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Reports

Blind spots in the search for happiness: Implicit attitudes and nonverbal leakage predict affective forecasting errors

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ABSTRACT

We investigated implicit knowledge and affective forecasting, reasoning that although conscious evaluations are available to people when predicting their future emotional responses, nonconscious evaluations are not. However, these automatically-activated evaluations should contribute to in-the-moment emotional experiences, and thus they should account for misforecasts (i.e., discrepancies between affective forecasts and actual experiences). We conducted two studies to explore affective misforecasts, using food items as stimuli. In Study 1, participants' implicit attitudes (but not their explicit attitudes) predicted misforecasts of food enjoyment, supporting the role of nonconscious evaluations in affective forecasting errors. In Study 2, we examined participants' facial expressions (another index of nonconscious evaluation) upon the presentation of food items, and we found that these nonverbal behaviors predicted affective misforecasts as well. In sum, although nonconscious evaluations are unavailable when anticipating the future, they may contribute to one's in-the-moment experiences and thus serve as blind spots in affective forecasting.

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Since ancient times, when the words “know thyself” were inscribed at the Temple of Apollo at Delphi, sages and philosophers have hailed the importance of self-knowledge. Modern research, however, has called its value into question. For instance, research on self-delusion has found that holding unrealistically positive views of oneself and one's future prospects can promote emotional, and even physical, well-being (e.g., Taylor & Brown, 1988; Taylor, Lerner, Sherman, Sage, & McDowell, 2003). Although viewing the self through mildly rose-tinted glasses may be beneficial in some circumstances, Wilson and Dunn (2004) argue that psychological blind spots may do more harm than good. In the pursuit of happiness, one particularly problematic obstruction may lie in our implicit attitudes, motives, and self-views—associations that resist conscious access or control. That is, our inability to access nonconscious knowledge may undermine our ability to select courses of action that will make us happy.

At the heart of this proposal is the distinction between conscious and nonconscious evaluative knowledge (see Gawronski & Bodenhausen, 2006; Rydell & McConnell, 2006; Smith & DeCoster, 2000). When people consciously reflect on attitude objects, they effortfully draw upon information that is structured by language, logic, and reasoning. For example, when someone completes an explicit attitudes measure (e.g., semantic differentials), one's response is based on information that can be consciously brought to mind and verbally reported. On the other hand, some forms of evaluation require little or no conscious

effort because merely encountering an attitude object spontaneously activates valence-related associations without one's intention or deliberation. For instance, measures of implicit attitudes (e.g., evaluative priming tasks) assess how strongly positivity or negativity is associated with an attitude object by examining the speed with which people can make judgments without being asked to consciously consider their feelings about the attitude object. If one's explicit and implicit attitudes toward an object diverge, differential outcomes can result based on what actions require conscious deliberation and what actions are more spontaneous and less mediated by intention (e.g., Dovidio, Kawakami, & Gaernter, 2002; McConnell & Leibold, 2001; Rydell & McConnell, 2006). That is, if people's expectations and subsequent decisions are guided by conscious evaluations (i.e., explicit attitudes) yet their in-the-moment experiences are influenced by nonconscious evaluations (i.e., implicit attitudes), their choices may diminish their own satisfaction when explicit-implicit attitude discrepancies exist.

Consistent with this reasoning, there is evidence that holding contradictory explicit and implicit attitudes produces discomfort (Rydell, McConnell, & Mackie, 2008) and that possessing inconsistent explicit and implicit motives reduces emotional well-being (Brunstein, Schultheiss, & Grassmann, 1998). Further, such inconsistencies are not uncommon (Petty & Brinol, 2009; McConnell, Rydell, Strain, & Mackie, 2008; Rydell & McConnell, 2010). In the current work, we suggest that discrepancies between nonconscious and conscious evaluations may hold costs for well-being because the relative inaccessibility of implicit associations precludes people from using this important information in contemplating what will make them happy. Specifically, we propose

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that nonconscious evaluations should influence emotional experiences but may be unavailable when people predict their own emotions, leading to affective forecasting errors. Because good decisions in life, big and small, hinge on anticipating how the alternatives before us would make us feel (Dunn & Laham, 2006; Wilson & Gilbert, 2003; 2005), this blind spot may impair the pursuit of happiness.

Why would nonconscious evaluations shape actual emotions but not anticipated emotions? Research shows that implicit attitudes predict many spontaneous behavioral responses independent of explicit attitudes (e.g., Dovidio et al., 2002; Rydell & McConnell, 2006), and Gawronski and Bodenhausen (2006) propose that nonconscious evaluations may play an important role in shaping one's in-the-moment affect. Thus, individuals' nonconscious evaluative knowledge (e.g., implicit attitudes) should contribute to spontaneous affective responses to events as they transpire. For example, a regular coffee drinker who has strong positive implicit attitudes toward coffee may experience a surge of pleasure from her daily latte, which triggers a host of automatic, positive associations.

