

The Personal Continuity Heuristic:

How Anticipating Future Outcomes Affects Identity-relevant Choices

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CONTRIBUTION STATEMENT

Prior research on consumers' identity-relevant choices has generally focused on the symbolic identity implied by the content of the chosen option, and how primarily social influences affect these choices. We propose that the identity signal in a choice can also reside in the *consistency* of choices, independent of the *content* of choices. Moreover, these choices can be volitional and proactive, as opposed to induced by social influences. Using a novel experimental paradigm that precludes important theoretical confounds, we found that current preferences for identity-relevant choices can be shaped by attitudes towards uncertain future outcomes. These findings provide fresh insight into how consumers perceive and consider identity-relevant choices, with practical implications for product/brand loyalty, novel product adoption, and brand switching.

ABSTRACT

Prior research on the role of personal identity in choices has focused on the symbolic implications of the chosen option. We propose that the consistency of choices also conveys identity signals, independent of the content of choices. We explore a novel account of when people prefer consistency or change in identity-relevant choices, the Personal Continuity Heuristic, proposing that present preferences for identity consistency can be shaped by attitudes towards future uncertainty. Specifically, we hypothesize that preference for personal continuity is enhanced by optimism about the future, whereas preference for personal discontinuity can be motivated by pessimism about the future, resulting in different identity-relevant choices. Using a novel experimental paradigm, we examined the effect of personal continuity on future anticipation (Study 1), demonstrated its consequences for consumer choices (Study 2), and tested important boundary conditions and presented initial process evidence (Study 2; 3B, 3C & 3D).

“Very often a change of self is needed more than a change of scene”

--A.C. Benson

Choices often constitute an important means of self-presentation (Kim and Drolet 2003; Oyserman 2009). Consumer researchers have long established that what we choose not only reflects what we want, but in many cases, represents either who we are (Levy 1959; Solomon 1983), or who we want to be (Berger and Heath 2007; Escalas and Bettman 2005). In this paper, we investigate when and why consumers prefer to express consistency or express change through the identity-relevant choices they make.

In the extant literature on identity and choices, the identity signal conveyed by a choice often derives from the symbolic implications of the chosen option (Levy 1959; Solomon 1983; Elliott and Wattanasuwan 1998). As such, the research focus has been on the *content* of the choices. For example, unique choices signal a unique personality (Kim and Markus 1997), virtuous choices signal a virtuous character (Khan and Dhar 2005), and depending on which social group uses a certain product or brand, adopting or abandoning a product or brand often signals desires to either become associated with, or avoid being associated with the group (Escalas and Bettman 2005; Berger and Heath 2007).

In this view, identity-relevant choices are assumed to convey who one is or wants to be at the moment, and changes in identity-relevant choices often arise in reaction to identity threats (White and Argo 2009; Guendelman, Cheryan, and Monin 2011), or to shifts in highlighted identity cues in the social environment (Leboeuf, Shafir, and Bayuk 2009), rather than due to a proactive preference for change. In fact, little is known about consumers' volitional openness to change in identity-relevant choices.

We propose that the identity-signaling value in a choice can also reside in the *consistency* of choices, which can be independent of the *content* of choices. Specifically, we explore a novel account of when people will prefer either consistency or change in identity-relevant choices, proposing that present preferences for such choices can be shaped by attitudes towards future uncertainty. We hypothesize that consumers in optimism-inducing situations may prefer consistency, and will be more likely to repeat choosing the options that they typically choose, whereas consumers in pessimism-inducing situations may prefer change, and be more likely to pick a more novel option instead. While preferences for consistency (or change) often correspond with adaptive responses to good (or bad) situations, we propose that these preferences can hold for identity-relevant choices even when these choices are causally irrelevant to the future event. In other words, optimism about the future may induce a general preference for identity-relevant choices that are consistent with the past, while pessimism about the future may yield a general preference for identity-relevant choices that are inconsistent with the past. Importantly, the proposed preferences for change are volitional and proactive, as opposed to induced by salient identity-related cues in the social context. (Reed et al. 2012).

Next, we discuss how different preferences for personal continuity can be produced by different anticipatory states of the future, and how these different preferences are expressed in identity-relevant choices. We introduce a novel experimental paradigm to elicit spontaneous anticipation about the future while precluding potential confounds. We then provide an initial demonstration of our proposed account in three studies. Last, we comment on the theoretical and practical implications of these findings.

THE ROLE OF PERSONAL CONTINUITY IN THE ANTICIPATION OF FUTURE OUTCOMES

Cognition about the future is one of our most distinctly human features, attributed to our uniquely evolved frontal lobe (Banyas 1999). As we actively form anticipations of uncertain future outcomes (Aspinwall 2010), we also attempt to exert control over the outcome (Bandura 1991), proactively pursuing desirable future outcomes and avoiding undesirable ones (Elliot and Covington 2001).

The self is a key factor in the consideration of personal outcomes. Research on agency and control (Langer 1975; Thompson, Armstrong, and Thomas 1998) has established a tendency to overestimate the impact of personal influence (e.g., one's own intentions, personal control) over other factors (eg., chance, other people) on personally relevant outcomes. Similarly, decades of research on attribution theory (Kelley 1965) has documented a prevalent bias to over-attribute behaviors to internal causes such as dispositional traits of the person over external causes such as context and situation (Jones and Davis 1965; Gilbert and Malone 1995).

Given that a person is regarded as in possession of the internal attributes (including thoughts, motives, goals and beliefs) which are seen as enabling, guiding, and constraining behavior (Fiske et al. 1998), changes in the person may have an important influence on how people think about future outcomes. Consistent with Parfit's proposition (1984) that "a person can be construed as a temporal sequence of partially overlapping selves", it has been shown that both physical continuity and the continuity of mental states play important roles in the judgment of personal continuity (Blok et al. 2005, Klein and Nichols 2012). Moreover, recent research has documented that anticipated change or stability of personal identity affects the degree to which

the future self is seen as connected to or distinct from the present self, with consequences for future-oriented motivation (Bartels and Rips 2010; Bartels and Urminsky 2011).

To the extent that the temporal continuity of a person is malleable, causal inferences from the past to the future may thereby be affected by the perceived degree of similarity between the past and future selves. When people make inferences from past outcomes to future outcomes, the strength and continuity of the causal mechanism precedes any predictions. For example, a set of earlier studies showed that people predicting the outcomes of coin tosses stopped applying the same inferences from past outcomes when the coin was swapped (Gold and Hester 2008). Likewise, when people think about their future by making inferences from the past outcomes they achieved, the degree of perceived continuity between past and future selves could affect how the future outcome is anticipated. When the past and future selves seem closely related, the person's past outcomes will seem more relevant to their future outcomes. In contrast, when the link between past and future selves is disrupted, the outcomes of the past self will seem less relevant to the outcomes of the future self.

In sum, strengthened personal continuity (eg., choosing to behave in ways that are consistent with the past, or that continue to highlight the same aspect of identity) may reinforce the sense that past events are diagnostic of future outcomes. Disrupted personal continuity (eg., choosing to diverge from one's typical behaviors, or diverting attention from the previously salient aspect of one's identity to a different aspect of identity) may undermine the feeling that past events are indicative of the future. As a result, optimism about the future may induce preferences for personal continuity, while pessimism about the future may induce preferences for personal discontinuity (figure 1). That is to say, the differences in anticipated future outcomes

may in turn color how attractive unrelated choice options appear, to the degree that they express symbolic values of personal continuity.

Insert figure 1 about here

PREFERENCES FOR PERSONAL CONTINUITY REPRESENTED IN IDENTITY- RELEVANT CHOICES

Consumer culture theory has a long tradition of examining the symbolic meanings of acquisition, consumption, possession, and disposition of consumer items (Arnould and Thompson 2005). It has been posited that material possessions are seen as extensions of the self (Belk 1988), and that “objects reveal continuity of the self” and “stabilize who we are” (Csikszentmihalyi 1993). Specifically, acquisitions of products help in creating one’s identity (Gentry, Baker, and Kraft 1995), such that holding on to past possessions and behavioral patterns are often seen as enhancing self-continuity (Csikszentmihalyi 1993; Kleine and Baker 2004), while discarding past possessions are seen as preparing for future changes and life transitions (Price, Arnould, and Curasi 2000; Young 1991).

Therefore, if a usually-purchased product has been incorporated into a consumer’s primary personal identity while a novel product represents an alternative identity aspect, then choosing between the two may be experienced as a choice between personal continuity versus discontinuity. Consider John, who not only prefers Apple products but also has incorporated that preference into his personal identity. For John to instead buy a PC not only changes the inherent

identity signal embodied in the purchase behavior – “John is a PC guy now”, but also sends a strong signal about the temporal discontinuity of his identity – “John is a different type of person now”. Thus, preferences to signal personal continuity or discontinuity may be reflected in decisions to repeat or diverge from past choices.

We have proposed that optimistic inferences about the future can induce a preference for personal continuity, whereas pessimistic inferences can prompt personal change. As a result, identity-relevant options that signal personal continuity would be more attractive under optimism-inducing circumstances, but less attractive under pessimism-inducing circumstances. In contrast, identity-relevant options that signal discontinuity would be more attractive under optimism-inducing circumstances, and less attractive under pessimism-inducing circumstances (figure 1). In sum, people making identity-relevant choices may behave as if they are seeking to thwart undesirable anticipated outcomes by adopting change, or embracing desirable future outcomes by staying the course.

EXPERIMENTAL PARADIGM: INDUCING OPTIMISM AND PESSIMISM

A key component of our framework is that the effects of optimism and pessimism on identity-relevant choices are based on the contingency between one’s own past and future events. These anticipatory states therefore hinge on an inference from past events to future outcomes, distinct from personality traits of optimism and pessimism (Scheier and Carver 1985) or positive versus negative mood (Räikkönen et al. 1999).

To systemically induce spontaneous optimistic and pessimistic anticipatory states, independently of potential confounds, we devised a novel manipulation by leveraging the two

distinct types of beliefs that have been documented in prior findings on judgments for short sequences of binary outcomes (Oskarsson et al. 2009). One belief, which holds that recent outcomes are more likely to repeat in the future (eg., the hot-hand fallacy; Gilovich, Vallone, and Tversky 1985), has primarily been shown for tasks involving skill. In this view, recent successes indicate a superior level of skill, and therefore lead to optimistic predictions of a future outcome, while recent failure leads to pessimistic predictions. Thus, a basketball player may be seen as having a good or bad day, depending on recent performance, which is expected to continue.

