

Decision and experience: why don't we choose what makes us happy?

Christopher K. Hsee and Reid Hastie

Center for Decision Research, Graduate School of Business, University of Chicago, 5807 S. Woodlawn Avenue, Chicago IL 60637, USA

Corresponding author: Hsee, C.K. (chris.hsee@chicagogsb.edu).

Recent years have witnessed a growing interest among psychologists and other social scientists in subjective well-being and happiness. Here we review selected contributions to this development from the literature on behavioral-decision theory. In particular, we examine many, somewhat surprising, findings that show people systematically fail to predict or choose what maximizes their happiness, and we look at reasons why they fail to do so. These findings challenge a fundamental assumption that underlies popular support for consumer sovereignty and other forms of autonomy in decision-making (e.g. marriage choice), namely, the assumption that people are able to make choices in their own best interests.

Introduction

A fundamental assumption of classic economic theory is that people are able to identify and choose what is best for them, conditional on being well-informed about their circumstances. This assumption is not an idiosyncratic doctrine of economics; it is shared by the general public. Our support for consumer sovereignty, free marriage, and democratic elections all reflect this assumption.

Are people really able to choose what is best for them? Other than those that meet the basic survival needs, most decisions (some would argue all decisions) are motivated by the pursuit of subjective well-being or, broadly defined, happiness. Thus, we define 'best choice' as one that yields the greatest happiness. Furthermore, following Bentham [1] and recently Kahneman [2], we define greatest happiness as best time-integrated momentary experiences.

Many psychologists suspect that we do not make choices that maximize our happiness. The vast popular literature on self-improvement is based on the belief that we aren't getting everything we could out of life, and is replete with recipes to increase happiness. Recent findings from behavioral-decision research provide evidence that people are not always able to choose what yields the greatest happiness or best experience. People fail to choose optimally, either because they fail to predict accurately which option in the available choice set will generate the best experience or because they fail to base their choice on their prediction, or both (see Figure 1).

Failures to predict future experience accurately

To choose the experientially optimal option, decision-makers need to predict accurately the experiential consequences of their choice options. Individuals rely on a variety of strategies to make these predictions, including quick emotional responses triggered by associations with similar previous experiences, conscious recall and evaluations of related previous experiences, and savoring or simulation of future experiences to infer their hedonic

qualities [3–7]. Behavioral-decision researchers have identified several systematic biases in these predictions.

Impact bias

People often overestimate the impact (both intensity and duration) of an affective event [8–11]. For example, junior faculty members typically overestimate the joy of getting tenure and the misery of being turned down. One cause of this impact bias is 'focalism' [3] – predictors pay too much attention to the central event and overlook context events that will moderate the central event's impact [12,13]. For example, college football fans overpredicted the joy they would experience in the days following the victory of their favored team, because they failed to consider that the victory was only one of a myriad of events that would affect their future hedonic state [8]. Consistent with this account, asking fans, at the time they made predictions, to list other factors that might affect their future lives produced more accurate predictions [14].

Another cause of impact bias is 'immune neglect' [9,10,15]. After an emotion-evoking event happens, people tend to rationalize or make sense of it, thereby damping its emotional impact. For example, when an assistant professor is denied tenure, he might say, '*The review process was unfair*' or '*I did not want to be in academia anyway*'. However, most predictors do not anticipate the protective effects of this sense-making mechanism and hence overestimate the impact of an event. To test this account, Gilbert and co-authors asked participants to predict how they would feel after receiving negative personality feedback from either a computer or expert clinicians. Presumably, it was easier to rationalize the negative feedback from a computer than from an expert. Consistent with the immune-neglect notion, participants overpredicted their negative feelings towards the negative feedback only when it was provided by the human expert, not when it came from the computer [10].

Projection bias

People making predictions and people experiencing are often in different visceral (arousal) states. For example, predictors might be rested, satiated or sexually unaroused, whereas experiencers might be tired, hungry or aroused (or vice versa). When predictors in one visceral state make predictions about experience in another state, they project their own state into their predictions, as if the experiencers were also in that state [16,17]. Projection bias occurs not only when experiencers are others but also when experiencers are predictors themselves. For example, when people predict immediately after dinner how much they will enjoy a delicious breakfast the next morning, they understate the pleasure. They appear to reason as though, if they are full now, they will also be full

the next morning [18–20]. Loewenstein and co-authors dubbed this phenomenon projection bias [19].

Projection bias can lead to choices that one will regret. For example, hungry grocery shoppers purchase more foods than they need. Or, before a teenage girl goes to visit her boyfriend, she is unaroused, does not expect to be motivated to engage in sexual activity, and so does not take protective measures. But once she is with her boyfriend, she is aroused and engages in unanticipated sexual activities. Later, she might wish that she had been more cautious.