In making an affective forecast, however, individuals must rely on evaluative information that can be brought to mind. While explicit evaluations are available for these deliberations, knowledge that is more associative in nature, such as implicit attitudes, is often unavailable for conscious consideration (Gawronski & Bodenhausen, 2006; Rydell & McConnell, 2006; Smith & DeCoster, 2000). When making affective forecasts, nonconscious evaluative associations (e.g., implicit attitudes) should be less available than conscious evaluations (e.g., explicit attitudes). If nonconscious evaluations contribute to actual experiences but not to affective forecasts, then measures of nonconscious evaluations should account for discrepancies between expected and actual emotions, thereby uniquely predicting affective forecasting errors.

We conducted two studies to evaluate this reasoning. To test these ideas in a controlled context while studying predicted and actual responses to a common and highly familiar source of daily pleasure, we selected food as our stimuli. In Study 1, to assess participants' nonconscious and conscious evaluations, we measured their implicit and explicit attitudes (respectively) toward apples and chocolate (Karpinski & Hilton, 2001). Participants then forecasted how much they would enjoy eating each food and reported their actual enjoyment after eating. We expected that participants' explicit attitudes would be the primary predictor of their affective forecasts. However, because nonconscious evaluations should be unavailable at the time of forecast but should contribute to in-the-moment experiences, we expected that individuals' implicit attitudes would uniquely predict their forecasting errors.

If true, then one might observe the expression of this nonconscious, association-based evaluative knowledge through nonverbal means. Specifically, research (e.g., Dovidio et al., 2002; McConnell & Leibold, 2001; Rydell & McConnell, 2006) has shown that people's nonconscious evaluations are "leaked out" through uncontrolled behavioral expressions, which therefore correlate with measures of implicit attitudes. Thus in Study 2, we assessed another indicator of nonconscious evaluative knowledge, one's nonverbal behavioral leakage, to observe if it could predict affective forecasting errors.

Study 1: Implicit attitudes predict affective forecasting errors

Method

Participants

At Miami University, 56 undergraduates participated for course credit (35 women, $M_{\text{age}} = 19.25$ years). They were told that the current study might involve tasting food and that people with relevant medical conditions (e.g., food allergies, diabetes) should not participate.

Measures

Explicit attitudes. To assess explicit attitudes, participants completed separate feeling thermometer measures for apples and for chocolate (McConnell & Leibold, 2001; Rydell & McConnell, 2006), indicating their positivity on a scale ranging from 0 (very unfavorable) to 100 degrees (very favorable). Evaluation order was counterbalanced.

Implicit attitudes. Participants' implicit attitudes were assessed using a personalized Implicit Association Test (IAT; Olson & Fazio, 2004). Although many implicit attitudes measures exist (e.g., Dovidio et al., 2002; Greenwald, McGhee, & Schwartz, 1998), we used the personalized IAT because it is argued to provide a reliable index of one's personally-relevant, automatically-activated evaluations (Han, Olson, & Fazio, 2006). In this task, a series of stimuli were presented on a computer monitor one at a time, and on each trial, participants categorized the stimulus using one of two response keys. There were seven experimental blocks, each with 20 trials (the presentation order of stimuli was randomly determined, and equal numbers of exemplars from the relevant categories were presented).

In Block 1, the stimuli consisted of several color images of chocolates and apples, and participants categorized each attitude object (keys were labeled "apples" and "chocolate"). In Block 2, participants categorized evaluative words (e.g., disco, spinach) based on their personal evaluations (keys were labeled "I like" and "I don't like"). In Blocks 3 and 4 (pro-chocolate combination blocks), attitude objects and evaluative words were presented, and each response key was associated with two categories (keys were labeled "I like or chocolate" and "I don't like or apples"). Block 5 repeated Block 1 but the response key labels were reversed. Finally, Blocks 6 and 7 (pro-apple combination blocks) repeated Blocks 3 and 4 but the labels were switched (keys were labeled "I like or apples" and "I don't like or chocolate").

Following Olson and Fazio (2004), error feedback was not presented and idiosyncratic evaluative words were used to enhance the personally-evaluative nature of the task.¹ By comparing the mean response latencies for the pro-apple and pro-chocolate combination blocks (regardless of block ordering), one can assess the strength of association between the attitude objects and evaluations (e.g., faster performance in the pro-chocolate combination blocks reflects having a more positive automatic evaluation of chocolate relative to apples).

Affective forecasts. After completing the attitude measures, participants reported how much they would enjoy eating each item (i.e., apples and chocolate, order counterbalanced) on a scale ranging from 1 (not at all) to 9 (very much).

Experiences. Finally, participants ate one food item and immediately reported how much they enjoyed it on a scale ranging from 1 (not at all) to 9 (very much). Next, they ate the other item and rated their enjoyment (order was counterbalanced).