In contrast, the other belief, which holds that recent outcomes are more likely to be reversed in the future (eg., the gambler's fallacy, Clotfelter and Cook 1993; the stock-of-luck belief, Leopard 1978), has primarily been shown in contexts involving chance. In this view, people anticipate that random outcomes will "balance out", even in a short sequence (per the "Law of Small Numbers", Tversky and Kahneman 1971). Thus, recent failures can lead to optimistic predictions of a future outcome, while recent successes could lead to pessimistic predictions. A gambler may feel that their luck is about to run out or that they are due for a win, depending on how they have been doing.

Prior theories (Ayton and Fischer 2004) have suggested that whether people believe the process is determined by skill or chance may account for which belief is applied, although, to our knowledge this has never been systematically tested by manipulating the perceived nature of the process in a single context. In our studies, we manipulate people's causal beliefs of whether skill or chance plays a dominant role, in a single task context. This approach assumes that the degree to which skill or chance determines an outcome is ambiguous, which has been supported in empirical studies across multiple contexts (e.g. poker, Levitt and Miles 2014) fund management, Fama and French 2010).

By manipulating the believed influence of skill versus chance, the same recent outcomes will be systematically interpreted as suggesting either desirable or undesirable future outcomes (figure 2). This paradigm minimizes concerns about demand effects, since the same optimistic and pessimistic anticipatory states occur for both positive and negative recent outcomes, depending on the manipulated beliefs. Moreover, by using this paradigm we are able to disassociate optimism and pessimism from potentially confounding variables, such as mood, perceived level of skill, perceived degree of control, and internal versus external locus of control.

Insert figure 2 about here

Next, we present empirical tests of our proposed account. We first validate our basic experimental paradigm in Study 1, where we test the effect of identity continuity on the predictions for future outcomes. Then, in Study 2, we test how consumer choices between identity-relevant products differ in optimism-inducing versus pessimism-inducing situations, and identify the presence of future uncertainty as a necessary condition. In Study 3, participants play a real game, and we directly test the proposed role of personal continuity in shaping preferences for choice consistency versus inconsistency.

STUDY 1: THE ROLE OF PERSONAL CONTINUITY IN FUTURE ANTICIPATION

In Study 1A, we first validate the proposed relationship between recent outcomes and skill versus chance beliefs on anticipation of future outcomes. Then, in Study 1B, we demonstrate that identity change disrupts this relationship.

STUDY 1A: INDUCING FUTURE ANTICIPATIONS

In this study, participants read a scenario about a ball-throwing game, in which we manipulated both recent outcomes (success vs. failure) and causal beliefs (skill vs. chance), and asked participants to predict the upcoming outcome. We also varied the player's identity in the game (self vs. friend), resulting in a 2 X 2 X 2 between-subjects factorial design.

The purpose of this first study is to confirm the predicted process, in which the interaction of recent outcomes and causal beliefs induces state pessimism or optimism. We propose that when outcomes are attributed to skill, state optimism is more likely to ensue after a short sequence of recent successes, while state pessimism is more likely to ensue after recent failures. In contrast, when outcomes are attributed to chance, state optimism is more likely to ensue after a short sequence of recent failures, while state pessimism is more likely to ensue after recent successes.

Method

Participants (N=87) from a large public university in China filled out a brief questionnaire in exchange for a candy snack. Participants were asked to imagine visiting an amusement park with a friend and playing a game in which they could win a prize. The goal of the game was to throw a ping-pong ball into a basket, which was moving back and forth at a random speed (adapted from a popular Chinese amusement park game). Participants were told that the probability of scoring a basket each time was roughly 50%.

We manipulated causal beliefs, by varying the name of the game and the accompanying promotional slogan, to frame the game as either determined by chance or skill. In the skill-belief condition, the game was presented as “*Master Shooting – Some people are good at it, others are not. Want to try?*” while in the chance-belief condition, the game was presented as “*Lucky Shooting – Sometimes one is good at it, other times not. Want to try?*” Participants were told to imagine that they and a friend had decided to play six rounds together. In the scenario, either they had initially started to play or the friend had started (self vs. friend conditions), and the first player got either two hits or two misses (success vs. failure conditions). Then, participants were asked to predict whether the outcome of the next shot performed by the same player would be a hit or a miss. After that, they filled out demographic questions.

Results

We found no differences between the self and friend conditions. Therefore, we collapsed across the player’s identity in our analyses, resulting in a 2 (recent outcomes) X 2 (causal beliefs) design. As predicted, the manipulations induced different anticipations of the same future outcome. Participants were more likely to predict future success than failure (higher state optimism) after recent successes in the skill-belief condition (70%) as well as after recent failures in the chance-belief condition (57%). In contrast, participants were less likely to predict future success than failure (higher state pessimism) after recent failures in the skill-belief condition (26%) or after recent successes in the chance-belief condition (42%, figure 3). Logistic regression revealed the two-way interaction between the recent outcomes and the manipulation of causal belief type ($\beta = - 2.48$, Wald = 7.30, $p < .01$).

Insert figure 3 about here

Discussion

The results of Study 1A confirmed that inferences about the future from past outcomes depend on the type of causal belief, and provided the basic building block for us to test the effect of state optimism and pessimism on choices. In a realistically complex game setting, where both skill and chance causal attributions are presumably plausible, different predictions of the same future outcome can be systemically induced by the combination of information about prior outcomes and manipulation of causal beliefs. This validation of our basic experimental paradigm means that we can disassociate anticipatory states for future outcomes from the valence of past outcomes, which will be useful in addressing potential alternative accounts.

Manipulating the player's identity (self vs. friend) tested whether the predicted differences in anticipated future outcomes stem from a cognitive inference or from some form of motivated reasoning (Kunda 1990). The lack of difference in results when the scenario involved the self or another person playing, provides evidence against a motivational process, and suggests a broader cognitive inferential process that generalizes beyond the self.

This finding is broadly consistent with evidence for the "same person" heuristic (Lord and Gilbert 1983), which demonstrated that events happening to the same person were judged to be interconnected and more diagnostic. In contrast, they found that events happening to two different people, due to lower intrapersonal (vs. interpersonal) similarity, were judged to be less

related and less diagnostic. We have argued that it is the causal contingency between past outcomes and future events that forms the basis of people's inferences, resulting in optimistic or pessimistic states. When the player's identity changes (e.g., a second player substitutes for the first), the past events may therefore be seen as less diagnostic of future outcomes, disrupting the causal link between past and future. We test this prediction in Study 1B.

STUDY 1B: FUTURE ANTICIPATION DISRUPTED BY THE SWITCH OF IDENTITY

In Study 1B, we used the same scenario as in Study 1A, modified to test whether a change of player would disrupt the demonstrated link between observed past and predicted future events, and hence suppress optimistic or pessimistic predictions of future outcomes. We predicted that when the player changes, predictions of future outcomes would be similar across conditions, as if the sequence of events had been "reset" and past outcomes no longer seem diagnostic of future outcomes.

Method

We recruited 83 participants, using the same 2 (recent outcomes: success vs. failure) X 2 (causal beliefs: skill vs. chance) X 2 (player identity: self vs. friend) between-subjects design. Before participants were asked to predict the upcoming outcome, they were told that they had switched places with their friend, and would therefore predict the next shot performed by the other person: either the friend taking over from the participant (in the self condition), or the participant taking over for the friend (in the friend condition).

Results

As in Study 1A, we found no effect of the initial player's identity and collapsed across the self versus friend conditions, yielding a 2 (recent outcomes) X 2 (causal beliefs) design for further analysis.

Participants' predictions in all four conditions were similar and close to 50% (figure 3), such that the two-way interaction we found in Study 1A between recent outcomes and causal beliefs was no longer significant in a logistic regression on the predicted outcome ($\beta = .693$, Wald = .612, $p = .434$).

Studies 1A and 1B were parallel studies, conducted using the same population in the same time frame, using the same hypothetical scenario, hence we compare the results in Study 1A to Study 1B. We found a significant three-way interaction among recent outcomes, causal beliefs, and identity continuity ($\beta = 3.17$, Wald = 6.19, $p < .05$). The differences in predictions induced in Study 1A by the combination of recent outcomes and causal beliefs were completely suppressed in Study 1B by the change of person playing. When the personal continuity between past and future events was disrupted, the contingency between past and future outcomes was mitigated.

Discussion

These results suggest that inter-personal continuity plays a key role in the strength of the perceived link between past and future outcomes. Prior research has suggested that inferences

involving intra-personal similarity may be extended to inter-personal similarity as well (Lord and Gilbert 1983). Accordingly, we propose that the effect of maintaining or disrupting inter-personal identity continuity on anticipated future outcomes may extend to intra-personal identity continuity as well. Specifically, just as the change between different persons lead to a suppression of initial future anticipations in Study 1, a change in which aspects of the same person's identity are highlighted may also be perceived to disrupt the contingency between past and future outcomes.

Therefore, when facing future uncertainty, state optimism may make options that signal personal continuity more attractive, as if making that choice could strengthen the contingency between past and future. Similarly, state pessimism may make options that signal identity change more attractive, as if making that choice could weaken the contingency between past and future events, and hence "reset" the future outcome. We test this Personal Continuity Heuristic in Study 2, by manipulating anticipatory states of a future outcome, and examining the effect on preferences for identity-signaling choice options.

STUDY 2: FUTURE ANTICIPATION AFFECTS CHOICE CONSISTENCY

We theorized that when an uncertain future is perceived in an optimistic (or pessimistic) light, people would prefer personal continuity (or discontinuity). When given an opportunity, this preference to maintain or disrupt personal continuity could be reflected in their choices. Specifically, when choosing between an option that one usually chooses and an equally preferred but more novel option, choosing the usual option may reinforce one's currently highlighted aspect of identity, and thus enhance personal continuity. In contrast, choosing the novel option

may signal a change from the currently highlighted aspect of identity, and thus weaken personal continuity. Therefore, we predict that people will prefer the novel option to the more usual option in pessimism-inducing circumstances, and the reverse in optimism-inducing circumstances.

To test these predictions, we used choices between beverages as our main dependent variable. Picking a drink is a frequent consumer choice, and choices between consumer products can be a means to highlight a specific aspect of social identity (Belk 1988; Ariely and Levav 2000). Moreover, consumption choices are often seen as reflecting a person's sense of self (Belk 1988; Kleine, Kleine, and Kernan 1993), and such products are often marketed and perceived as representing different social identities (Fischler 1988; Valentine 1999).