Distinction bias

Whereas the projection bias occurs because predictors and experiencers are in different arousal states, distinction bias occurs because predictors and experiencers are in different evaluation modes [21–23]. Affective predictions, especially those preceding a decision, are often made in a joint-evaluation (JE) mode, in which predictors compare multiple options. By contrast, the consequence of a decision is typically experienced in a single-evaluation (SE) mode, in which the experiencer is exposed only to the chosen option. For example, when you shop for a plasma TV in a store, you have multiple models to compare (JE). When you eventually use the TV you buy, you experience that model alone (SE).

Decision-makers in JE mode might pay too much attention to subtle quantitative differences, such as differences in brightness between TVs, which seem obvious in JE mode but make little or no difference during consumption under SE mode. Dunn *et al.* [14] also found that when presented with multiple options, predictors tended to focus on the differences between the options and ignore their common features.

Distinction bias can also lead to non-optimal choices. This is likely to occur if the choice options involve a trade-off between subtle quantitative differences (e.g. subtle differences in TV brightness), and important qualitative differences (e.g. whether the TV has a user-friendly remote control, and whether the aspect ratio matches that of the programs one most often watches) [21]. One might spend a large sum of money to obtain the brightest plasma TV, only to find that the programs one most often watches are distorted because of a mismatch in aspect ratio.

Memory bias

Predictions of future experiences are often based on memories of related past experiences, but memory is fallible and introduces systematic biases into evaluations [24–27]. Memory-based evaluations of a past event are disproportionately influenced by the event's peak and end experiences and insensitive to the event's duration [28–30]. This memory bias and its effect on decisions were demonstrated in a classic experiment by Kahneman and co-authors [31]. Participants experienced two painful events, one requiring them to submerge their hands in very cold water for 60 s, and one requiring them to submerge their hands in very cold water for 60 s and in mildly cold water for another 30 s. Objectively, the latter experience was worse because the discomfort lasted longer. Yet, when asked to evaluate their overall experience, respondents rated the longer episode less unpleasant, because it had a less unpleasant ending. Moreover, when asked to repeat one of the episodes, most

opted for the longer one, consistent with their remembered experience.

Presumably the 'peak-end' bias occurs because these experiences are well-recalled at the time of evaluation. Unusual past events are also disproportionately well-remembered, producing an analogous bias. Morewedge *et al.* [32] asked subway passengers to recall either one or several past occasions on which they missed trains, and then asked them to predict a future reaction to missing a train. Those who recalled one past experience often recalled the worst past experience. Consequently they predicted that the future experience would be more dreadful than those who recalled multiple past experiences. This prediction bias disappeared if the predictors were alerted that the single episode they recalled was likely to be a distinctively bad experience.

Belief bias

Besides recall of related past events, another guide of hedonic forecasts is people's lay theories of what makes them happy or unhappy, including lay theories about contrast effects, adaptation and certainty [33–37]. These lay theories are usually learned in situations where they are valid, but are then over-generalized to situations where they do not hold. For example, pairing a lesser product with a superior product will generally reduce the appeal of the lesser product, an example of a contrast effect. In a generalization of this effect, students believed that eating a tasty jellybean would reduce the enjoyment of eating a less tasty jellybean at a later time; but, in fact, the contrast effect did not occur when the consumptions took place at different times [34].

Another common belief is that more choice options are always better. In reality, having more options can lead to worse experiences [38–40]. For example, if employees are given a free trip to Paris, they are happy; if they are given a free trip to Hawaii, they are happy. But if they are given a choice between the two trips, they will be less happy, no matter which option they choose. Having the choice highlights the relative deficiencies in each option. People who choose Paris complain that '*Paris does not have the ocean*', whereas people who choose Hawaii complain that '*Hawaii does not have great museums*' [39].

Relationships among the prediction biases

Despite the seeming disparateness of the prediction biases we have reviewed above, all of these biases occur because prediction and experience occur in different states but the predictor fails to appreciate the difference. The state of prediction and the state of experience can vary in many ways, and the five streams of research we reviewed each focuses on one of those different ways.

The projection-bias research is concerned with the difference between prediction and experience in visceral states (aroused versus unaroused). The distinction-bias research focuses on the difference between evaluation modes (JE versus SE). The impact-bias research explores the extent to which non-focal events affect one's life and the extent to which a sense-making system operates. Experiencers are distracted by non-focal events and are immunized by the sense-making process whereas predictors are not. According to the memory-bias literature, experiencers undergo a sequence of momentary experiences as an event unfolds, whereas predictors base their prediction on a summary evaluation. And according

to the belief-bias literature, experiencers face specific circumstances, whereas predictors use lay theories derived from general circumstances.