Procedure

Before each experimental session, an experimenter prepared a sample of apple (3 cm³, cut fresh from a red delicious apple) and a piece of chocolate (3 cm² of Hershey's Bliss milk chocolate), each placed in its own souffle cup. Participants arrived for a study about "food-related experiences." After consenting to participate, they completed measures of the feeling thermometers, the IAT, their affective forecasts, and their

¹ Following past work (e.g., Greenwald et al., 1998; McConnell & Leibold, 2001; McConnell et al., 2008), a number of counterbalancing steps were taken with the presentation of stimuli (e.g., whether Blocks 3 and 4 were pro-chocolate and Blocks 6 and 7 were pro-apple vs. Blocks 3 and 4 were pro-apple and Blocks 6 and 7 were pro-chocolate) and the labeling of the response keys (e.g., whether a particular category label was associated with the left or right response key), none of which qualified the results and thus are not discussed further.

experiences. Participants were not told that they would evaluate the food until after they provided their forecasts.

Results

Data reduction

To analyze the IAT data, we followed our previous work (e.g., McConnell & Leibold, 2001; McConnell et al., 2008) to produce an *implicit attitudes preference* index. Specifically, each response latency was log transformed, with trials faster than 300 ms recoded as 300 ms and trials slower than 3000 ms recoded as 3000 ms (Greenwald et al., 1998).² The mean response latency for pro-chocolate combination blocks was subtracted from the mean response latency for pro-apple combination blocks. Thus, larger scores reflected a more positive association with chocolate than apples.

We used a parallel approach for all of our measures, calculating difference score indexes such that larger, positive values indicated preferring chocolate to apples. For example, an *explicit attitudes preference* index was created by subtracting the apple feeling thermometer rating from the chocolate feeling thermometer rating. This difference score approach not only reduces between-subject variability, but it is necessary because IAT-derived measures are relativistic (e.g., preference for chocolate relative to apples; see McConnell & Leibold, 2001; 2009; Nosek, Greenwald, & Banaji, 2006). Likewise, for both the forecasts and experiences, responses for apples were subtracted from chocolates. As a result, individuals who predicted enjoying or actually enjoyed chocolates more than apples had larger *forecast preference* and *experience preference* indexes, respectively. Most important, a *misforecast* index was calculated by subtracting the forecast preference index from the experience preference index. As the misforecast index increased, participants *actually* enjoyed the chocolate more than the apple in comparison to their forecasted enjoyment.

Predicting affective misforecasts

As Table 1 shows, participants exhibited small, statistically nonsignificant pro-chocolate preferences in their explicit attitudes, implicit attitudes, forecasts, experiences, and misforecasts. Consistent with past work (see Greenwald, Poehlman, Uhlmann, & Banaji, 2009), there was a small but reliable positive correlation between implicit and explicit attitudes. Although both implicit and explicit attitudes predicted forecasts and experiences (indicating that there was considerable and meaningful variability in all of the measures used in the study), only implicit attitudes predicted misforecasts. All of these relations were in the expected direction (e.g., more positive implicit attitudes toward chocolate predicted misforecasts such that participants' actual enjoyment of chocolate, relative to apples, exceeded their expectations).

To evaluate the critical questions regarding whether implicit and explicit attitudes make unique contributions to the three outcomes of interest (i.e., forecasts, experiences, and especially misforecasts), we conducted multiple regression analyses where each of the three outcomes of interest was regressed on the explicit and implicit attitude preference scores simultaneously; this is the same analytical approach used in past published work to examine the unique predictive utility of implicit and explicit attitude measures (e.g., Rydell & McConnell, 2006; Jellison, McConnell, & Gabriel, 2004). As Table 2 reveals, the findings were exactly as expected. Specifically, explicit but not implicit attitudes uniquely predicted forecasts (those

² Alternative IAT scoring approaches (e.g., ignoring latencies from Blocks 3 and 6, omitting error trials, using different scoring algorithms) yielded similar results. The current approach is consistent with our previously published work (e.g., McConnell & Leibold, 2001; McConnell et al., 2008; Rydell, McConnell, Mackie, & Strain, 2006). Analyses were conducted on the log-transformed values, but the data are reported in ms.

Table 1
Descriptive statistics and zero-order correlations for Study 1 indexes.

Indexes	Descriptives		Correlations between indexes			
	M	SD	Explicit	Implicit	Forecast	Experience
Explicit attitudes preference	7.16	30.88	–			
Implicit attitudes preference	39.02	200.93	.36**	–		
Forecast preference	0.36	2.65	.80**	.43**	–	
Experience preference	0.68	3.78	.49**	.52**	.57**	–
Misforecast	0.32	3.16	–.08	.26*	–.16	.72**

Note. For all indexes, larger preference scores reflect greater positivity toward chocolate than toward apples. Implicit attitudes preference index in ms.