We confirmed that the choice between usual and novel options has different identity implications in two brief pre-tests (N=30 each) with the same online population as in the main study. A majority of participants agree that choosing a usual (vs. novel) option reflects a shift in self-identity in general (77%) and specifically for the choice between beverages, as used in our casino scenario (90%).

Method

We collected 203 complete and valid surveys from U.S. participants in an online survey pool, each paid \$1 for participating. Eight participants (3.8%) who failed a reading comprehension check were eliminated from the data prior to analysis.

We employed a 2 (recent outcomes: success vs. failure) X 2 (causal beliefs: skill vs. chance) X 2 (future uncertainty: present vs. absent) between-subjects design. When a future

outcome is present, we predict that state pessimism will lead participants to prefer the novel option, whereas state optimism will lead participants to prefer the usual option. Extending the results of Study 1, this would be captured by a two-way ANOVA interaction effect between recent outcomes (success vs. failure) and causal beliefs (skill vs. chance) on choice.

If the different choices are motivated by different anticipations of the uncertain future state of the world, as we have proposed, then the presence of future uncertainty becomes an important boundary condition. Accordingly, we predict that when no related future outcome follows in the sequence of events, anticipations are not formed and preferences for identity-relevant choices would therefore not vary across conditions. This is tested in the future-uncertainty-absent conditions.

In the study, participants were asked to imagine they were playing Blackjack in a Las Vegas casino, a game that plausibly contains aspects of both skill and chance (Wagenaar 1988). First, they were shown a pamphlet, which introduced the rules of blackjack, featuring photos and highlighted quotes from previous winners that emphasized the role of either skill or chance in the game, as a manipulation of causal beliefs. They then read a scenario about playing a few rounds of Blackjack, in which both the recent outcomes and presence of future uncertainty were manipulated.

In conditions where the uncertain future outcome is present, participants read:

“You have decided to buy five \$10 chips, each for one round. You decide that if you win, you’ll put the reward in your pocket, and if you lose, you’ll play another round with a new chip, but you won’t bet any chips you’ve won and put in your pocket. In each round, you’re the only player at the table. You plan to play only five rounds and redeem whatever you have in your pocket when you leave.”

Next, the recent outcomes were manipulated by having participants either read about experiencing a winning streak or read about a losing streak:

“Ten minutes later, having bet four chips and found yourself winning [losing] in each of the rounds, you want to bet the last chip on the table. But before you make the last bet, you suddenly feel thirsty. A waitress comes over and asks you if you want to be served. Which drink would you order now?”

Participants then made a choice between two counterbalanced options: *“the drink that you usually like and often order”* or *“an unusual drink that you have never tried before but have always wanted to”*.

The other half of the participants, in the future-uncertainty-absent conditions, read an almost identical scenario, except that they were told that at the beginning they had only bought four chips (instead of five) and had therefore stopped playing after winning or losing all four chips. They were also asked to make the same choice between drinks, described as occurring before leaving the casino.

Results

First, when participants faced future uncertainty (i.e. a pending future outcome) we observed the predicted effect of recent outcomes and causal beliefs on choices between the two drinks. The choice between a usual and novel drink was predicted by an interaction between recent outcomes and causal beliefs (logistic regression $\beta = 1.78$, Wald = 4.22, $p < .05$). That is, conditions inducing state pessimism gave rise to higher choice share of the novel drink, whereas conditions inducing state optimism gave rise to higher choice share of the usual drink (figure 4).

Insert figure 4 about here

In contrast, when no future outcome was pending, no interaction was found ($\beta = -1.51$, Wald = 2.20, $p = .138$; figure 4). We conclude that without a pending future outcome, neither pessimism or optimism were induced, and therefore the combination of recent outcomes and causal beliefs did not induce a preference for either identity continuity or identity change. The three-way interaction between recent outcomes, causal beliefs, and the presence of a future outcome was significant ($\beta = -3.29$, Wald = 6.07, $p < .05$).

Discussion

As predicted, when a future outcome was pending, people were more likely to choose novel options in pessimism-inducing conditions, and more likely to choose usual options in optimism-inducing conditions. In other words, state optimism increased choice consistency, whereas state pessimism increased choice inconsistency.

Study 2 provides initial evidence that people's identity-relevant choices can be affected by anticipations of future uncertainty, even when the choice bears no causal relation to the future outcome. Specifically, the act of ordering a beverage is arguably causally irrelevant to one's win or loss in an upcoming hand of blackjack, but such choices often convey self-presentation (Belk 1988; Kleine, Kleine, and Kernan 1993). Thus, the act of choosing a drink affected perceived personal continuity.

We tested whether our results could be related to a belief in “karmic investment,” whereby virtuous behaviors are believed to yield more desirable outcomes in the future (Converse, Risen, and Carter 2011). A subset of the participants (N=118) identified the specific usual and novel drink options they were thinking of, after the main study. Participants’ ratings of the degree to which virtuous traits (eg., indulgence and healthiness) were signaled by the drinks did not differ across conditions, and did not correlate with choices. Thus, participants did not associate the novel drinks or the drinks they chose with higher degree of virtuousness. We also found no relationship between our findings and a general belief in luck, suggesting that the effect was not driven by superstitious people.

In interpreting this study, we argued that the observed effects on choices of a novel versus usual consumer product are explained by preferences for signaling personal continuity or discontinuity. In the next study, we directly test choices that signal personal continuity versus personal discontinuity, and contrast those with other choices that signal non-identity-relevant continuity or discontinuity.

STUDY 3: PREFERENCES FOR PERSONAL CONTINUITY UNDERLIE DIFFERENCES IN CHOICES

We designed a ball-rolling game in which participants would actually experience the prior outcomes. A table was marked with a red starting line on one side near the edge, and ten small rubber erasers were scattered in a blue target area at the center of the opposite end. Participants rolled an irregularly shaped rubber-band ball from behind the red line, trying to land the ball inside the target area (figure 5). This game incorporates elements of both skill (the

participant's aim and force of the roll) and chance (the irregularly-shaped ball and the rubber erasers), allowing us to plausibly manipulate causal beliefs. All participants were told that approximately 50% of rolls succeed, based on initial testing.

Insert figure 5 about here

The study is composed of four separate parts. We first recruited participants from an online subject pool in Study 3A, and elicited their prediction of the future outcome in the game scenario, in order to validate our manipulations in this setting. Then three parallel versions of the game (Studies 3B, 3C and 3D) were tested in three sequential waves in the same research lab, using the same population and following the same manipulation paradigm. In each of the three studies, we gave participants a different causally irrelevant choice between options representing continuity or discontinuity during a mid-game break, which was the primary dependent variable. In Study 3B, the choice was directly related to one's self-identity. In Study 3C, the choice was not related to one's self-identity, but related to changes between the identities of other people, who were not involved in the game. In Study 3D, the choice was unrelated to identities, but relevant to an element of the game. Participants for Study 3B, 3C and 3D were all run individually using the same lab and experimental setup, by the same research assistant who was blind to the hypotheses.

STUDY 3A: PREDICTIONS

We first confirmed that participants' predictions of the future outcome in this game are jointly determined by the interaction of recent outcomes and causal beliefs. We used a sample that did not actually play the game, since factors such as wishful thinking (Bar-Hillel and Budescu 1995) or concerns about "tempting fate" (Risen and Gilovich 2008) might impact stated predictions, particularly when playing the game for monetary stakes.

Method

Participants (N=61) completed a Mechanical Turk survey for \$1.50. Four additional participants (6.1%) failed a reading comprehension test and were excluded before analysis. The results with these participants included are very similar. We manipulated recent outcomes (success vs. failure, within-subjects) and causal beliefs (skill vs. chance, between-subjects).

Participants first saw pictures of the game and read the basic rules of how to play and then read additional information stressing either the role of skill in the game or the role of chance in the game. In the skill-belief condition, participants read:

*"In this game, **skill** plays a vitally important role. Each time you roll the ball, your strength and choice of direction may determine the result. Having a clear goal in mind before rolling may also help with the result. What you need to do is to plan carefully where you want the ball to land. Your outcome in this game will depend on both your skill and your precision."*

In the chance-belief condition, participants instead read:

*"In this game, **chance** plays a vitally important role. Although it may feel as if how you roll the ball determines where it will go, where the ball ends up and its path each time is*

essentially random. This is because of the irregular shape of the ball, and because minor differences in the angle and the speed at which the ball hits each of the erasers can send it in a completely different direction. So, no matter how you roll the ball, every play of the game can be different by chance. What you can do each time is to try your luck and see what happens. The outcome will depend on whether the ball happens to go in the right direction each time it encounters an obstacle.”

Participants were then asked to imagine that they had tried three times and had either three hits or three misses in a row (counterbalanced within-subjects), and reported how optimistic or pessimistic they would be about the next outcome in each case. Participants indicated their answers using a sliding bar, on an 11-point scale from “very pessimistic” to “very optimistic”. As a manipulation check, participants then rated how much of a determining role they believed chance or skill played in the game on a 7-point scale from chance (1) to skill (7).

Manipulation check

The causal beliefs manipulation affected beliefs about whether the outcomes of the ball-rolling task were more determined by skill or chance. Participants’ ratings on the chance-to-skill scale were higher (reflecting more belief in skill) in the skill-belief than chance-belief condition (5.9 vs. 2.7, $F(1,59) = 86.0, p < .001$).

Results

Participants were more optimistic after recent successes in the skill-belief condition ($M = 6.30$, $SD = 2.37$) as well as after recent failures in the chance-belief condition ($M = 6.38$, $SD = 2.04$). In contrast, participants were more pessimistic after recent failures in the skill-belief condition ($M = 5.09$, $SD = 2.35$) or after recent successes in the chance-belief condition ($M = 5.88$, $SD = 2.00$). ANOVA analysis revealed the same two-way interaction between information about recent outcomes and manipulation of causal beliefs on participants' prediction of the future outcome ($F(1, 59) = 6.82$, $p < .05$, $\eta_p^2 = .12$) as in Study 1A, validating our experimental paradigm in the context of the ball-rolling game. Specifically, the manipulation reliably induced state optimism and pessimism independently of the prior outcomes.

STUDY 3B: THE EFFECT OF FUTURE ANTICIPATIONS ON IDENTITY-RELEVANT CHOICES

Next, we test whether manipulating optimism and pessimism (by manipulating causal beliefs and observing prior outcomes) during the ball-rolling game impacts people's choice whether to signal personal continuity or discontinuity.

