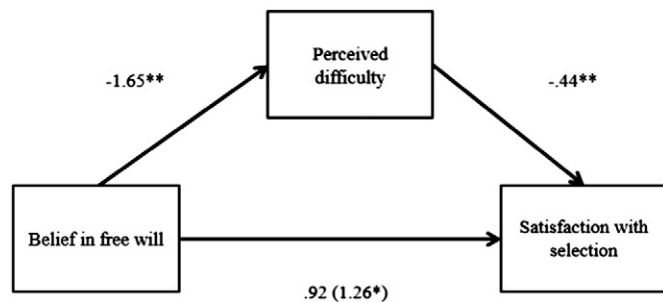


Fig. 1. Indirect effect of belief in free will on satisfaction with outcome through perceived difficulty. * $p < .05$, ** $p < .01$.

participants respond capriciously, we verified the attention check questions and compliance with instructions. Data from 30 participants were deemed contaminated by either failing the attention checks or unintentionally conflating the two conditions (e.g., writing actions instead of choices, or vice versa) thereby leaving a sample of 114 ($M_{age} = 32.70$, $SD_{age} = 10.63$, 65 females).

Measures

Choice manipulation. The choice manipulation was adapted from Savani and Rattan (2012). Participants were randomly assigned to the two conditions. In the action condition, participants were asked to recall five things they did the previous day during four different time periods: morning (8 am-noon), afternoon (noon-4), evening (4-8 pm), and night (8 pm-midnight). Participants in the choice condition were instructed to list choices and decisions among alternatives made in the same time periods.

Belief in free will. Belief in free will was measured using an eight-items self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos et al., 2008), as well as the belief in free will and fatalistic determinism subscales of the Free Will and Determinism Plus scale (Paulhus & Carey, 2011). The items from all subscales were intermixed with additional attention check questions, and the order of items was randomized so that the sequence was different for each participant.

Results and discussion

The two belief in free will subscales were highly correlated ($r = .47$, $p < .001$). Belief in fatalistic determinism was negatively correlated with the belief in free will in self but had a much weaker correlation with the general belief in free will (FWD self: $r = -.50$, $p < .001$; FAD + general: $r = -.14$, $p = .13$).

To assess how choice affected participants' beliefs in free will and determinism we analyzed differences between the two conditions using an independent samples t-test. Participants who had recalled making choices expressed higher belief in free will than participants who had recalled actions (FWD: $M = 4.15$, $SD = .51$ versus $M = 3.85$, $SD = .46$, $t(112) = 2.91$, $p = 0.004$; FAD+: $M = 4.01$, $SD = .54$ versus $M = 3.74$, $SD = .51$, $t(112) = 2.451$, $p = .016$; see Fig. 2 for the plot). The FAD + fatalistic determinism subscale also yielded differences: participants who recalled choices expressed less fatalistic determinism than those who recalled actions ($M = 2.31$, $SD = 1.05$ versus $M = 2.99$, $SD = 1.04$, $t(112) = 3.142$, $p = 0.002$). These results clearly show that recalling choices made compared to actions made strengthened participants beliefs in free will and weakened participants beliefs in fatalistic determinism.

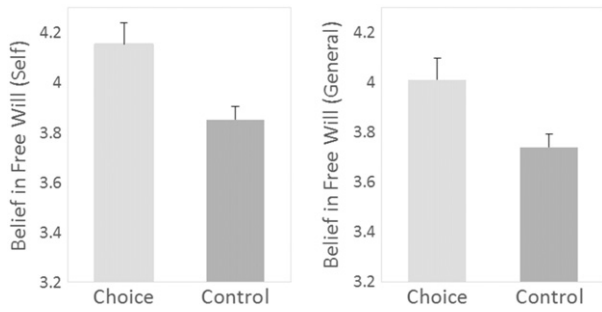


Fig. 2. Means of self and general beliefs in free will (with standard error bars) for choice manipulation conditions in Study 3.

Study 4 – Degree of choice activation

Study 4 was constructed to extend the findings in Study 3 in two ways. First, this study manipulated the degree of choice, aiming to show that more choice leads to a stronger activation of the belief in free will. Second, the findings in Study 3 had only two conditions which makes it unclear whether it was the choice recall that activated the belief in free will or whether it was the actions recall that caused disbelief in free will. This study therefore added a control condition. Lastly, this study was designed to replicate the findings from Study 3 using a different choice manipulation.