** $p < .01$.

* $p < .05$.

with more positive explicit attitudes toward chocolate forecasted greater enjoyment of chocolate, all relative to apples). Actual experiences were predicted by both implicit and explicit attitudes (i.e., those with relatively more positive attitudes toward chocolate actually enjoyed the chocolate more than the apples). But most important, participants' misforecasts were predicted only by their implicit attitudes; that is, only participants' nonconscious evaluations predicted the magnitude of their affective forecasting errors. As a result, individuals with more positive implicit attitudes toward chocolate were most prone to underestimate how much they would enjoy the chocolate relative to the apple.

Discussion

Employing widely-used measures of implicit and explicit attitudes, Study 1 offered strong support for our hypotheses. First, affective forecasts were uniquely related to conscious evaluations (i.e., explicit attitudes) and unrelated to nonconscious evaluations (i.e., implicit attitudes). This makes sense because predictions of future enjoyment should be rendered on whatever information is consciously available during one's deliberations. By demonstrating that implicit attitudes predicted individuals' actual enjoyment of foods above and beyond their explicit attitudes, the current study also provided the first direct empirical support for Gawronski and Bodenhausen's (2006) theoretical argument that nonconscious evaluations help shape spontaneous affective experiences. But most important, although implicit attitudes were linked to in-the-moment enjoyment, these nonconscious evaluations were unavailable at the time of affective forecast, and as a result, only implicit attitudes could account for misforecasts (i.e., discrepancies between participants' affective forecasts and their actual enjoyment).

Study 2: Nonverbal leakage predicts affective forecasting errors

Although Study 1 provided strong support for our hypotheses that only implicit attitudes would predict affective misforecasts, we sought to obtain additional evidence that nonconscious evaluations are linked to affective forecasting errors in circumstances not involving

Table 2
Multiple regression analyses predicting outcome indexes from implicit and explicit attitude preference indexes in Study 1.

Outcome indexes	Standardized regression weights	
	Explicit attitude preference	Implicit attitude preference
Forecast preference	.74**	.16
Experience preference	.35**	.39**
Misforecast	–.21	.34*

** $p < .01$.

* $p < .05$.

intrusive attitudes measures. For instance, in Study 1 we chose to assess implicit attitudes with the personalized IAT, however any particular choice of attitude measure (explicit or implicit) can be contentious and subject to debate (e.g., Gawronski, Peters, & LeBel, 2008; Karpinski & Hilton, 2001; McConnell & Leibold, 2009; Olson & Fazio, 2004; Nosek & Hansen, 2008). Moreover, explicit attitude measures in general are subject to self-presentational concerns, which can cloud their interpretation (Fazio & Olson, 2003). Thus in Study 2, we avoided using direct measures of attitudes. Instead, we leveraged past findings showing that one's nonconscious association-based evaluations "leak out" through one's spontaneous nonverbal behaviors (e.g., Dovidio et al., 2002; McConnell & Leibold, 2001; Rydell & McConnell, 2006).

Admittedly, nonverbal leakage provides a "noisier," less direct indicator of nonconscious evaluations than do computer-administered tasks such as the IAT. But if even participants' nonverbal behaviors can predict their affective misforecasts, then this would supply further support for our central hypothesis, as well as carry important implications for real-world decision-making. Thus, integrating past work with the findings from Study 1, we focused on people's spontaneous nonverbal behaviors (instead of employing formal measures of implicit and explicit attitudes) and hypothesized that people's affective misforecasts should be predicted by the nonverbal responses they exhibit when presented with food items.

Method

Participants

Forty-six students (25 women, $M_{\text{age}} = 21.13$ years) at the University of British Columbia participated for two dollars. One male participant failed to complete the forecasting survey and was therefore not included in the analyses.

Procedure

Participants were recruited in public areas of campus for a taste-test study, though they were not told what foods they would sample. After completing consent forms, the experimenter lifted the cover from a dish, revealing the first food that participants would taste, which was either a bite-sized cookie or a small piece of celery. Two research assistants, positioned 3 m away from the participant and from each other, surreptitiously rated the participant's facial expression as soon as the food was revealed. Once revealed, participants predicted how much they would enjoy eating it. Next, they ate the food and rated their actual enjoyment. Both the affective forecast and actual enjoyment reports used the same 9-point scales from Study 1. The procedure was repeated with the other food, with food order counterbalanced between participants.

Coders stood behind the experimenter and thus were unable to see which food was revealed (the dish cover obstructed their view), keeping them unaware of the food presented. They rated how much the person would enjoy eating each food on a scale ranging from 1 (*not at all*) to 9 (*extremely much*) based on the participant's facial expression when the food was revealed. Coders demonstrated good interrater reliability ($r = .61$, $p < .001$), and thus the mean of their ratings served as a measure of facial expression positivity.