If predictors could sufficiently appreciate the differences between their current state and their state as an experiencer, and correct for the differences, they would not commit systematic prediction errors. In reality, predictors often fail to recognize these differences fully and thereby make predictions as if the experiencer were in the same situation as themselves. The failure to appreciate the differences between prediction and experience underlies all the prediction biases reviewed here (see Figure 2).

Failures to follow predictions

To choose the experientially optimal option, decision-makers not only need to make accurate predictions of future experiences, but also need to act on their predictions. Yet they do not always do so. Instead of choosing what they predict will generate the greatest overall happiness, they variously choose the option that has the greatest immediate appeal (impulsivity), that fits their choice rules (rule-based choice), that is easy to justify (lay rationalism), or that yields the greatest token reward such as money (medium maximization).

Impulsivity

A major cause of sub-optimal decisions is impulsivity – the choice of an immediately gratifying option at the cost of long-term happiness. Overeating, avoiding medical exams, dropping out of college, taking drugs, and squandering savings produce immediate pleasure, but can lead to long-term misery. Impulsivity might result from a failure to predict long-term experience accurately. For example, some people smoke because they underestimate the future negative consequences [41].

However, often impulsivity is a result not of a prediction error, but of a failure to follow predictions. People might still act impulsively even if they can accurately predict that doing so will undermine their long-term, and even their overall (short-term plus long-term) well-being [42–46]. For example, drug addicts might accurately predict that the short-term pleasure from taking drugs is not worth the long-term loss in their well-being and therefore that their overall happiness (short-term plus long-term) will be lower if they abuse drugs than if they don't, but they cannot resist the craving and continue to abuse drugs. It is in this sense that we classify impulsivity as a case of failure to follow predicted experience. Here, predicted experience means predicted overall experience.

Rule-based decisions

Decision-makers sometimes base their choices on rules for 'good behavior' rather than predicted experience [47–50]. Examples of such decision rules include '*seek variety*' [51–54], '*don't waste*' [55,56], and '*don't pay for delays*' (Amir and Ariely, unpublished). These rules might prevent decision-makers from choosing what they predict will produce the best experience.

In a study exploring the '*don't waste*' rule, Arkes and Blumer [56] asked participants to imagine that they purchased both a \$100 ticket for a weekend ski trip to Michigan and a \$50 ticket for a weekend ski trip to Wisconsin. They later found out that the two trips were for the same weekend. They could not return either of the two

tickets and had to pick one to use. Although the participants were told that the trip to Wisconsin was likely to be more enjoyable, the majority of them chose the more expensive trip to Michigan.

Disassociation between predicted experience and actual choice is also demonstrated in the context of variety-seeking. Simonson [54] found that students were happier if they ate the same candy (the one they liked the most) repeatedly on consecutive days than if they ate different candies on different days. Most students could accurately predict that the 'same candy diet' would make them happier. However, when asked to make candy choices simultaneously in advance, most students chose different candies for different days, a strategy that is consistent with the variety-seeking rule, but contradictory to their own predicted experience.

Lay rationalism

Decision-makers strive to be rational [48,50,57] but, paradoxically, the desire for rationality can lead to less rational decisions. When decision-makers try to 'do the rational thing', it can prevent them from choosing what they predict to be experientially optimal.

Hsee and co-authors [58] referred to the layperson's desire for rationality as 'lay rationalism', and studied three specific manifestations. One is 'lay economism', the tendency to base decisions on financial aspects of the options and neglect experiential aspects. For example, when asked to choose between a 50¢ small chocolate that looks like a heart and a \$2 large chocolate that looks like a cockroach, most respondents opted for the larger cockroach-shaped chocolate, even though when asked to predict which they would enjoy more, most favored the smaller, heart-shaped chocolate.

Another manifestation is 'lay scientism', a tendency to base choices on objective, 'hard' attributes rather than subjective, 'soft' attributes. For example, when choosing between two equally expensive audio systems, one with a higher wattage rating (a hard attribute) and the other with a richer sound (a soft attribute), most people chose the high-wattage model, even though when asked to predict their enjoyment, they favored the richer-sounding model. A third manifestation of lay rationalism is 'lay functionalism', a tendency to focus on the primary goal(s) of the decision and overlook other aspects that are important to overall experience [58].

Medium-maximization

Often when people exert effort to obtain a desired outcome, the immediate reward they receive is not the outcome itself, but a medium – an instrument or currency that they can trade for the desired outcome [59,60]. For example, points in consumer loyalty programs and miles in frequent flyer programs are both such a medium.

