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Developmental Sources of Implicit Attitudes

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Explanations for implicit and explicit attitude dissociation have largely focused on causes of explicit attitudes. By contrast, this article examines developmental experiences as potential sources of implicit (more than explicit) attitudes, using attitudes toward smoking and body weight, which have shown dissociation with self-reports. In Study 1, smokers' implicit and explicit attitudes toward smoking were uniquely predicted by their early and recent experiences with smoking, respectively. In Study 2, participants' childhood and current weight uniquely predicted implicit and explicit body weight attitudes, respectively. Furthermore, being raised primarily by a beloved, heavyweight mother predicted proheavy implicit (but not explicit) attitudes. In Study 3, people's reports of pleasant dreams in childhood (but not currently) predicted their implicit attitudes toward dreams. In concert, results provide support for theorizing that implicit and explicit attitudes may stem from different sources of information and are, therefore, conceptually distinct.

Keywords: *implicit attitudes; implicit social cognition; automatic attitudes; automatic associations; Implicit Association Test*

Imagine that you grew up in a house with two chain-smoking parents. To make matters worse, you lived in a cold climate so that the windows were shut for 9 months out of the year. To add insult to injury, you suffered from pneumonia every winter, resulting in periods of hospitalization that often deprived you of joyful holidays. As you matured, you not only learned to tolerate smoking but you became an avid smoker. What will your attitude toward smoking be?

One possibility is that your recent experiences with smoking will result in a largely favorable evaluation of your habit. However, if you define attitudes as an association in long-term memory between objects and valence (Fazio, 1990), it is just as likely that you will

have a negative evaluation of smoking derived from your childhood experiences. Indeed, the explosion of interest in implicit attitudes rests on the fact that well-learned attitudes are accessed automatically (i.e., without effort or control) in the presence of attitude objects. A third possibility—and the hypothesis tested by this research—is that your explicit, self-reported attitude will stem largely from recent experiences (and therefore be positive), whereas your implicit attitude will be influenced by your childhood experiences with smoking (and therefore be negative). If your explicit and implicit attitudes have disparate sources, we would not expect them to covary or even to share the same valence (Rudman, 2004). In essence, each evaluation would be legitimate but because they stem from different types of information they would conflict, resulting in “dual attitudes” (Wilson, Lindsey, & Schooler, 2000). Although there is debate about the coexistence of dual attitudes (Fazio & Olson, 2003), there has been little attempt to inform this discussion by examining the sources of implicit attitudes. This was the primary aim of this research.

IMPLICIT AND EXPLICIT ATTITUDES

Operationally, response latency (implicit) measures assume that performing tasks in which responses and attitudes are congruent (i.e., well associated) is easier than performing tasks in which responses and attitudes are incongruent. Because latency judgments do not depend

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on respondents' willingness or ability to be forthcoming about their opinions, implicit measures have been hailed as a "bona fide pipeline" to respondents' true attitudes (Fazio, Jackson, Dunton, & Williams, 1995). However, this approach assumes that when implicit and explicit attitudes differ it is because of the untrustworthiness of self-reports. By contrast, attending to potential differences in the sources of attitudes leaves open the possibility that each evaluation is genuine but that they differ for theoretical reasons.

How different are they? It is no secret that implicit and explicit attitudes are often (although not always) dissociated. For example, a meta-analysis of the prejudice literature showed weak convergence ($r = .24$) for implicit and explicit measures (Dovidio, Kawakami, & Beach, 2001). To date, explanations for this pattern have focused largely on causes of explicit attitudes—and, in particular, on people's ability to control self-reports (Dovidio & Fazio, 1992). For example, prejudice, like smoking, is stigmatized. Engaging in stigmatized actions has implications for how the self is viewed—not only by others, but also by one's self (Breckler & Greenwald, 1986). Thus, we might expect self-reports to be biased (e.g., by social desirability or self-justification motives) under these conditions. In fact, prejudice research suggests that respondents' motives to be nonprejudiced can moderate implicit–explicit attitude links (e.g., Dunton & Fazio, 1997; Fazio et al., 1995). Specifically, people low on motives to be nonprejudiced tend to show stronger implicit–explicit prejudice relationships as compared with people high on these motives. In a similar vein, Swanson, Rudman, and Greenwald (2001) found that the stigmatization of health-related behaviors moderated implicit–explicit attitude convergence. Smokers showed dissociation between their implicit and self-reported attitudes toward smoking (average $r = .15$), whereas nonstigmatized actors (e.g., vegetarians and omnivores) showed significant implicit–explicit attitude relations (average $r = .53$). Taken together, these findings suggest that motivational pressures influence some attitudes and that these may contaminate explicit measures more than implicit measures (see also Nosek, 2005).