Method

Procedure and Participants

One hundred and eighty six participants were recruited through Amazon Mechanical Turk ($M_{age} = 30.31$, $SD_{age} = 8.35$, 77 females). Participants were led to believe they are participating in two separate studies - a marketing study followed by a psychology study. In the first part, participants were asked to perform a task designed to activate the idea of choice. In the second part participants were asked about their belief in free will using two free will scales (FWD and FAD+). Last, participants were probed for suspicion as to the purpose of the manipulation and the study.

Measures

Choice manipulation. The Vohs et al. (2008) choice manipulation was adjusted for the purpose of this study. Participants were randomly assigned to one of five conditions in three categories - choice (high choice, low choice), actions (rating, describing) and a control group (recalling the weather of the previous day). In the choice conditions, participants were asked to make 13 choices. In the low choice condition, in each of the choice sets the participants chose between two pens, while in the high choice condition the choice was between four pens. The action conditions did not involve any choices but rather required the participants to perform 13 actions. In the rating condition, participants were asked to rate pens on a scale of 0 (*Do not like it at all*) to 100 (*Like it very much*), while in the other condition participants were asked to describe the pens' features. The order of the pens in these four conditions was randomized. The control condition asked participants to recall the weather conditions the day before during morning (8 am–12 pm), afternoon (12 pm–4 pm), evening (4 pm–8 pm) and night (8 pm–midnight; temperature, rain, wind and pollution conditions). To make sure participants understood the task assigned to them, participants first read a description of the task they have been assigned to and were asked to answer a two quiz questions they had to answer correctly in order to be able to proceed to the task.

Free will beliefs. Free will beliefs were measured using the eight item self free will subscale of the Free Will and Determinism Scale (FWD scale, Rakos et al., 2008) and the general belief in free will subscale from the Free Will and Determinism Plus scale (FAD+, Paulhus & Carey, 2011). The items from the two subscales were intermixed and the order of items was randomized so that the sequence was different for each participant.

Results

The correlations between the FWD belief in self free will ($\alpha = .66$) and the FAD+ general belief in free will ($\alpha = .76$) subscales was high ($r = .54$, $p < .001$) yet there were slight difference in the way the two were affected by the choice manipulations.

The choice manipulation affected the general belief in free will so that the belief in free will was highest in the choice conditions and lowest in the control condition (Choice: $M = 4.03$, $SD = .54$; No Choice: $M = 3.87$, $SD = .62$; Control: $M = 3.67$, $SD = .59$; $F(2, 183) = 3.75$, $p = .025$; see Fig. 3 for plot). There were no significant differences between the two choice conditions (High choice: $N = 46$, $M = 4.03$, $SD = .58$; Low choice: $N = 44$, $M = 4.03$, $SD = .51$) or between the two action conditions (Rating: $N = 43$, $M = 3.85$, $SD = .58$; Describing: $N = 32$, $M = 3.88$, $SD = .67$). Significant differences were found between the choice conditions and the control condition ($t(109) = 2.64$, $p = .009$), but not between the choice and no-choice or between the no-choice and control conditions.

The choice manipulation also affected the belief in self free will, but the pattern of results was slightly different. There were no significant differences between the low choice, rating, describing and control conditions, yet the high choice condition resulted in significantly higher rating of belief in self free will compared to all other conditions (High choice: $M = 3.83$, $SD = .55$; Low choice: $M = 3.51$, $SD = .44$; Rating: $M = 3.59$, $SD = .40$; Describing: $M = 3.38$, $SD = .50$; Control: $M = 3.55$, $SD = .47$; $F(4, 181) = 4.91$, $p = .001$; High choice compared to the other conditions - low choice: $t(88) = 3.01$, $p = .003$; rating: $t(87) = 2.41$, $p = .018$; describing: $t(76) = 3.73$, $p < .001$; control: $t(65) = 2.06$, $p = .044$).