In decisions involving a medium, individuals often maximize the medium rather than their predicted experience with the ultimate outcomes [61]. For example, in an experiment to test the effects of medium, respondents were assigned to one of two conditions. In the 'no-medium' condition, respondents could choose between a low-effort and a high-effort task, each leading to a reward – vanilla ice cream for the low-effort task and pistachio ice cream for the high-effort task. In the 'medium' condition, the immediate reward was points. Performance of the low-effort task earned 60 points, which

could be exchanged for the vanilla ice cream; performance of the high-effort task earned 100 points, which could be exchanged for the pistachio ice cream. The points had no other use except to obtain the specified ice cream. In the no-medium condition, most respondents chose the low-effort task and received vanilla ice cream. In the medium condition, most chose the high-effort task and received pistachio ice cream. When asked about their ice-cream preference afterwards, most preferred vanilla ice cream [61]. This result suggests that the presence of a medium could lead decision-makers to exert more effort, but without a better outcome.

Money is also a medium. The experiment reviewed above is a microscopic representation of a prevalent social phenomenon – that people work harder and harder to accumulate more and more wealth, but are not in fact happier [62,63].

Relationships among the failures to follow predictions

Decision-makers base their choices on a variety of factors other than predicted experience. Despite their apparent diversity, these factors share an inherent relationship: the last three factors we reviewed, rules, lay rationalism and medium-maximization, are all self-control devices against the first factor we discussed – impulsivity. To illustrate this, suppose that an employee near her retirement age gets a cash bonus and can either save it for her retirement or spend it on a luxury cruise. Taking the cruise is enjoyable in the short-run, but saving the money will benefit her in the long-run. Impulsivity would urge her to take the cruise. But both lay rationalism and medium maximization would urge her to save the money. Although a few decision rules encourage immediate gratifications, most (e.g. 'don't waste') are also self-control devices that promote delayed gratifications.

We propose that self-control devices such as lay rationalism, decision rules and medium-maximization can sometimes help decision-makers and sometimes hurt decision-makers, and that whether they help or hurt depends on whether the options the decision-maker faces entail a trade-off between short-term and long-term happiness. If they do, these devices usually help. If not, they can hurt.

Again, take the soon-to-be-retired employee as an example. Consider two alternative scenarios: in one, she has little money for retirement; in the other, she has plenty of money for retirement. If she has little savings for retirement, the options she faces – saving the cash bonus for retirement or spending it on a cruise – do entail a short-term/long-term trade-off. In this scenario, the self-control devices that encourage her to save the money will benefit her in the long run. On the other hand, if she is wealthy and already has ample retirement money, then saving the money entails little or no long-term benefit; she should simply enjoy the cruise now. In this scenario, if she still applies the self-control devices and keeps accumulating wealth without using it to enjoy life, she might in fact lower her overall happiness.

We further propose that most individuals do not effectively distinguish between these situations. When situations involve a short-term/long-term trade-off and require self-control to combat impulsivity, they do not exert enough self-control and act myopically. When situations do not involve such trade-offs and do not require self-control, they still exert some self-control and deny

themselves optimal enjoyment. Consequently, decisions are often too regressive, that is, too much 'in the middle'. For example, the soon-to-be retiree might spend some of her bonus money on a low-quality cruise and save the remainder for retirement, regardless of her wealth situation. Our point is that the same behavior (i.e. splitting the money between short-term and long-term goals), might appear too impulsive in one situation and too stoic in another (see Figure 3).

Summary

For decades, behavioral-decision researchers have studied inconsistencies in choices, demonstrating for example, that people would choose apples over oranges in one situation and oranges over apples in an apparently different, but essentially identical, situation. These findings imply that the choice in at least one of the situations is sub-optimal but do not tell us which one it is.

In recent years, decision researchers have studied directly when decisions are sub-optimal, in particular, when decisions fail to maximize happiness. We have examined two general reasons for the failure: (i) prediction biases, and (ii) failures to follow predictions. Prediction biases occur because predictors do not fully appreciate the differences between the state of prediction and the state of experience. Failures to act on predictions occur because choosers fail to reach the optimal balance between impulsivity and self-control.

Many social policies, such as free choice of health providers, retirement plans, and public offices, are built upon the assumptions that people know their own preferences and that what people choose must be in their best interests (see also Box 1). The behavioral-decision-research findings we have reviewed here cast doubt on these assumptions and, therefore, on the derived policies. They also give the old aphorism, '*Be careful what you wish for; you might receive it*', a new significance.