Results

Data reduction

Following Study 1, we created preference indexes that reflected greater positivity exhibited toward the cookie than toward the celery. First, we computed a *facial preference* index, subtracting coders' ratings of participants' expressions when the celery was revealed from their facial expressions when the cookie was revealed. Thus, greater scores on the facial preference index reflected how much more delighted participants appeared when shown the cookie than

the celery. This approach effectively eliminates irrelevant between-subject differences in general positivity and expressiveness, allowing us to focus on the component of participants' facial expressions that was specific to the particular foods revealed. Likewise, we computed preference indexes for both the forecasts and experiences, where responses for celery were subtracted from cookie. Thus, larger *forecast preference* and *experience preference* indexes indicated a prediction of enjoying (or actually enjoying) the cookie more than the celery. Finally, a *misforecast* index was calculated by subtracting the forecast preference index from the experience preference index. As the misforecast index increased, participants *actually* enjoyed the cookie more than the celery in comparison to their forecasted enjoyment. It is this misforecast index that we anticipated would be positively related to participants' facial preference scores, indicating that people's facial preferences for the cookie over the celery would predict the extent to which they actually enjoyed the cookie more than the celery in comparison to their forecasts.

Predicting affective misforecasts

Building on past research establishing that nonconscious evaluations are leaked through nonverbal behaviors and our findings from Study 1 that implicit attitudes alone predicted misforecasts, our primary hypothesis was that participants' facial reactions would predict their forecasting errors. To evaluate this reasoning, we conducted zero-order correlations among the preference indexes. As Table 3 indicates, participants' facial preferences tended to predict their actual experiences, suggesting that people who exhibited more facial positivity to the cookie than to the celery enjoyed the cookie more than the celery. Yet, participants' facial preferences were unrelated to their forecasted preferences, even though facial responses to each food were assessed just moments before participants made their affective forecasts. As a result, the correlation between facial preferences and the experience preference index was greater than the correlation between facial preferences and the forecast preference index, $z = 1.90$, $p < .03$ (one-tailed). Most important for our hypothesis, participants' facial expressions significantly predicted their forecasting errors, as captured by the misforecasting index. Specifically, individuals who displayed more facial positivity following the presentation of the cookie actually enjoyed it more than they forecasted (all relative to the celery). Thus, the important association-based evaluations that participants could not access when rendering their forecasts were displayed on their faces for observers to see.

General discussion

In the pursuit of happiness, people must preview what courses of actions will bring them enjoyment. The current work provides the first empirical evidence for an important obstacle in this pursuit:

Table 3
Descriptive statistics and zero-order correlations for Study 2 indexes.

Indexes	Descriptives		Correlations between indexes		
	<i>M</i>	<i>SD</i>	Facial	Forecast	Experience
Facial preference	0.49	1.71	–		
Forecast preference	1.61	2.03	–.04	–	
Experience preference	1.02	2.99	.25***	.58**	–
Misforecast	–.59	2.45	.34*	–.12	.74**

Note. For all indexes, larger preference scores reflect greater positivity toward the cookie than toward the celery. Overall, participants exhibited a preference for the cookie (relative to the celery), resulting in positive scores on the facial preference, forecast preference, and experience preference index. However, participants on average forecasted a slightly stronger pro-cookie preference than they actually experienced, resulting in a misforecast index that was nonsignificantly negative across the sample as a whole.

*** $p < .10$.

** $p < .01$.

* $p < .05$.

nonconscious evaluations that shape in-the-moment emotional experiences appear invisible to the mind's eye when rendering affective forecasts. Whether captured by lab-based measures of attitudes (Study 1) or by subtle and spontaneous displays of nonverbal leakage (Study 2), nonconscious responses consistently accounted for people's misforecasted enjoyment. Ironically, Study 2 indicates that although nonconscious evaluations may represent a forecasting blind spot for people, the flash of affect stemming from these evaluations may appear on their faces, readily visible to those around them.

Our conclusions are buttressed by the consistent pattern of results obtained using multiple methods to assess the underlying psychological construct of interest, nonconscious evaluations, in multiple contexts. That is, we found that forecasting errors were predicted by nonconscious evaluations both when we assessed this construct with the IAT in a lab setting (Study 1) and with participants' nonverbal behaviors outside of the lab (Study 2). Although converging evidence is always valuable, it is particularly worthwhile here to assuage concerns that may exist with the use of any particular measure of nonconscious evaluations, which continue to be controversial (Gawronski et al., 2008; McConnell & Leibold, 2009; Olson & Fazio, 2004; Nosek & Hansen, 2008).