Method

Participants ($N = 76$) were recruited to take part in the experiment at a research lab in a large mid-western city for \$3. A single research assistant conducted two seemingly unrelated studies with each participant individually: the ball-rolling game and a survey on personal identity. Five participants (4 in Study 3B, 1 in Study 3C) who indicated in a debrief that the

studies were linked were eliminated, although the findings were very similar when these participants were included.

Participants first filled out a one-page “Self-Identity Survey”, in which they were asked to list three different aspects of their personal identity:

“People have multiple aspects of self-identity. For example, a person may describe herself as a first-year medical student, a daughter, a firm environmentalist, and so on. Please write down the identities that you think represent you, and list at least three different aspects of your identity.”

Next, participants were asked to choose one of the identities they had listed and briefly describe that aspect.

The experimenter then showed each participant to another room to play the ball-rolling game, which was presented as a pre-test for a future study. He told each participant that after one practice roll, they would play seven rolls in the game and could win a prize of \$1 by scoring at least four times. After the practice roll and three “real” rolls, the experimenter asked the participant to stop and give feedback on their impressions of the game. As part of the feedback survey, participants read the paragraph pretested in Study 3A, which characterized the game as based on either skill or chance. Participants were then asked if the ball-rolling game reminded them of another game, and to list the name of the other game, if any.

Before resuming the game, the experimenter asked participants to finish filling out Part 2 of the Self-Identity Survey, wherein we measured the main dependent variable:

“Now please again take some time to think about your multiple identities. Please choose one of your multiple identities and describe yourself in detail about one of them below. What would you like to write about?”

- A. *I'd like to write more about the identity I have described earlier.*
- B. *I'd like to write about a different identity of myself."*

Participants then wrote a paragraph about the chosen aspect of identity, and went on to play the last 4 rolls of the game, completed demographics and potential covariate measures, and were paid based on their performance.

We predict that participants will prefer to write about the same aspect of self when circumstances imply an optimistic future outcome, signaling continuity of identity, but will prefer to write about a novel aspect of identity when circumstances imply a pessimistic future, signaling discontinuity of identity.

Manipulation checks

Study 3A confirmed that the manipulation affected causal beliefs. We also collected data about causal beliefs at two points in Studies 3B-3D, once in the mid-game break, and again after the game was finished. First, immediately after participants read the mechanism information during the mid-game break, they were asked to list another game they thought was similar to the ball-rolling game, and 81% of participants listed a game. Pooling across Studies 3B, 3C and 3D, these suggested games were rated by a coder who was blind to the hypotheses as more determined by skill in the skill-belief condition than in the chance-belief condition (3.46 vs. 3.05, $F(1, 184) = 11.12, p < .05$). Participants' own ratings of the game in Studies 3B, 3C and 3D, when they were done playing, indicated more of a perceived role of skill in the skill-belief conditions than in the chance-belief conditions (5.42 vs. 4.38, $F(1, 228) = 26.17, p < .001$). We found no differences in the manipulation checks between Studies 3B, 3C and 3D.

Performance

In the first four rolls (before the break in the game), 20% of participants made no hits, 35% made one hit, 31% had two hits, 13% had three hits, and 1% made all four hits, across Studies 3B, 3C and 3D. In other words, roughly half of the participants did poorly with zero or one hit (55.1%), below the success rate needed to win the reward, while the other half did well, with two or more hits (44.9%). No differences in performance were found between the skill-belief and chance-belief conditions (3.20 vs. 2.75, $t(74) = 2.23$, $p = .22$).

Choices Between Identity-Continuity and Discontinuity

Our participants listed a variety of aspects of themselves in the initial “Self-Identity Survey”. For example, one participant described himself as “*reader, cyclist, and foodie*,” while another listed “*artist, engineering student, only child*”. After the mid-game break, 37.2% of all participants chose to elaborate about the same aspect of the self, while 62.8% of them chose to write about a different aspect of the self.

The predicted effect emerged in a two-way interaction between observed prior outcomes and the manipulation of causal beliefs on the choice of self-descriptions in a logistic regression ($\beta = .575$, Wald = 4.56, $p < .05$; figure 6). More participants chose to describe the same aspect of the self in optimism-inducing conditions (doing well in the skill-belief condition or doing poorly in the chance-belief condition). In contrast, more participants chose to describe a different aspect of the self in pessimism-inducing conditions (doing poorly in the skill-belief condition or doing

well in the chance-belief condition). In other words, state optimism gives rise to a stronger preference to describe oneself in a manner that signals continuity of identity, while state pessimism gives rise to a stronger preference to describe oneself in a manner that signals a shift in identity.

The differences in choices had no effect on performance. Whether choices were consistent versus inconsistent with the predicted pattern did not affect subsequent performance to win the prize (1.64 vs. 1.65, $t = -.052$, n.s.). In contrast, since superstitious rituals have been shown to have a performance-enhancing effect (Damisch, Stoberock, and Mussweiler 2010), our findings are further distinguished from superstitious beliefs.

Discussion

These results are consistent with our account, in which people's preference for expressing consistency of identity depends on their optimistic or pessimistic anticipation of future outcomes. However, there are a few alternative accounts to address.

First, might participants have chosen to describe a different aspect of themselves in the pessimistic situations in order to spontaneously affirm themselves or elevate their mood in their second writing task, consistent with self-affirmation theory (Steele 1988) or mood management (Forgas, Johnson, and Ciarrochi 1998)? If so, then participants in the pessimism-inducing conditions should have chosen a more positive aspect of their identity for the second self-description. Based on an independent coder's ratings of the participants' first and second self-descriptions, we found no difference in any of the measures (positivity, virtuousness or boasting) between the first and the second descriptions, overall or by condition or choice. This suggests

that the results cannot be explained by motivations related to spontaneous self-affirmation or mood management.

Second, research has shown that people are more likely to perceive illusory patterns, find illusory correlations, or engage in superstitious rituals when they lack control (Whitson and Galinsky 2008), potentially as means to regain control over the situation and reduce anxiety (Brooks et al., 2013). Could the manipulations have caused differences in the perceived level of control across conditions, prompting participants to choose change in the pessimism-inducing conditions to reassert control? Contrary to this account, we found no significant differences across conditions in the post-game ratings of perceived control, and the ratings did not moderate participants' choices. Likewise, we found no difference in the independent coder's ratings of the level of control exhibited in the first versus second self-descriptions, either by condition, by choice, or overall.

Next, we report the results of two parallel studies, which test boundary conditions of these results, by again giving people choices between continuity and discontinuity, either involving identities of other people unrelated to the game (Study 3C), or involving non-identity-related elements of the game (Study 3D).

Insert figure 6 about here

STUDY 3C: NO EFFECT ON CHOICES INVOLVING NON-SELF-RELEVANT IDENTITY

In Study 3C, we substituted the choice between describing the same or a different aspect of oneself used in Study 3B with a choice between describing the same other person, or two different other people. If differently anticipated future outcomes affect the attractiveness of the choice options via preferences to maintain versus disrupt personal continuity, as we theorized, then only choices that are relevant to self-identity should be affected.

Method

The procedure in Study 3C (N=78) was identical to Study 3B, except that participants received a questionnaire named “Social Cognition Survey” in the initial survey, in which they first read:

“People see numerous strangers in passing every day. For example, a doorman, a busy cashier, a passenger on the bus or train, and so on. Please think about the strangers that you have seen for a moment today, and list at least three different persons you have noticed.”

After they listed three different people, they chose one and briefly described that person. Then on the second questionnaire participants received in the mid-game break, they chose between describing that same person or describing one of the other two people in detail.

Results

Participants' performance in the game was similar to that in Study 3B (table 1). In contrast with Study 3B, there was no effect of recent outcomes and causal beliefs on the choice between consistency and inconsistency (logistic regression $\beta = -.044$, Wald = .036, $p = .850$; figure 6). These results support our claim that it is specifically self-relevant choices that are affected by future anticipations. However, it is also possible that continuity or disruption of any game-relevant factor would yield a similar effect. In order to test this conjecture, we conducted Study 3D, in which participants chose between maintaining or changing an element of the game itself.

STUDY 3D: NO EFFECT ON CHOICES FOR GAME-RELEVANT ELEMENTS

In Study 3D, rather than choosing between describing the same or a different aspect of the self, participants chose whether to keep or switch the rubber-band ball used in the game. As in Studies 3B and 3C, this is a symbolic choice, because the balls only differed in their colors, but otherwise had the same irregular shape (figure 3), such that using one or another would not make a difference for performance in the game. According to our account, self-identity plays a unique role in inferences from past to future, and therefore a symbolic choice involving change which does not involve self-identity will not be affected by differently anticipated future outcomes.

Method

In this study, there was no separate survey. Instead, at the start of the game, participants (N=78) were shown three otherwise identical rubber-band balls in the colors of yellow, blue, and orange, respectively, and randomly assigned to use one in the game. During the mid-game break, they were given a choice to either keep using the same ball, or replace it with one of the other two. The rest of the procedure was identical to Studies 3B and 3C.

Results

Participants' performance in the game was similar to those in Study 3B and 3C (table 1). There was no significant interaction between recent outcomes and the manipulation of causal belief on choices between keeping the same ball or changing the ball (logistic regression $\beta = -.251$, Wald = .799, $p = .371$), suggesting that state optimism and pessimism did not affect choices. These results indicate that relevance to one's personal identity is necessary for the choice to be differentially affected by inferences about future uncertainty.

As a further test, we merged the data in Studies 3B, 3C and 3D. Comparisons of the common measures (demographics, game outcomes, manipulation checks and other individual differences) confirmed that there were no significant differences across the three versions. Therefore, we compared the results among the three waves, revealing a three-way interaction among recent outcomes, causal beliefs, and self-relevance of the choice options ($\beta = -.676$, Wald = 4.561, $p < .05$; figure 6), based on finding the predicted effects in Study 3B and a significant debiasing of these effects in Studies 3C and 3D.

Discussion

Overall, the results of Study 3 provide strong support for our hypotheses. Facing future uncertainty, people spontaneously form anticipations of the future outcomes, partly drawing on an interaction between recent outcomes and causal beliefs. The resulting optimism or pessimism about the future outcomes, in turn, affects the attractiveness of choice options that signal continuity or disruption of personal identity. Signaling continuity of identity, which can facilitate the existing inference from past to future outcomes, is preferred when those inferences generate optimism. In contrast, disrupting the continuity of one's own identity, which can in turn disrupt inferences involving the self, is preferred when those inferences yield pessimism. As a result, state optimism prompts choice consistency for identity-relevant options, which reflects a preference for personal continuity, while state pessimism prompts choice inconsistency, which reflects a preference for personal change. These findings are specific to self-relevant choices -- situations leading to optimism or pessimism about future outcomes do not affect preferences for change or consistency in non-self-relevant choices.