References

- 1 Bentham, J. (1789, reprinted 1948) *An Introduction to the Principles of Morals and Legislations*, Blackwell
- 2 Kahneman, D. (2000) Experienced utility and objective happiness: a moment-based approach. In *Choices, Values and Frames* (Kahneman, D. and Tversky, A. eds), pp. 673–692, Cambridge University Press
- 3 Gilbert, D.T. et al. (2002) The trouble with Vronsky: impact bias in the forecasting of future affective states. In *The Wisdom in Feeling: Psychological Processes in Emotional Intelligence* (Barrett, L.F. and Salovey, P. eds), pp. 114–143, Guilford Press
- 4 Loewenstein, G. and Lerner, J.S. (2003) The role of affect in decision making. In *Handbook of Affective Sciences* (Davidson, R.J. et al. eds), pp. 619–642, Oxford University Press
- 5 Mellers, B. (2000) Choice and the relative pleasure of consequences. *Psychol. Bull.* 126, 910–924
- 6 Slovic, P. et al. (2002) The affect heuristic. In *Heuristics and Biases: The Psychology of Intuitive Judgment* (Gilovich, T. et al. eds), pp. 397–420, Cambridge University Press
- 7 Mellers, B.A. and McGraw, A.P. (2001) Anticipated emotions as guides to choice. *Curr. Dir. Psychol. Sci.* 10, 210–214
- 8 Wilson, T.D. et al. (2000) Focalism: a source of durability bias in affective forecasting. *J. Pers. Soc. Psychol.* 78, 821–836
- 9 Gilbert, D.T. et al. (1998) Immune neglect: a source of durability bias in affective forecasting. *J. Pers. Soc. Psychol.* 75, 617–638
- 10 Wilson, T.D. and Gilbert, D. (2003) Affective forecasting. *Adv. Exp. Soc. Psychol.* 35, 345–411
- 11 Gilbert, D.T. et al. (2004) Looking forward to looking backward: the misprediction of regret. *Psychol. Sci.* 15, 346–350