It is conceivable, however, that our findings might stem from nonconscious evaluations being relatively immune to social desirability concerns. Perhaps, participants were reticent to tell the experimenter that they would prefer chocolate over apples (Study 1) or cookies over celery (Study 2). Their forecasts might reflect this concern with social desirability, such that their "true attitude" was only revealed by the measure of nonconscious evaluations (i.e., the IAT in Study 1 or nonverbal leakage in Study 2). From this perspective, nonconscious evaluations reflect the attitudes that participants are *able but unwilling* to report. Thus, because affective forecasts are contaminated by social desirability concerns, nonconscious evaluations predict forecasting errors. There are several reasons why this account is not supported by the data. First, in both studies, participants *did* forecast a preference for the "less healthy option" (i.e., chocolate or cookie) over the "healthy option" (i.e., apple or celery), which shows the participants were willing to acknowledge that they would prefer the less healthy option. Further, in Study 2 participants' forecasts actually *overestimated* how much they would like the cookie relative to the celery in comparison to their actual enjoyment. If social desirability was at work, participants should not forecast greater positivity toward the less healthy option, and their forecasts should not exaggerate their actual enjoyment of the less healthy option relative to the healthy option. In short, the current findings do not support such a social desirability interpretation.

Implications for affective forecasting

The current findings contribute to our understanding of the mental representations that underlie affective forecasts—and why these representations sometimes lead us astray. According to recent theorizing, when people engage in affective forecasting, "The cortex attempts to trick the rest of the brain by impersonating a sensory system. It simulates future events to find out what subcortical structures know, but try as it might, the cortex cannot generate simulations that have all the richness and reality of genuine perceptions" (Gilbert & Wilson, 2007, p. 317). In particular, Gilbert and Wilson (2007) argue that mental simulations often fall short by drawing on only a few key pieces of information while neglecting the large store of relevant details and memories associated with similar past events. Research on reasons analysis has demonstrated that focusing explicitly on a limited number of easily accessible and verbalizable attributes can lead people to make less satisfying decisions (e.g., Wilson & Schooler, 1991; Wilson et al., 1993). Conversely, disabling conscious thought can facilitate good decision-making by enabling people to harness

unconscious processes, which is capable of handling the vast stores of information that conscious thought leaves out (Dijksterhuis & Nordgren, 2006). While past research suggests that the simulations people use in affective forecasting are incomplete (e.g., Wilson, Lindsey, & Schooler, 2000), the current findings provide direct evidence that these mental previews leave out the rich network of nonconscious associations that shape our in-the-moment experiences.

In this way, the current work may help to explain some of the most dramatic forms of forecasting errors observed in the extant literature, whereby people's anticipated and actual emotional reactions differ considerably. For example, in a recent series of studies, people expected to feel very upset in response to witnessing an act of racism against an African-American person, but they actually responded with indifference (Kawakami, Dunn, Karmali, & Dovidio, 2009). Kawakami et al. (2009) speculated that this striking discrepancy emerged because people drew on their consciously accessible, egalitarian attitudes in forecasting that they would be upset about an act of racism, but that their more negative, nonconscious feelings toward African-Americans may have shaped their complacency in the moment when faced with this racist act. Our current findings provide the first empirical support for this reasoning by demonstrating that people overlook their own implicit attitudes in making affective forecasts.

More broadly, our work sheds light on the contexts that should provoke affective forecasting errors. Specifically, if affective forecasts are driven primarily by conscious evaluations, but nonconscious associations help shape actual emotions, then strong discordance between implicit and explicit attitudes should give rise to sharp discrepancies between predicted and actual emotions. Conversely, affective forecasting errors should be far less likely when one's conscious and nonconscious evaluations reveal greater correspondence. Thus the magnitude of implicit–explicit attitude discrepancies can qualify affective forecasting errors, just as they do for producing cognitive dissonance (e.g., Rydell et al., 2008), triggering greater elaboration of persuasive arguments (e.g., Briñol, Petty, & Wheeler, 2006), or revealing dissociations between spontaneous and planned behaviors (e.g., Rydell & McConnell, 2006).

Because correspondence between implicit and explicit attitudes depends on features of both the attitude object and the perceiver (e.g., Nosek, 2005), the current work enables a wide range of predictions about the person–situation interactions that will give rise to affective forecasting errors. Critically, the current work also explains *why* affective forecasting errors should occur in these contexts (i.e., the unavailability of nonconscious knowledge). Thus, the current studies both identify conditions under which affective forecasting errors are more likely and specify the processes through which these errors are produced, improving our understanding of why people's predictions about the future are often incorrect. Whereas much of the initial research on affective forecasting focused on nomothetic biases (e.g., showing that people, on average, overestimate the intensity of their emotions), the current work contributes to a new wave of research explicating the individual differences that shape forecasting accuracy (e.g., Dunn, Brackett, Ashton-James, Schneiderman, & Salovey, 2007; Quoidbach & Dunn, 2010).