GENERAL DISCUSSION

In the face of a largely uncertain future, people typically have two spontaneous instincts: to predict what will happen, and to exert control over what will happen (Heider 1958; White 1959). In a series of studies, we provide the first evidence that the anticipation of uncertain future outcomes affects preferences for identity-relevant products, which reflect preferences for personal continuity or change. Specifically, when an optimistic future outcome is anticipated based on prior outcomes, people prefer options reflecting personal continuity, whereas

anticipating a pessimistic future outcome leads to a preference for options reflecting personal discontinuity. Using a novel experimental paradigm, we have examined the effect of the Personal Continuity Heuristic on future anticipation (Study 1 and Study 3A), demonstrated its consequences for consumer choices (Study 2), and tested important boundary conditions (Study 2; Study 3B vs. Studies 3C and 3D) to explore the underlying psychological mechanism.

It is important to note the distinction between state optimism/pessimism that we examined in this paper, and trait optimism/pessimism. Trait optimism and pessimism persist over time, are independent of specific anticipated future outcomes (Scheier and Carver 1985; Kluemper, Little, and Degrout 2009), and have been linked to variation in stable individual characteristics including perceived control (Darvill and Johnson 1991). We argue that state optimism or pessimism, in contrast, does not necessarily relate to any of these constructs, and our measures of these factors did not account for any of the findings.

Moreover, anticipatory states also differ from affective states, which can be affected by both anticipated future outcomes and experienced prior outcomes (Strathman et al. 1994). We measured mood in Study 2 and Study 3 and did not find any effects on our results.

Neither did we find direct evidence of magical thinking (Vyse 2013) underlying our effects, as noted earlier. Instead, our findings may be best understood as a novel form of “quasi-magical thinking” (Shafir and Tversky 1982), where people act as if their actions influence an outcome, even though they do not really hold that causal belief. These findings may be attributable to a fundamental confusion between causal contingency and diagnostic contingency, such that people behave as if actions that are merely correlated with a particular outcome actually cause that outcome (Quattrone and Tversky 1984; Shafir and Tversky 1982). In everyday life, there often is a causal link between a person’s past and future events, as reflected

in proverbs such as “you reap what you sow”. Our findings might reflect an over-generalization of the causal contingency between change in the self and change in the outcome. When the continuity between the agent in the past and the agent in the future is disrupted, it may seem as if the contingency between past and future outcomes is also disrupted, even when no causal link exists.

Future implications

Our findings provide a novel perspective that complements two major lines of prior research: one on the psychological mechanisms of coping with threat, and the other on identity-relevant consumer choices.

Research has documented a variety of psychological mechanisms to either cope with experienced threats or prepare for expected threats (Miller, Brody, and Summerton 1988), including resurrecting control (Whitson and Galinsky 2008), self-esteem restoration (Greenberg, Pyszczynski, and Solomon 1986), and self-affirmation (Steele 1988). Our findings suggest that choices of identity-relevant options in the present could be interpreted as a distinct coping mechanism for some anticipated future threats. When the combination of past outcomes and causal beliefs yields pessimism about the future, people tend to choose an identity-disrupting option, as if the identity-disrupting signal invalidates the inference and reduces pessimism. Future research might develop this possibility further, investigating proactive coping mechanisms that minimize the perceived likelihood of anticipated threats occurring.

In research on consumers’ identity and choices, changes in the social context have been shown to lead to changes in a wide range of identity-relevant choices (Reed et al. 2012). In

comparison, little is known about when it is that consumers will volitionally and proactively prefer identity-relevant changes, irrespective of social influences. Our research provides initial evidence that optimism (vs. pessimism) about future outcomes may lead to a generalized preference for choice consistency (vs. change) for identity-relevant products. In fact, our results suggest that preferences for choice consistency can be systemically affected by considerations that are orthogonal to the content of choices.

The Personal Continuity Heuristic we have identified in this paper may have important implications for theories of how consumers make product or brand decisions. Everyday consumption decisions often carry symbolic identity implications (Kleine, Kleine, and Kernan 1993). Research on consumer culture theory has demonstrated that the symbolic implications of the products we use can influence consumer behaviors (Arnould and Thompson 2005), as they are incorporated into the self (Belk 1988) and influence the perceived continuity of the self (Csikszentmihalyi 1993). Our findings build on these views, to suggest that consumers may spontaneously incorporate the identity-relevant consequences into decisions about identity-signaling products.

Our findings may also have implications for how consumers resolve conflict between product loyalty and novel product adoption, or between brand loyalty and brand switching. Prior research has examined consumers' stable traits such as the need for change (Wood and Swait 2002) and the need for novelty (Acker and McReynolds 1967) on consumers' openness to adopt innovative products. Our research suggests that fleeting situational factors, independent of the satisfaction with or the valuation of a product, may likewise impact whether consumers prefer to repeat purchasing and signal continuity, or to adopt novel products and signal discontinuity of identity. In a recent review of research on consumers' identity-based motivation, Oyserman

(2009) concluded that, "...products associated with identity-based concerns are more likely to have a loyal consumer base." However, precisely because product and brand loyalty can signify a high level of identity-continuity, when prevalent pessimism about the future arises among consumers based on prior outcomes, identity-relevant products and brands might be more susceptible to consumer defection.

While change may be the only constant in life, as Heraclitus once noted, it has not been well understood when change will be welcomed and when change will be disliked. In fact, theories of human behaviors often seem at odds with each other on this issue. Some research has argued that people prefer constancy, seeking opportunities to validate the self and to emphasize the consistency and continuity of their attitudes and behaviors (Esptein 1991). On the other hand, people also initiate fresh starts in life, often employing opportunities symbolically associated with changes (Dai, Milkman and Riis, 2013) and actively instigating a change in the self. In this research, we have identified one specific process influencing preferences about change, in which spontaneously anticipated future outcomes affect preferences for continuity or discontinuity expressed in identity-related choices. However, this research is only a first step towards understanding these preferences and the resulting behaviors, which are complex and likely to be multiply determined. As William Arthur Ward has observed, "change, like sunshine, can be a friend or a foe, a blessing or a curse, a dawn or a dusk." Much work remains before we fully understand when it is that people will behave as if change heralds the onset of dusk, and when they will welcome change as a new dawn.

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TABLE 1. COMPARISON OF PERFORMANCE IN STUDY 3B, 3C AND 3D

	Gender	Age	First 4 rolls	Last 4 rolls	All 8 rolls
Study 3B (N = 75)	Male = 51%	30.7 (12.1)	1.34 (.960)	1.64 (1.09)	2.99 (1.60)
Study 3C (N = 77)	Male = 56%	27.9 (10.9)	1.37 (1.02)	1.69 (1.09)	3.06 (1.59)
Study 3D (N = 78)	Male = 58%	29.6 (10.6)	1.47 (.950)	1.42 (1.10)	2.90 (1.40)
One-way ANOVA across studies	$F = .756,$ $p = .473$	$F = 1.77,$ $p = .177$	$F = .390,$ $p = .677$	$F = 1.35,$ $p = .262$	$F = .231,$ $p = .794$

FIGURE 1. FRAMEWORK: FUTURE ANTICIPATION AFFECTS PREFERENCES FOR PERSONAL CONTINUITY, AND HENCE IDENTITY-RELEVANT CHOICES.