- 12 Buehler, R. and McFarland, C. (2001) Intensity bias in affective forecasting: the role of temporal focus. *Pers. Soc. Psychol. Bull.* 27, 1480–1493
- 13 Schkade, D.A. and Kahneman, D. (1998) Does living in California make people happy? A focusing illusion in judgments of life satisfaction. *Psychol. Sci.* 9, 340–346
- 14 Dunn, E.W. et al. (2003) Location, location, location: the misprediction of satisfaction in housing lotteries. *Pers. Soc. Psychol. Bull.* 29, 1421–1432
- 15 Wilson, T.D. et al. (2004) When to fire: anticipatory versus postevent reconstrual of uncontrollable events. *Pers. Soc. Psychol. Bull.* 30, 340–351
- 16 Van Boven, L. and Loewenstein, G. (2003) Social projection of transient drive states. *Pers. Soc. Psychol. Bull.* 29, 1159–1168
- 17 Van Boven, L. et al. (2005) The illusion of courage in social predictions: underestimating the impact of fear of embarrassment on other people. *Organ. Behav. Hum. Decis. Process.* 96, 130–141
- 18 Gilbert, D.T. et al. (2002) The future is now: temporal correction in affective forecasting. *Organ. Behav. Hum. Decis. Process.* 88, 430–444
- 19 Loewenstein, G. et al. (2003) Projection bias in predicting future utility. *Q. J. Econ.* 118, 1209–1248
- 20 Read, D. and van Leeuwen, B. (1998) Predicting hunger: the effects of appetite and delay on choice. *Organ. Behav. Hum. Decis. Process.* 76, 189–205
- 21 Hsee, C.K. and Zhang, J. (2004) Distinction bias: misprediction and mischoice due to joint evaluation. *J. Pers. Soc. Psychol.* 86, 680–695
- 22 Hsee, C.K. (1996) The evaluability hypothesis: an explanation for preference-reversal between joint and separate evaluations of alternatives. *Organ. Behav. Hum. Decis. Process.* 67, 247–257
- 23 Hsee, C.K. et al. (1999) Preference-reversals between joint and separate evaluations of options: a review and theoretical analysis. *Psychol. Bull.* 125, 576–591
- 24 Karney, B.R. and Coombs, R.H. (2000) Memory bias in long-term close relationships: consistency or improvement? *Pers. Soc. Psychol. Bull.* 26, 959–970
- 25 Libby, L.K. et al. (2005) Here's looking at me: the effect of memory perspective on assessments of personal change. *J. Pers. Soc. Psychol.* 88, 50–62
- 26 Mather, M. et al. (2000) Misremembrance of options past: source monitoring and choice. *Psychol. Sci.* 11, 132–138
- 27 Wirtz, D. et al. (2003) What to do on spring break? The role of predicted, on-line, and remembered experience in future choice. *Psychol. Sci.* 14, 520–524
- 28 Fredrickson, B.L. (2000) Extracting meaning from past affective experiences: the importance of peaks, ends, and specific emotions. *Cogn. Emotion* 14, 577–606
- 29 Fredrickson, B.L. and Kahneman, D. (1993) Duration neglect in retrospective evaluations of affective episodes. *J. Pers. Soc. Psychol.* 65, 45–55
- 30 Kahneman, D. et al. (1997) Back to Bentham: explorations of experienced utility. *Q. J. Econ.* 112, 375–405
- 31 Kahneman, D. et al. (1993) When more pain is preferred to less: adding a better end. *Psychol. Sci.* 4, 401–405
- 32 Morewedge, C.K. et al. The least likely of times: how remembering the past biases forecasts of the future. *Psychol. Sci.* (in press)
- 33 Kahneman, D. and Snell, J. (1992) Predicting a changing taste: do people know what they will like? *J. Behav. Decision Making* 5, 187–200
- 34 Novemsky, N. and Ratner, R.N. (2003) The time course and impact of consumers' erroneous beliefs about hedonic contrast effects. *J. Consumer Behav.* 29, 507–516
- 35 Robinson, M.D. and Clore, G.L. (2002) Belief and feeling: evidence for an accessibility model of emotional self-report. *Psychol. Bull.* 128, 934–960
- 36 Igou, E.R. (2004) Lay theories of affective forecasting: the progression of affect. *J. Exp. Soc. Psychol.* 40, 528–524
- 37 Wilson, T.D. et al. (2005) The pleasures of uncertainty: prolonging positive moods in ways people do not anticipate. *J. Pers. Soc. Psychol.* 88, 5–21
- 38 Iyengar, S.S. and Lepper, M. (2000) When choice is demotivating: can one desire too much of a good thing? *J. Pers. Soc. Psychol.* 76, 995–1006
- 39 Luce, M.K. et al. (2001) The impact of emotional tradeoff difficulty on decision behavior. In *Conflict and Tradeoffs in Decision Making* (Weber, E.U. and Baron, J. eds), pp. 86–109, Cambridge University Press
- 40 Hsee, C.K. and Leclerc, F. (1998) Will products look more attractive when evaluated jointly or when evaluated separately? *J. Consum. Res.* 25, 175–186
- 41 Slovic, P. (2001) Cigarette smokers: rational actors or rational fools? In *Smoking: Risk, Perception, and Policy* (Slovic, P. ed.), pp. 97–124, Sage Publications
- 42 Kivetz, R. and Simonson, I. (2002) Self-control for the righteous: towards a theory of pre-commitment to indulgence. *J. Consum. Res.* 29, 199–217
- 43 O'Donoghue, T. and Rabin, M. (1999) Doing it now or later. *Am. Econ. Rev.* 89, 103–124
- 44 Strack, F. and Deutsch, R. (2004) Reflective and impulsive determinants of social behavior. *Pers. Soc. Psychol. Rev.* 8, 220–247
- 45 Thaler, R.H. and Shefrin, H.M. (1981) An economic theory of self-control. *J. Polit. Econ.* 89, 392–406
- 46 Ariely, D. and Wertenbroch, K. (2002) Procrastination, deadlines, and performance: self-control by precommitment. *Psychol. Sci.* 13, 219–224
- 47 Ames, D. et al. (2004) It's the thought that counts: on perceiving how helpers decide to lend a hand. *Pers. Soc. Psychol. Bull.* 30, 461–474
- 48 Prelec, D. and Herrnstein, R. (1991) Preferences or principles: alternative guidelines for choice. In *Strategy and choice* (Zeckhauser, R.J. ed.), pp. 319–340, MIT Press
- 49 Simonson, I. (1989) Choice based on reasons – the case of attraction and compromise effects. *J. Consum. Res.* 16, 158–174
- 50 Simonson, I. and Nowlis, S.M. (2000) The role of explanations and need for uniqueness in consumer decision making: unconventional choices based on reasons. *J. Consum. Res.* 27, 49–68
- 51 Ariely, D. and Levav, J. (2000) Sequential choice in group settings: taking the road less traveled and less enjoyed. *J. Consum. Res.* 27, 279–290
- 52 Benartzi, S. and Thaler, R.H. (2001) Naïve diversification strategies in defined contribution savings plans. *Am. Econ. Rev.* 91, 79–98
- 53 Ratner, R.K. et al. (1999) Choosing less-preferred experiences for the sake of variety. *J. Consum. Res.* 26, 1–15
- 54 Simonson, I. (1990) The effect of purchase quantity and timing on variety-seeking behavior. *J. Mark. Res.* 27, 150–162
- 55 Arkes, H.R. and Ayton, P. (1999) The sunk cost and Concorde effects: are humans less rational than lower animals? *Psychol. Bull.* 125, 591–600
- 56 Arkes, H.R. and Blumer, C. (1985) The psychology of sunk cost. *Organ. Behav. Hum. Decis. Process.* 35, 124–140
- 57 Shafir, E. et al. (1993) Reason-based choice. *Cognition* 49, 11–36
- 58 Hsee, C. K. et al. (2003) Lay rationalism and inconsistency between predicted experience and decision. *J. Behav. Decision Making* 16, 257–272
- 59 Kivetz, R. and Simonson, I. (2002) Earning the rights to indulge. *J. Mark. Res.* 39, 155–170
- 60 Van Osselaer, S.M.J. et al. (2004) Irrelevant information and mediated intertemporal choice. *J. Consum. Psychol.* 14, 257–270
- 61 Hsee, C.K. et al. (2003) Medium maximization. *J. Consum. Res.* 30, 1–14
- 62 Layard, R. (2005) *Happiness: Lessons from a New Science*, Penguin Press