Implications for implicit–explicit dissociations

In addition to contributing to the affective forecasting literature, the current work helps to explain how implicit–explicit attitude discrepancies can lead to unfavorable outcomes for people. Discrepancies between conscious and nonconscious knowledge are not unusual (McConnell et al., 2008; Petty & Brinol, 2009; Rydell & McConnell, 2010), and these mismatches result in outcomes ranging from increased negative affect (e.g., Rydell et al., 2008) to reduced emotional well-being (e.g., Brunstein et al., 1998). Our work indicates that discrepancies between implicit and explicit evaluations may undermine well-being by leading people to think that they are

pursuing courses of action that maximize their happiness when, in actuality, they are not. Going one step further, our findings provide initial evidence for a potential solution: Individuals who hold conflicting implicit and explicit evaluations may benefit from seeking input from those around them, to the extent that nonconscious evaluations leak out in the form of nonverbal behavior. This line of reasoning may explain why friends or therapists can sometimes have unique insights into people's emotional dilemmas that are invisible to those facing them first hand.

Further, the current work highlights the importance of nonconscious, associative knowledge, in line with many conceptualizations of attitudes that point to the value of appreciating differences between associative and propositional knowledge (e.g., Gawronski & Bodenhausen, 2006; McConnell et al., 2008; Rydell & McConnell, 2006; Smith & DeCoster, 2000; Strack & Deutsch, 2004; Wilson et al., 2000). Indeed, Study 1 provides strong support for the previously untested position advocated by Gawronski and Bodenhausen (2006) that associative knowledge (e.g., implicit attitudes) may play an important role in shaping in-the-moment, real-world affective experiences. Moreover, the core finding of the current work—that discrepancies between conscious and nonconscious evaluations help to explain when people do not pursue optimal courses of action—reaffirms the value of considering how implicit and explicit knowledge each play important roles in determining behavior.

Conclusion

In sum, diverse judgment frailties may occur when decision makers do not, or cannot, incorporate important knowledge into their deliberations (e.g., Slovic, 1996; Slovic, Finucane, Peters, & MacGregor, 2002; Tversky & Kahneman, 1974; Wilson & Dunn, 2004). For example, failures of introspection often result when the causes of one's feelings and behavior are unavailable to an individual and attempts to explain one's actions are grounded in seemingly plausible, but not necessarily accurate, accounts that one can articulate (Nisbett & Wilson, 1977). In a similar fashion, the current work illustrates how unavailable knowledge (e.g., one's implicit attitudes) shapes one's in-the-moment emotional experiences, but because such influences are invisible to the mind's eye, attempts to forecast future affect leave one in the dark.