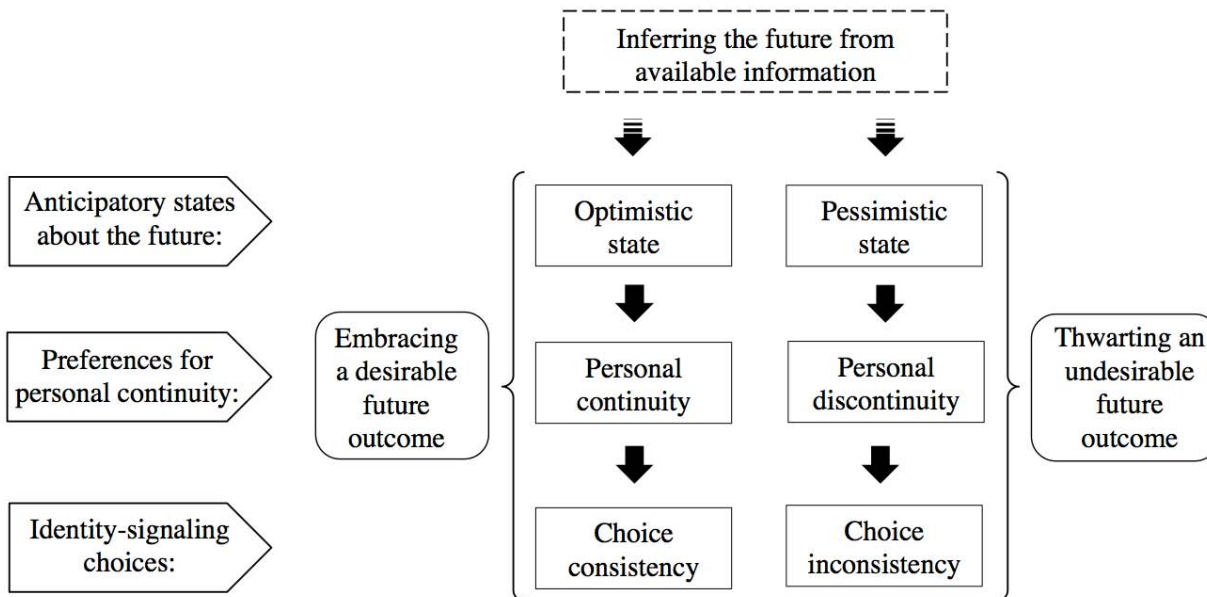


FIGURE 2. EXPERIMENTAL PARADIGM: INDUCING FUTURE ANTICIPATIONS FROM RECENT OUTCOMES AND MANIPULATED CAUSAL BELIEFS

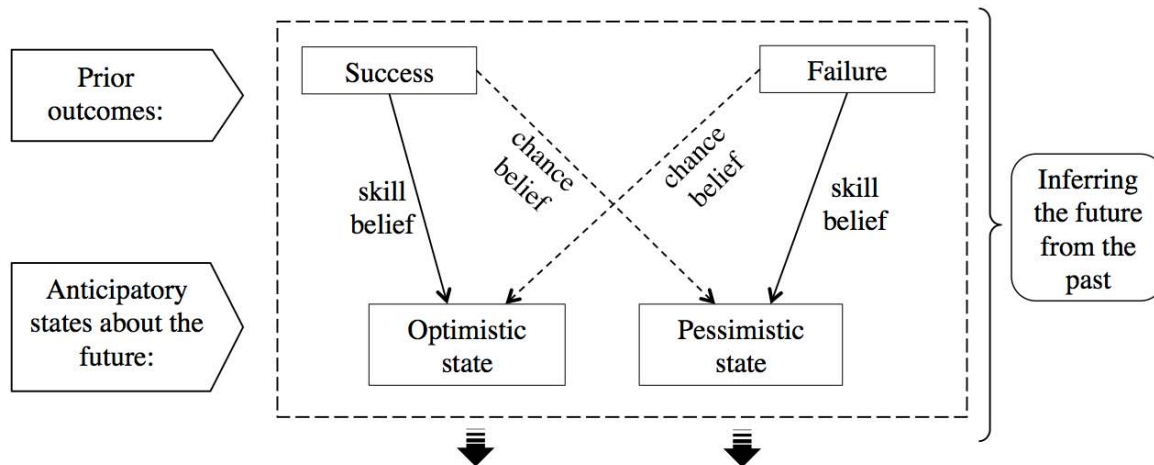


FIGURE 3: EFFECT OF PLAYER CONTINUITY, PRIOR OUTCOMES AND CAUSAL BELIEF ON OUTCOME PREDICTION

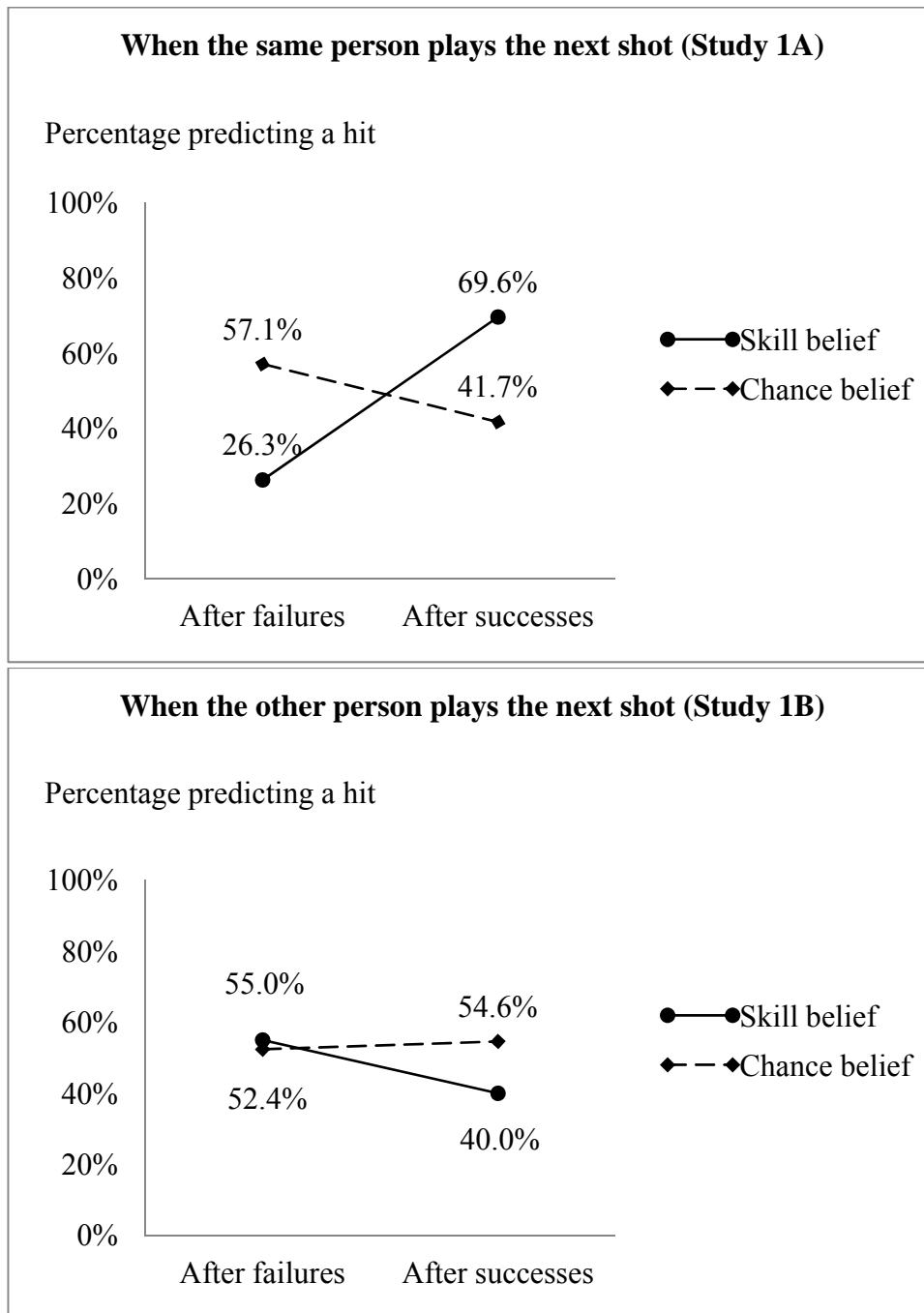


FIGURE 4: EFFECT OF PRIOR OUTCOMES AND CAUSAL BELIEF ON CHOICES

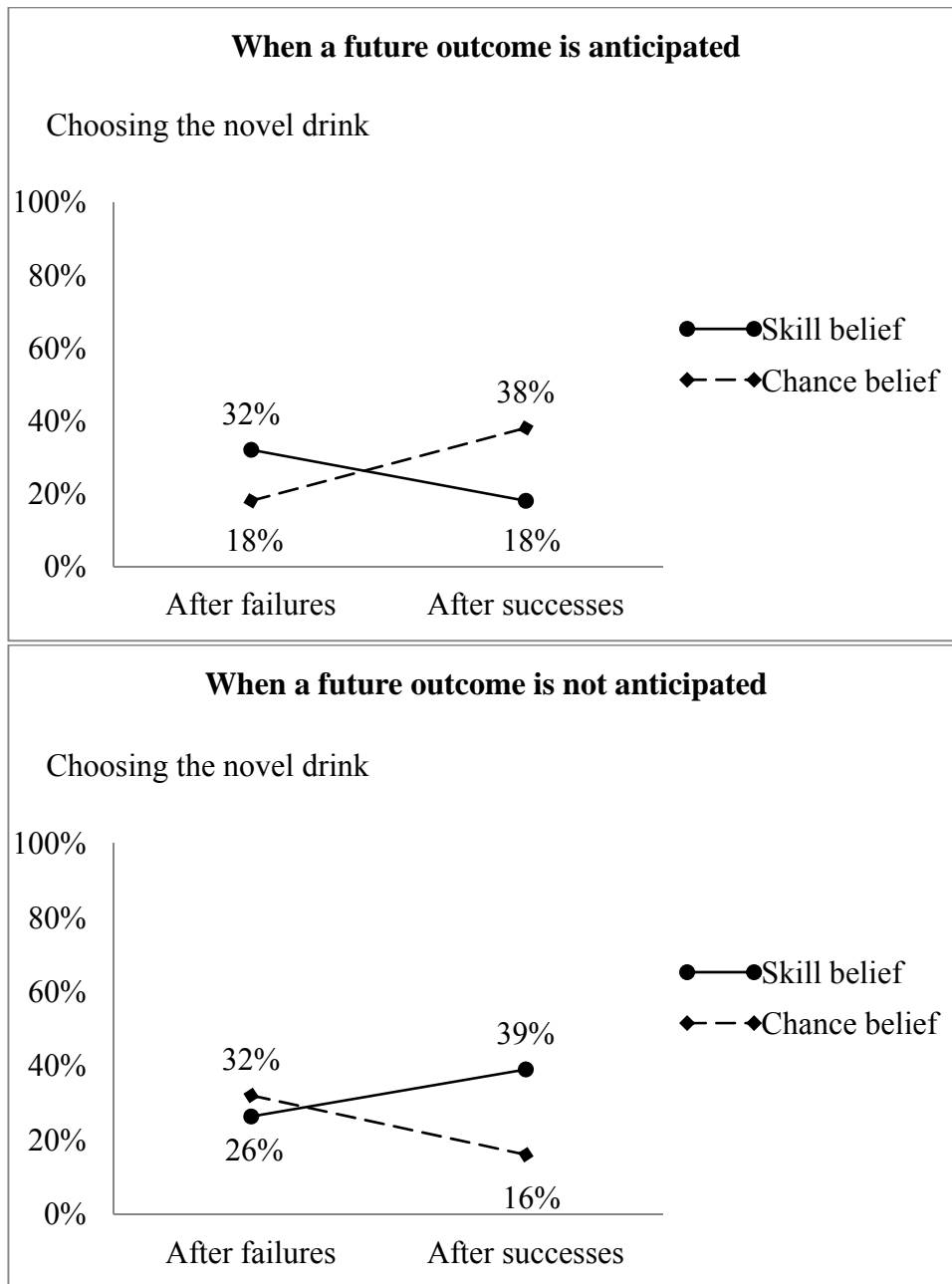
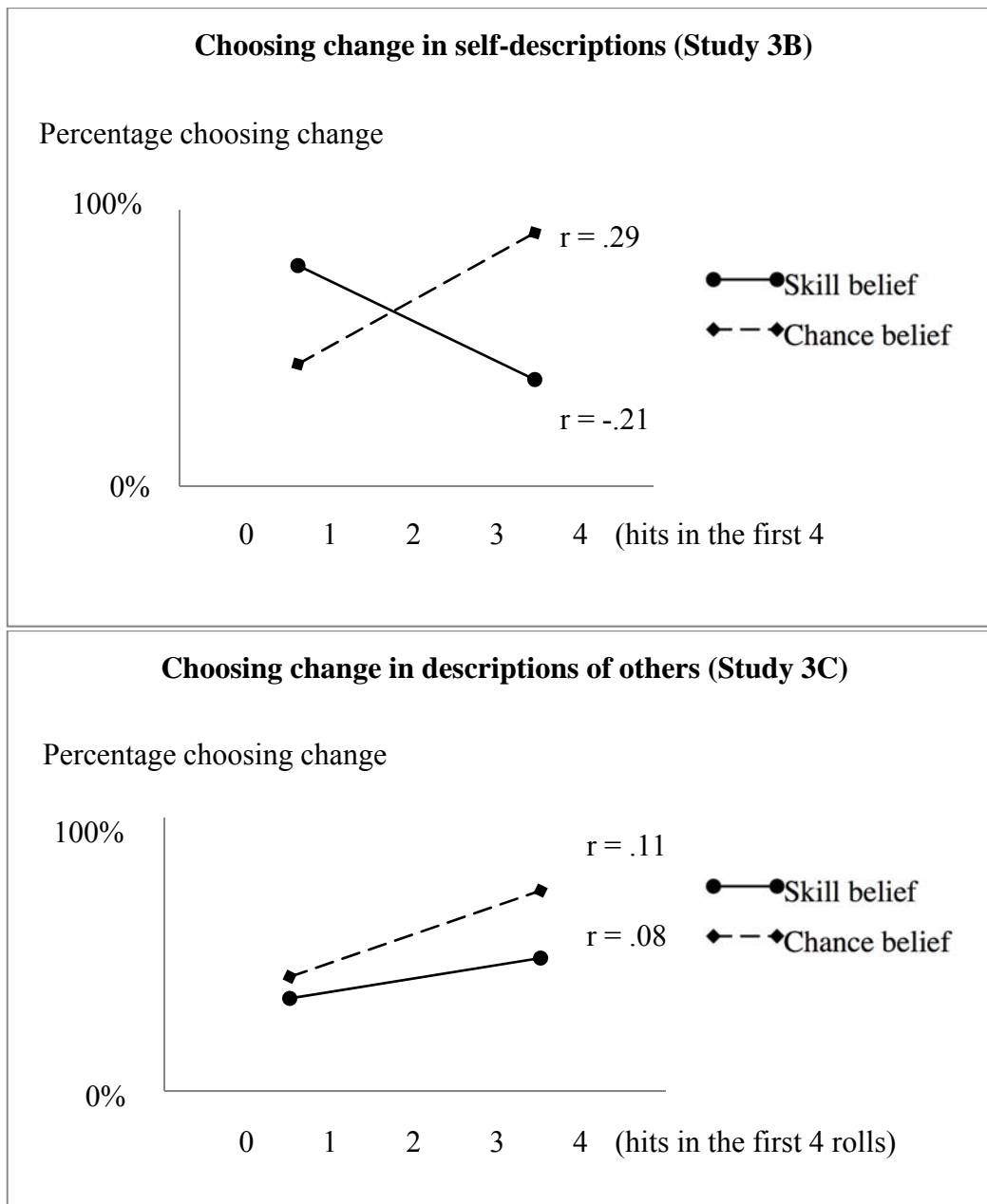
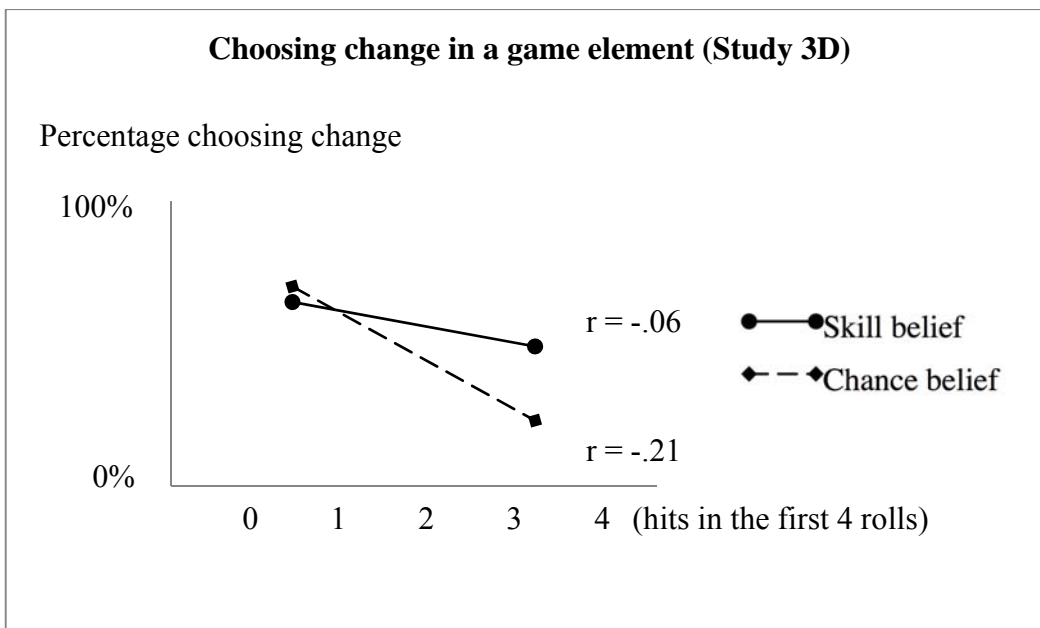