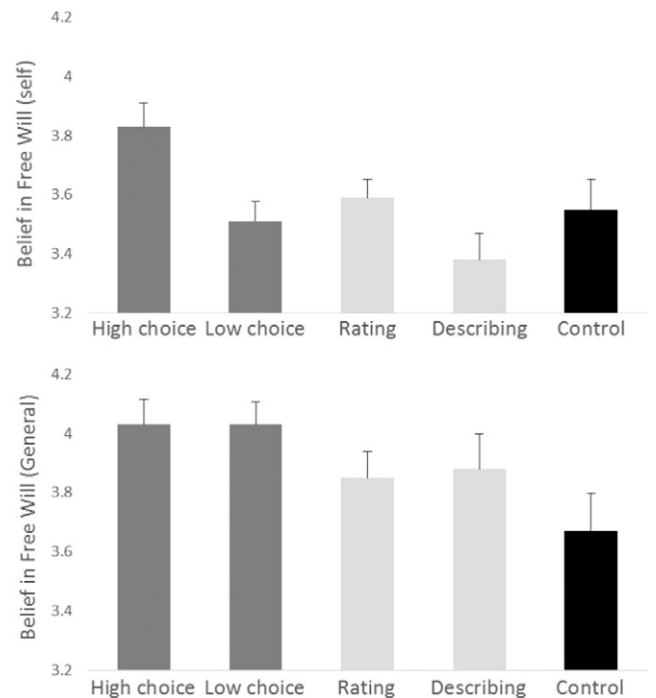


Fig. 3. Means of self and general beliefs in free will (with standard error bars) for choice manipulation conditions in Study 4.

Discussion

This study offers several significant extensions over Study 3. First, the inclusion of the control condition makes it clear that it is the choice condition that leads to the activation of the belief in free will rather than actions leading to an activation of disbelief in free will. Second, the degree of choice matters, at least for the belief in free will in self. While a choice between two pens was sufficient to activate the general belief in free will, it did not affect the belief in self free will. However, a choice between four pens successfully activated both beliefs, meaning that it is not only the actual existence of choice but also the extent of the choice or the number of options available within the choice that matters.

These findings may seem contradictory to those of *Vohs et al. (2008)*. In their study, a similar choice manipulation was used and the findings indicated that making choice, as compared to taking actions, depleted participants of their self-control (termed 'ego depletion') so that they were less able to control their temptations in subsequent tasks. A depletion of self-control is conceptually close to the idea of having less free-will, as a depleted person is less able to overcome internal constraints in the form of urges, desires, wants and needs and therefore less able to make free choices. Yet, a possible way to resolve the two sets of findings is that choice stimulates belief in free will, but having too much choice or having to make too many choices can be depleting and limiting to the feelings of having free will, especially so for 'maximizers' who are constantly preoccupied with making the best choices (*Iyengar & Lepper, 2000; Schwartz, 2000, 2004*). Quite possibly, the findings regarding choice manipulation of *Vohs et al. (2008)* and *Iyengar and Lepper (2000)* suggest that the effects found in this study may be reversed if one is faced with 'too much' choice, indicating a curvilinear relationship. Yet, it is important to note our findings clearly indicate that the presentation of simple choices stimulates the belief in free will in people's minds.

General Discussion

Four studies confirmed that, at least among laypersons, belief in free will is strongly and multiply linked to the idea of choosing. The first two studies showed that the more strongly people endorse the belief in free will, the more they associate choice with freedom, the more they perceive their actions to be choices, the more they enjoy making decisions and choices, the more confident they are about their ability to make such choices, the less difficult they perceive their selections to be and, finally, the more satisfied they were with their selections in life. Some of these factors were found to be correlated in Study 1 across a two-month hiatus and must therefore be assumed to reflect quite stable cognitive structures.

That high belief in free will entails belief in one's ability to choose may be considered a matter of definition, though it may be important given the controversial variety of specialists' definitions of free will. The link to liking choice in Study 1 however is not explicable based on definition, and indeed some have regarded free will as a burden of having to make choices (*Fromm, 1941; Sartre, 1956*) and choice as a possible constraint to elements that allow for more free will (*Vohs et al., 2008*), so that, in theory, free will belief might be associated with disliking choice. The liking finding thus suggests a motivational aspect. People who like to make decisions may be glad to have the capacity to choose freely, and so they endorse that belief. In contrast, people who dislike choosing may wish to shed some responsibility for their decisions. Denying their own free will may be an appealing way of distancing themselves from their choices and the anticipated (or even feared) outcomes of those choices. Presumably, people do not need to worry about having chosen the wrong thing if all actions are inevitable and caused by prior events.