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References

- Briñol, P., Petty, R. E., & Wheeler, S. C. (2006). Discrepancies between explicit and implicit self-concepts: Consequences for information processing. *Journal of Personality and Social Psychology*, *91*, 154–170.
- Brunstein, J. C., Schultheiss, O. C., & Grassmann, R. (1998). Personal goals and emotional well-being: The moderating role of motive dispositions. *Journal of Personality and Social Psychology*, *75*, 494–508.
- Dijksterhuis, A., & Nordgren, L. F. (2006). A theory of unconscious thought. *Perspectives on Psychological Science*, *1*, 95–109.
- Dovidio, J. F., Kawakami, K., & Gaertner, S. L. (2002). Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology*, *82*, 62–68.
- Dunn, E. W., Brackett, M. A., Ashton-James, C. E., Schneiderman, E., & Salovey, P. (2007). On emotionally intelligent time travel: Individual differences in affective forecasting ability. *Personality and Social Psychology Bulletin*, *33*, 85–93.
- Dunn, E. W., & Laham, S. M. (2006). Affective forecasting: A user's guide to emotional time travel. In J. P. Forgas (Ed.), *Affect in social thinking and behavior* (pp. 177–193). New York: Psychology Press.
- Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, *54*, 297–327.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, *132*, 692–731.
- Gawronski, B., Peters, K. R., & LeBel, E. P. (2008). What makes mental associations personal or extra-personal? Conceptual issues in the methodological debate about implicit measures. *Social and Personality Psychology Compass*, *2*, 1002–1023.
- Gilbert, D. T., & Wilson, T. D. (2007). Propection: Experiencing the future. *Science*, *317*, 1351–1354.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, *74*, 1464–1480.
- Greenwald, A. G., Poehlman, T. A., Uhlmann, E., & Banaji, M. R. (2009). Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, *97*, 17–41.
- Han, H. A., Olson, M. A., & Fazio, R. H. (2006). The influence of experimentally created extrapersonal associations on the Implicit Association Test. *Journal of Experimental Social Psychology*, *42*, 259–272.
- Jellison, W. A., McConnell, A. R., & Gabriel, S. (2004). Implicit and explicit measures of sexual orientation attitudes: Ingroup preferences and related behaviors and beliefs among gay and straight men. *Personality and Social Psychology Bulletin*, *30*, 629–642.
- Karpinski, A., & Hilton, J. L. (2001). Attitudes and the Implicit Association Task. *Journal of Personality and Social Psychology*, *81*, 774–788.
- Kawakami, K., Dunn, E. W., Karmali, F., & Dovidio, J. F. (2009). Mispredicting affective and behavioral responses to racism. *Science*, *323*, 276–278.
- McConnell, A. R., & Leibold, J. M. (2001). Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology*, *37*, 435–442.
- McConnell, A. R., & Leibold, J. M. (2009). Weak criticisms and selective evidence: Reply to Blanton et al. (2009). *Journal of Applied Psychology*, *94*, 583–589.
- McConnell, A. R., Rydell, R. J., Strain, L. M., & Mackie, D. M. (2008). Forming implicit and explicit attitudes toward individuals: Social group association cues. *Journal of Personality and Social Psychology*, *94*, 792–807.
- Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, *84*, 231–259.
- Nosek, B. A. (2005). Moderators of the relationship between implicit and explicit evaluation. *Journal of Experimental Psychology: General*, *134*, 565–584.
- Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2006). The Implicit Association Test at age 7: A methodological and conceptual review. In J. A. Bargh (Ed.), *Social psychology and the unconscious: The automaticity of higher mental processes* (pp. 265–292). New York: Psychology Press.
- Nosek, B. A., & Hansen, J. J. (2008). Personalizing the Implicit Association Test increases explicit evaluation of target concepts. *European Journal of Psychological Assessment*, *25*, 226–236.
- Olson, M. A., & Fazio, R. H. (2004). Reducing the influence of extra-personal associations on the Implicit Association Test: Personalizing the IAT. *Journal of Personality and Social Psychology*, *86*, 653–667.
- Petty, R. E., & Brinol, P. (2009). Implicit ambivalence: A meta-cognitive approach. In R. E. Petty, R. H. Fazio, & P. Brinol (Eds.), *Attitudes: Insights from the new implicit measures* (pp. 119–164). New York: Psychology Press.
- Quoidbach, J., & Dunn, E. W. (2010). Personality neglect: The unforeseen impact of personal dispositions on emotional life. *Psychological Science*, *21*, 1783–1786.
- Rydell, R. J., & McConnell, A. R. (2006). Understanding implicit and explicit attitude change: A systems of reasoning analysis. *Journal of Personality and Social Psychology*, *91*, 995–1008.
- Rydell, R. J., & McConnell, A. R. (2010). Discrepancies and consistencies in implicit and explicit attitudes. In B. Gawronski, & B. K. Payne (Eds.), *Handbook of implicit social cognition: Measurement, theory, and applications* (pp. 295–310). New York: Guilford.
- Rydell, R. J., McConnell, A. R., & Mackie, D. M. (2008). Consequences of discrepant explicit and implicit attitudes: Cognitive dissonance and increased information processing. *Journal of Experimental Social Psychology*, *44*, 1526–1532.
- Rydell, R. J., McConnell, A. R., Mackie, D. M., & Strain, L. M. (2006). Of two minds: Forming and changing valence inconsistent implicit and explicit attitudes. *Psychological Science*, *17*, 954–958.
- Slovic, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin*, *119*, 3–22.
- Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 397–420). Cambridge, UK: Cambridge University Press.
- Smith, E. R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. *Personality and Social Psychology Review*, *4*, 108–131.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*, 220–247.
- Taylor, S. E., & Brown, J. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*, 193–210.
- Taylor, S. E., Lerner, J. S., Sherman, D. K., Sage, R. M., & McDowell, N. K. (2003). Are self-enhancing cognitions associated with healthy or unhealthy biological profiles? *Journal of Personality and Social Psychology*, *85*, 605–615.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, *185*, 1124–1131.
- Wilson, T. D., & Dunn, E. W. (2004). Self-knowledge: Its limits, value, and potential for improvement. *Annual Review of Psychology*, *54*, 493–518.
- Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 35. (pp. 345–411) San Diego, CA: Academic Press.

- Wilson, T. D., & Gilbert, D. T. (2005). Affective forecasting: Knowing what to want. *Current Directions in Psychological Science*, *14*, 131–134.
- Wilson, T. D., Lisle, D., Schooler, J., Hodges, S. D., Klaaren, K. J., & LaFleur, S. J. (1993). Introspecting about reasons can reduce post-choice satisfaction. *Personality and Social Psychology Bulletin*, *19*, 331–339.
- Wilson, T. D., Lindsey, S., & Schooler, T. Y. (2000). A model of dual attitudes. *Psychological Review*, *107*, 101–126.
- Wilson, T. D., & Schooler, J. W. (1991). Thinking too much: introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology*, *60*, 181–192.