FIGURE 5. DESIGN OF THE BALL-ROLLING GAME IN STUDY 3.



FIGURE 6: EFFECT OF PRIOR OUTCOMES AND CAUSAL BELIEF ON PERSONAL IDENTITY RELEVANT CHOICES





Online Appendix – Supplemental Materials

STUDY 1

1.1 Study 1 Detailed Statistical Results

TABLE 1. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS PREDICTING A HIT WHEN THE *SAME* PERSON WILL MAKE THE NEXT SHOT (STUDY 1A).*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	1.317	0.683	3.725	0.054
Number of hits	4.337	1.508	8.274	0.004
Belief x hits	-2.480	0.918	7.301	0.007
Constant	-2.347	1.131	4.303	0.038

TABLE 2. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS PREDICTING A HIT WHEN THE *OTHER* PERSON WILL MAKE THE NEXT SHOT (STUDY 1B).*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	-0.105	0.627	0.028	0.867
Number of hits	-1.299	1.420	0.838	0.887
Belief x hits	0.693	0.886	0.612	0.434
Constant	0.306	0.999	0.094	0.759

TABLE 3. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS PREDICTING A HIT (STUDY 1A & STUDY 1B).*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	2.740	1.502	3.327	0.068
Number of hits	9.973	3.333	8.954	0.003
Switching	2.653	1.510	3.088	0.079
Belief x hits	-5.654	2.038	7.694	0.006
Belief x switching	-1.423	0.927	2.357	0.125
Hits by switching	-5.636	2.071	7.407	0.006
Belief x hits x switching	3.174	1.276	6.189	0.013
Constant	-5.000	2.474	4.085	0.043

*Belief manipulation = 1 if skill, 2 if chance

Number of hits = either 0 (loss) or 2 (win)

Switching = 1 if same player, 2 if different player

STUDY 2

2.1 Study 2 Pre-tests

We conducted three different versions of pretests. The results of all three versions supported the identity relevance of the choice between drinks used in the scenario.

Pre-Test Materials

1. Choice between usual and novel options:

“Consider a person choosing between two options, one that the person usually chooses and one which the person has never chosen before. Which option would make the person choosing it more of a different person?”

A. The drink that you usually like and often order

B. An unusual drink that you have never tried before but have always wanted to”

Between these two options, which choice do you think would make you feel like a more different person?”

2. Choice between usual drink and novel drink:

“Imagine that you are on vacation in Las Vegas. While at a casino, you feel thirsty. You have two options to choose from for a drink:

A. The drink that you usually like and often order

B. An unusual drink that you have never tried before but have always wanted to

Between these two options, which choice do you think would make you feel like a more different person?”

3. Five-point scale:

“Indicate the degree to which you agree with each of the statements below:

- 1. The more different people are, the more different their choices will be, even in the same situation*
- 2. When a person makes inconsistent choices, the choices may reflect different facets of the person's identity*
- 3. The choices a person makes does not reflect what kind of a person he or she is at all (-)*
- 4. Choices only reflect a person's tastes, but not the person's personality or identity (-)*
- 5. When someone starts making very different choices from before, they start to seem almost like a different person*
- 6. When someone changes as a person, there is usually very little difference in the choices the person makes (-)”*

Pre-Test Results

We confirmed that the choice between usual and novel options has different identity implications in two brief pre-tests (N=30 each) with the same online population as in the main study. A majority of participants agree that choosing a usual (vs. novel) option reflects a shift in self-identity in general (77%) and specifically for a drink in a casino (90%).

In the first pre-test (N=30), a majority of participants (77%) agreed that choosing “an option that a person usually chooses” over “an option that the person has never chosen before” reflects a shift in the preference of self-identity.

In the second pre-test (N=30), we asked the same question in the specific context used in the main study (choosing a drink in a casino). In this setting, 90% agreed that the novel option (a novel drink that one has never tried before) would represent a shift in the preference of self-identity.

In addition, we developed a six-item measure ($\alpha = .65$), which included three statements suggesting that different choices relate to different aspects of one’s self-identity, and three statements suggesting that different choices have no bearing on the focal aspect of one’s self-identity. In both pre-tests, we found that participants agreed more with the statements linking choices and identity ($M = 5.04$, on a 7-point scale) than with the statements that posited no link ($M = 2.94$; paired $t(59)=11.64$, $p < .001$).

2.2 Study 2 Materials

The mechanism framing information was given in the pamphlet introducing the rules of blackjack. Three photos of previous winners were shown with quotes emphasizing skill in one condition, and chance in the other condition.

FIGURE 1. PAMPHLET SHOWN IN THE SKILL-BELIEF CONDITION.

Blackjack Rules

- The cards from 2 through 9 are valued at their face value;
- The 10, Jack, Queen, and King are all valued at 10; an Ace can count as either 1 or 11, depending on which is more favorable;
- Every player draws cards for an initial two card hand, and after seeing those cards decides whether to draw more;
- The player bringing the total hand value closest to 21 without exceeding it wins.
- **Note: Of course a certain degree of luck plays a role in this game, but all it takes is just a little skill!**

The Top 3 Blackjack Winners in 2010



"This is amazing! I had what it took to win!!!"



"I can't believe I made it happen!"



"Following your strategy is everything.
Play well, everyone!"

FIGURE 2. PAMPHLET SHOWN IN THE CHANCE-BELIEF CONDITION.

Blackjack Rules

- The cards from 2 through 9 are valued at their face value;
- The 10, Jack, Queen, and King are all valued at 10; an Ace can count as either 1 or 11, depending on which is more favorable;
- Every player draws cards for an initial two card hand, and after seeing those cards decides whether to draw more;
- The player bringing the total hand value closest to 21 without exceeding it wins.
- **Note: Of course a certain degree of skill plays a role in this game, but all it takes is just a little luck!**

The Top 3 Blackjack Winners in 2010



"This is amazing! I had luck on my side to win!!!"