Study 2 extended the association between the belief in free will and choice even further. People generally differ in the extent to which they perceive their lives to have choices (*Savani et al., 2010, 2011*), in

the perceived difficulty in facing choices (*Novemsky, Dhar, Schwarz, & Simonson, 2007*), their enjoyment of making choices, and the level of satisfaction that they receive from their choices (*Iyengar & Lepper, 2000; Mellers, 2000; Schwartz, 2000, 2004*) and our findings indicate that these choice related factors are linked with the belief in free will. Those who believe in free will seem to welcome choice as a positive aspect in their lives.

Study 3 provided further evidence linking choosing to free will. Some participants recalled a series of choices they had recently made, and they subsequently expressed higher belief in their own free will than participants who recalled actions. The use of actions as the comparison group is revealing, because one could have thought that free will is more associated with taking action than with facing a choice. But our results clearly indicated that thinking about choice led to higher beliefs in free will than thinking about action. Furthermore, we found that thinking about choice reduced participants' belief in fatalistic determinism. Thus, as a result of recalling their own choices, people became less likely to think that human life is a preordained sequence of events and experiences, and they became more likely to regard it as something the individual controls and selects from amongst a range of alternative possibilities. Use of the faculty of choice sensitizes one to its power and efficacy (or causes one to overestimate those, such as a salience bias).

But it is not merely choice itself that activates the belief in free will, but also the level of choice. Using a behavioral task involving choice, Study 4 revealed differences between having some choice (between two options) to having more choice (between four options), such that the activation of the belief in free will in self only took place when choice was high. The findings from Study 4 also makes it clear that it is choice that activates the belief in free will rather than having no choice that leads to disbelief in free will. Hence, combining with the findings from Study 2, it appears that those who believe in free will tend to view their own actions as choices, and that making choices reinforces their belief in free will.

The present findings suggest that the associative link between free will and choice is robust and potentially bidirectional. The belief in free will is conceptually more enduring and stable than attitudes and perceptions (*Baumeister, Masicampo, & DeWall, 2009; Wyer & Albarracín, 2005*), and beliefs are generally viewed as the building blocks of action, and leading to the formation of attitudes and perceptions (*Fishbein & Ajzen, 1975*). Although studies 1 and 2 are correlational in nature, it is more reasonable to view the belief in free will as leading to the choice related attitudes and perceptions, rather than vice versa, especially given the timelag introduced in study 1. Hence, higher belief in free will was linked with a general tendency to view life as comprised of choices and a general positive attitude towards having choices and making decisions. Conversely, being faced with choice led people to report higher belief in free will.

A broader question concerns whether choice or free will belief is the more basic cause of the other. On conceptual grounds, we assume choice is more fundamental, as all persons (indeed many other animals too) must make choices whereas it is not necessary to form an opinion about free will. Our findings from Studies 3 and 4 are consistent with this hypothesized primacy of choice, insofar as they showed that manipulating choice causes free will beliefs to change, though of course they do not address the possibility that free will beliefs would also alter perceived choice.

Quite possibly both perceptions of choice and beliefs about free will are linked to a more fundamental motivational patterns, such as the desire for control. *Inesi, Botti, Dubois, Rucker, and Galinsky (2011)* proposed that the basic desire for control operates like thirst, increasing in drive strength independently of circumstances and seeking satisfaction in any of diverse behaviors, such as making choices or wielding power. Believing in free will may be a socially cognitive elaboration of the feeling of control that one gets from making choices.

Questions of free will have been debated for centuries, often in connection with abstruse metaphysical conceptions such as uncaused causes and immaterial but physically efficacious souls. The present findings add to a growing body of research suggesting the possibility of an alternative account of free will as being based on people's cognition and behavior related to the concept of choice (Guglielmo, Monroe, & Malle, 2009; Monroe & Malle, 2010). For ordinary folk, free will seems to have a strong cognitive link to making choices without external coercion — and enjoying the process. Possibly this reflects a pragmatic orientation. Insofar as notions of free will serve social functions, the resolution of metaphysical disputes about causation and souls is not of pressing or practical importance. In contrast, making decisions and choices is for most people a vital part of daily life. People may be highly attuned to both external and internal forces that affect their capacity to choose freely in the situations they face.

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