63 Diener, E. and Biswas-Diener, R. (2002) Will money increase subjective well-being? A literature review and guide to needed research. *Soc. Indic. Res.* 57, 119–169
 64 Loewenstein, G.F. et al. (2001) Risk as feelings. *Psychol. Bull.* 127, 267–286
 65 Lam, K.C.H. et al. Cultural differences in affective forecasting: the role of focalism. *Pers. Soc. Psychol. Bull.* (in press)

66 Van Boven, L. et al. (2000) Egocentric empathy gaps between owners and buyers: misperceptions of the endowment effect. *J. Pers. Soc. Psychol.* 79, 66–76
 67 Sunstein, C. and Thaler, R. (2003) Libertarian paternalism. *Am. Econ. Rev.* 93, 175–179

Box 1. Questions for future research

- This review focuses on experiences with the *outcome* of a decision (what one chooses), not with the *process* of a decision (how one chooses) [39,64]. How do these two types of experiences interact?
- Which of the biases reviewed in this review can be corrected by decision-makers themselves, and which cannot? [8,12,14,32,65,66].
- For biases that cannot be corrected by decision-makers themselves, is it feasible and ethical to apply paternalistic interventions that limit individual freedom of choice (see [67] for an ingenious strategy)?
- Most studies reviewed here concern inconsequential outcomes. Do the present conclusions 'scale up' and apply to more consequential decisions involving, for example, marital, medical and life-term financial consequences?

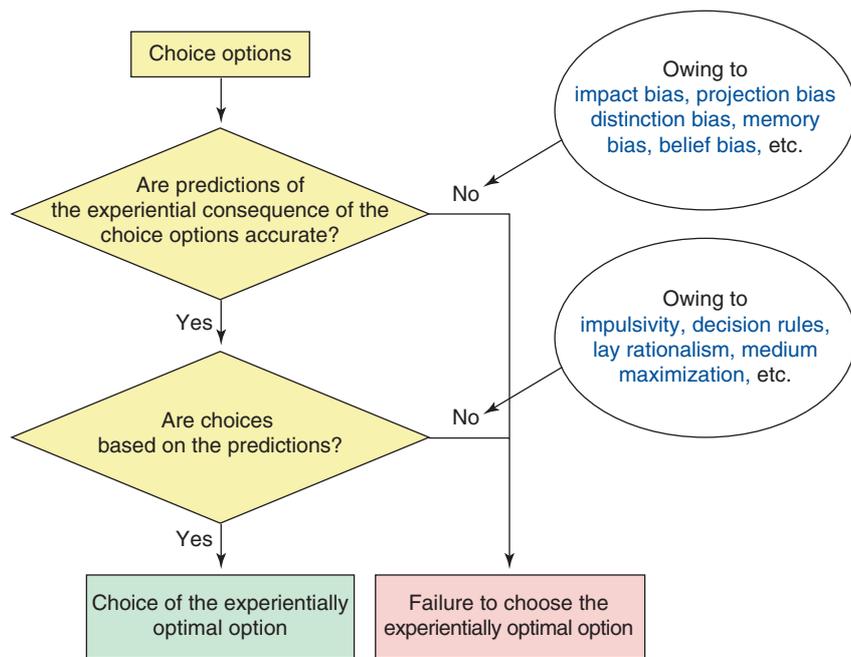


Figure 1. Causes of sub-optimal decisions. The biases listed in the upper right ellipse are discussed in the first part of this review; the factors in the lower ellipse are discussed in the second part of the review.