"I can't believe it happened to me!"



"Following your hunch is everything.
Good luck, everyone!"

2.3 Study 2 Detailed Statistical Results

TABLE 4. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING THE NOVEL DRINK WHEN A FUTURE OUTCOME *IS* ANTICIPATED.*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	-2.818	1.361	4.288	0.038
Number of wins	-2.818	1.361	4.288	0.038
Belief x wins	1.784	0.868	4.224	0.040
Constant	3.383	2.101	2.592	0.107

TABLE 5. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING THE NOVEL DRINK WHEN A FUTURE OUTCOME *IS NOT* ANTICIPATED.*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	2.740	1.664	2.712	0.100
Number of wins	2.428	1.665	2.127	0.145
Belief x wins	-1.508	1.017	2.200	0.138
Constant	-5.334	2.841	3.526	0.060

TABLE 6. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING THE NOVEL DRINK.*

	Beta	S.E.	Wald	<i>P</i>
Belief manipulation	-8.377	3.190	6.895	0.009
Number of wins	-8.065	3.191	6.388	0.011
Future outcome	-8.717	3.533	6.087	0.014
Belief x wins	5.077	2.012	6.366	0.012
Belief x future outcome	5.559	2.150	6.686	0.010
Future outcome x wins	5.247	2.151	5.952	0.015
Belief x wins x future outcome	-3.292	1.337	6.065	0.014
Constant	12.099	5.072	5.691	0.017

*Belief manipulation = 1 if skill, 2 if chance

Number of hits = either 0 (loss) or 4 (win)

Future outcome = 1 if future outcome anticipated, 2 if no future outcome

TABLE 7. CORRELATION TABLES

With a future outcome (N=142)			
	Choice	“Virtuous”	Belief in luck
Choice	1	-.345**	0.059
		$p = 0.000$	$p = 0.482$
“Virtuous”	-.345**	1	-0.067
	$p = 0.000$		$p = 0.429$
Belief in luck	0.059	-0.067	1
	$p = 0.482$	$p = 0.429$	
Without future outcome (N=46)			
	Choice	“Virtuous”	Belief in luck
Choice	1	-0.080	-0.161
		$p = 0.596$	$p = 0.285$
“Virtuous”	-0.080	1	0.033
	$p = 0.596$		$p = 0.83$
Belief in luck	-0.161	0.033	1
	$p = 0.285$	$p = 0.830$	

TABLE 8. MEANS

With a future outcome (N=142)				
Choice	Usual (N=103)	Novel (N=39)	t-test	p -value
“Virtuous”	-0.51 (2.36)	-2.33 (1.81)	4.356	0.000
Belief in luck	3.10 (1.18)	3.26 (1.27)	-0.705	0.482
Without future outcome (N=46)				
Choice	Usual (N=34)	Novel (N=12)	t-test	p -value
“Virtuous”	-1.29 (2.17)	-1.67 (1.78)	0.534	0.596
Belief in luck	3.24 (1.07)	2.83 (1.19)	1.083	0.285

STUDY 3

3.1 Study 3 Materials

The game was designed on a 52'' X 20'' table, using colored tape, a rubber band ball and 10 rubber erasers.

Study 3A:

Participants first saw pictures of the ball-rolling study, and then they read the basic rules of how to play:

“The goal in the game is to roll the rubber band ball from behind the red line into the blue square area. The rubber band ball is of slightly irregular shape and is not perfectly round. There are 10 pencil heads in the blue square area which are randomly scattered on the table. They sometimes stop the ball, and they sometimes divert the ball's path. Out of 100 rolls, the ball will land in the target area (either within or on the blue line) roughly 50 times, on average.”

After that, they read additional information stressing either the role of skill in the game or the role of chance in the game, manipulated between subjects, as shown in the main text. At last, they were asked,

“Suppose you tried three times, and had three hits (misses) in a row. How optimistic are you about the next outcome?”

Participants rated their optimism on an 11-point scale from 0 (very pessimistic) to 10 (very optimistic). The order of the question was counterbalanced within-subjects, with half of them imagining having three hits first, the other half imagining having three misses first.

Study 3B:

In the self-identity questionnaire in Study 3B, participants read:

“People have multiple aspects of self-identity. For example, a person may describe herself as a first-year medical student, a daughter, a firm environmentalist, and so on. Please write down the identities that you think represent you, and list at least three different aspects of your identity.”

After they listed three aspects of their identity, they read:

“Please select the one of the identities that represent who you are at the moment, and briefly describe that identity: _____...”

During the mid-game break, participants read the same skill (or chance) manipulation used in the pretest. Then they were asked:

“Does this game remind you of any other games you know? If so, what's the name of the game?”

On the second questionnaire that participants received in the mid-game break they read:

“Now please again take some time to think about your multiple identities. Please choose one of your multiple identities and describe yourself in detail about one of them below. What would you like to write about?”

- C. *I’d like to write more about the identity I have described earlier.*
- D. *I’d like to write about a different identity of myself:*

”

Study 3C:

In the “Social Cognition” questionnaire in Study 3C, people read:

“People see numerous strangers in passing every day. For example, a doorman, a busy cashier, a passenger on the bus or train, and so on. Please think about the strangers that you have seen for a moment today, and list at least three different persons you have noticed.”

After they listed three aspects of their identity, they read:

“Please select the one of the persons listed above, and briefly describe that person.”

Then on the second questionnaire that participants received in the mid-game break they read:

“Now please again take some time to think about the strangers you have described. Please choose one of your listed strangers and describe him/her in detail about one of them below. What would you like to write about?”

- A. *I’d like to write more about the person I have described earlier*
- B. *I’d like to write about a different person I have seen:*

”

Study 3D:

In Study 3D, at the beginning of the game, participants were given one of three rubber-band balls (blue, orange, or yellow), chosen at random. Then, during the mid-game break the second questionnaire read:

“Now you have a chance to switch the rubber band ball you use in the game. We have 3 of them in different colors: yellow, orange, blue. Would you like to use the same one or change for a different one from now on?”

- A. *I’d like to use the same rubber band ball*
- B. *I’d like to switch to another rubber band ball in the _____ color”*

3.2 Study 3 Detailed Statistical Results

TABLE 7. WITHIN-SUBJECTS ANOVA ANALYSIS OF ANTICIPATED OUTCOME.*

	Sum of Squares	df	Mean Square	F	<i>p</i>
Number of hits	3.576	1	3.576	1.007	0.320
Belief x hits	24.199	1	24.199	6.814	0.011
Error	209.5	59	3.551		

TABLE 8. BETWEEN-SUBJECTS ANOVA ANALYSIS OF ANTICIPATED OUTCOME.*

	Sum of Squares	df	Mean Square	F	<i>p</i>
Intercept	4317.6	1	4317.6	771.5	0.000
Belief manipulation	0.538	1	0.538	0.096	0.758
Error	330.2	59	5.596		

TABLE 9. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING TO CHANGE THEIR OWN IDENTITY DESCRIPTION (STUDY 3B).*

	Beta	S.E.	Wald	<i>p</i>
Belief manipulation	-0.836	0.432	3.742	0.053
Number of hits	-1.029	0.555	3.443	0.064
Belief x hits	0.575	0.269	4.557	0.033
Constant	2.130	0.989	4.639	0.031

TABLE 10. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING TO CHANGE THE OTHER PERSON THEY WERE DESCRIBING (STUDY 3C).*

	Beta	S.E.	Wald	<i>p</i>
Belief manipulation	0.135	0.393	0.118	0.731
Number of hits	0.280	0.535	0.273	0.601
Belief x hits	-0.044	0.231	0.036	0.850
Constant	-0.737	0.846	0.759	0.384

*Belief manipulation = 1 if skill, 2 if chance
 Number of hits = either 0 (lose frame) or 3 (win frame)

TABLE 11. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING TO CHANGE THE BALL THEY WERE USING (STUDY 3D).*

	Beta	S.E.	Wald	<i>p</i>
Belief manipulation	0.312	0.486	0.412	0.521
Number of hits	0.135	0.505	0.072	0.789
Belief x hits	-0.251	0.280	0.799	0.371
Constant	0.334	0.935	0.128	0.721

TABLE 12. LOGISTIC REGRESSION FOR THE PROPORTION OF PARTICIPANTS CHOOSING TO CHANGE ACROSS STUDY 3B, 3C, AND 3D.

	Beta	S.E.	Wald	<i>p</i>
Belief manipulation	-1.840	0.911	4.083	0.043
Number of hits	-2.252	1.163	3.750	0.053
Personal identity version	-2.346	1.156	4.120	0.042
Belief x hits	1.251	0.564	4.924	0.026
Belief x version	1.223	0.655	3.480	0.062
Version x hits	1.005	0.519	3.745	0.053
Belief x hits x version	-0.676	0.316	4.561	0.033
Constant	4.477	2.067	4.692	0.030

TABLE 12. LOGISTIC REGRESSION FOR THE PROPORTION OF ALL PARTICIPANTS CHOOSING TO CHANGE ACROSS STUDY 3B, 3C, AND 3D (INCLUDING PARTICIPANTS WITH SUSPICION).

	Beta	S.E.	Wald	<i>p</i>
Belief manipulation	-1.790	0.887	4.066	0.044
Number of hits	-2.126	1.153	3.401	0.065
Personal identity version	-2.428	1.151	4.450	0.035
Belief x hits	1.085	0.540	4.032	0.045
Belief x version	1.162	0.648	3.212	0.073
Version x hits	0.988	0.509	3.770	0.052
Belief x hits x version	-0.594	0.305	3.782	0.052
Constant	4.588	2.057	4.976	0.026

*Belief manipulation = 1 if skill, 2 if chance

Number of hits = between 0 and 4

Version = 1 if describing self, 2 if describing others or choose color

TABLE 13. NO DIFFERENCES ON CODED MEASURES BETWEEN OPTIMISM-INDUCING AND PESSIMISM-INDUCING CONDITIONS IN STUDY 3B.

Coded measures	Optimism-inducing conditions	Pessimism-inducing conditions	t-test	p-value
Positive	3.75(1.30)	3.85(1.12)	-0.361	0.719
Virtuous	3.42(.87)	3.60(.90)	-0.899	0.372
Bragging	3.47(.88)	3.45(.78)	0.117	0.907
Active	3.94(2.35)	3.95(2.32)	-0.010	0.992
Perceived control	4.86(1.81)	4.90(1.76)	-0.088	0.930