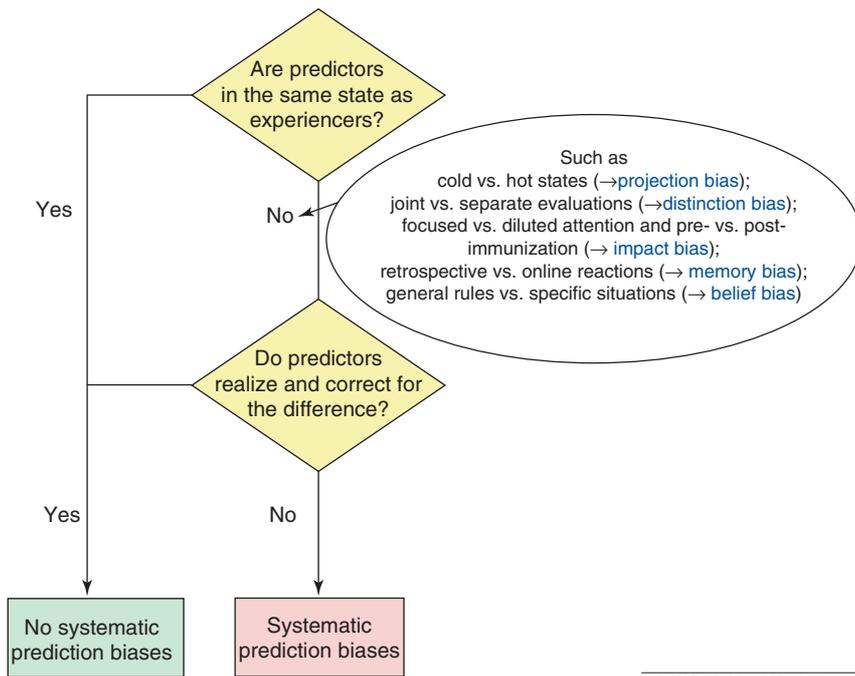


Figure 2. When are experiential predictions inaccurate?

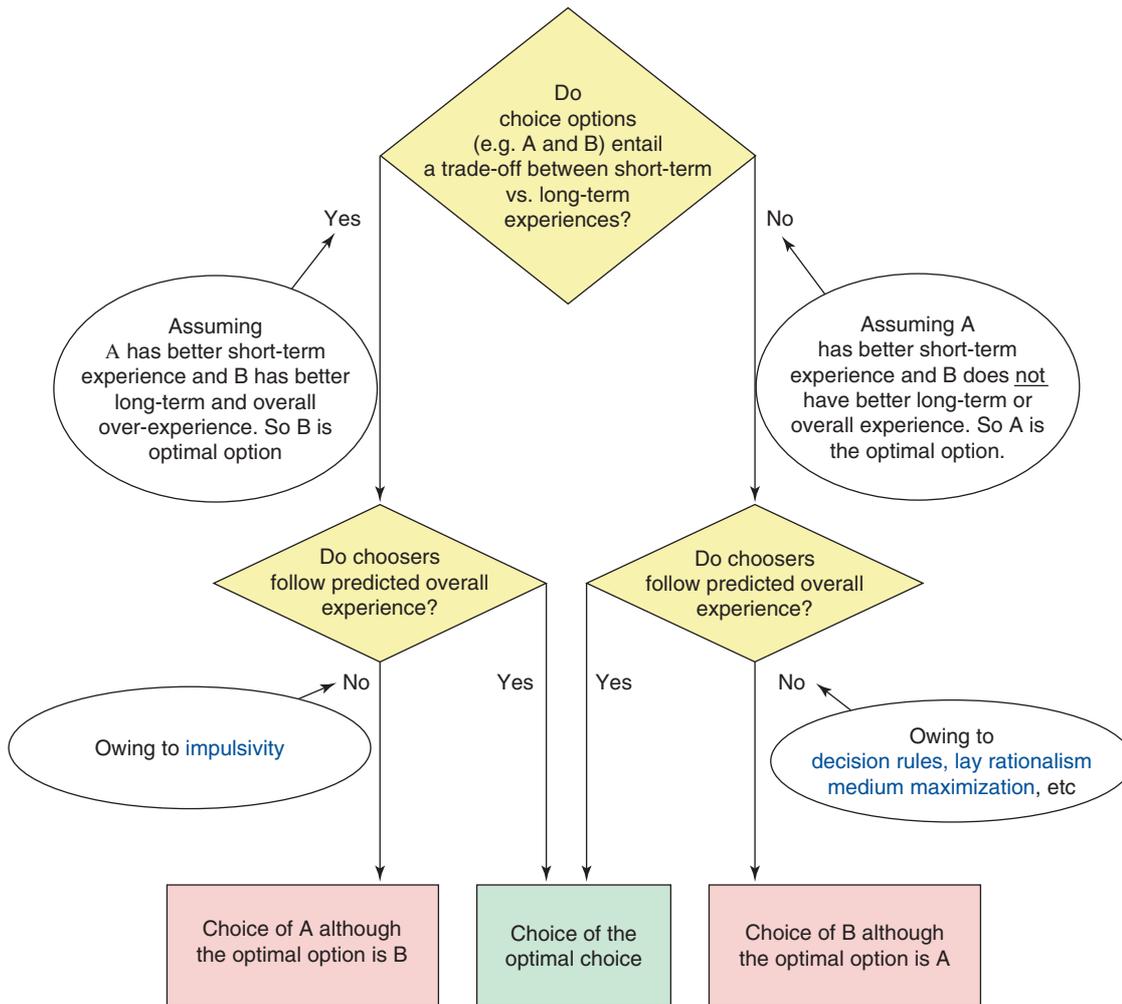


Figure 3. When do factors such as impulsivity, decision rules, lay rationalism and medium maximization lead to experientially sub-optimal decisions?