DEVELOPMENTAL SOURCES OF IMPLICIT ATTITUDES

Although the focus on the controllability of self-reports has been fruitful, it focuses solely on the causes of explicit attitudes and ignores other explanations for why implicit and explicit attitudes might diverge—in particular, because they may stem from different sources of information (Rudman, 2004). To explore this possibility, this research investigated developmental

experiences as a factor that may influence implicit more than explicit attitudes. In early theorizing, Greenwald and Banaji (1995) argued that implicit attitudes stem from past (and largely forgotten) experiences, whereas self-reports may reflect more recent and accessible events. Similarly, Wilson et al. (2000) hypothesized that implicit attitudes may be informed by developmental events more so than are explicit attitudes. We will refer to this view as the developmental sources hypothesis.

In support of this hypothesis, Rudman and Goodwin (2004) found that people's earliest experiences with females (maternal caregivers) influenced automatic gender attitudes. First, people raised primarily by their mothers implicitly preferred women to men. Second, implicit parent and gender attitudes were linked such that people favored women over men if they also preferred their mothers to their fathers. By contrast, explicit parent and gender attitudes did not reliably covary. Thus, maternal evaluations biased attitudes toward women in general but only at the automatic level.

This research tests the generalizability of the influence of developmental events on implicit attitudes. In Study 1, we investigated whether smokers' implicit attitudes might be derived from their early experiences with smoking. Even smokers' early experiences with smoking are likely to have been negative (e.g., aversive reactions to tobacco smoke or nausea from their first cigarette). By contrast, their more recent experiences with smoking might inform explicit attitudes, and these are likely to be more positive (e.g., sharing coffee and cigarettes with friends). If Study 1 supports these hypotheses, results would help to explain why smokers showed surprisingly negative implicit attitudes in Swanson et al.'s (2001) research ($d = -.28$), whereas their explicit attitudes were more positive ($d = .29$).¹ Moreover, Swanson et al. found, in three experiments, that smokers routinely showed dissociation between their implicit and explicit attitudes.

Similarly, past research has revealed strong automatic preference for slim over heavyweight people (i.e., implicit sizeism) that unreliably covaried with explicit attitudes (Rudman, Feinberg, & Fairchild, 2002). In Study 2, we tested the influence of developmental events on implicit sizeism in two ways. First, we assessed people's weight while they were growing up and their current weight. Past Implicit Association Test (IAT) research has found robust links between group identification and ingroup bias (e.g., Greenwald et al., 2002; Nosek, Banaji, & Greenwald, 2002). Thus, we would expect heavyweight people to show less proslim bias than would slim people. However, if being heavy while young predicts implicit attitudes even after controlling for current weight, this will support the developmental sources hypothesis. By contrast, current weight should be the sole predictor of explicit attitudes. Second, following

Rudman and Goodwin's (2004) finding that implicit gender attitudes were linked to maternal attitudes, we investigated whether implicit sizeism might stem from early experiences with primary caregivers. Our hypothesis was that people raised by a beloved mother might show less implicit preference for slim people if their mother was heavy when they were young. By contrast, explicit sizeism should be less susceptible to the influence of childhood experiences with a maternal caregiver.

In Study 3, we tested whether developmental events would influence implicit attitudes toward dreams, an object that is not as stigmatized as smoking or body weight. To do so, people reported their current and childhood dream experiences. If implicit dream attitudes are predicted by the quality of people's childhood (but not their current) dreams, support for the developmental sources hypothesis would be shown using a nonreactive object.

In each study, we used the IAT because it has demonstrated the requisite construct validity (for reviews, see Banaji, 2001; Greenwald & Nosek, 2001; Nosek, Greenwald, & Banaji, 2007; Poehlman, Uhlmann, Greenwald, & Banaji, 2004) as well as flexibility (e.g., Rudman, Greenwald, Mellott, & Schwartz, 1999). Moreover, the IAT has successfully measured smoking evaluation (Swanson et al., 2001) and body weight attitudes (Rudman et al., 2002) in the past. Finally, recent improvements in the IAT scoring algorithm have effectively reduced unwanted sources of variance, including procedural variations, differences in cognitive abilities, and task switching (Cai, Sriram, Greenwald, & McFarland, 2004; Greenwald, Nosek, & Banaji, 2003; Mierke & Klauer, 2003; see Nosek et al., 2007, for a review). Thus, the improved scoring method was another reason to use the IAT.

In sum, we examined early experiences as a stronger source for implicit attitudes, compared with recent events, in three studies. Although past research has been suggestive of this possibility (e.g., Rudman & Goodwin, 2004), to our knowledge this investigation reflects the first direct test of the developmental sources hypothesis. If supported, it would suggest a framework for understanding how people might hold dual attitudes toward any given object (Wilson et al., 2000, see also Greenwald & Banaji, 1995).

STUDY 1

Study 1 examined whether early experiences might inform smokers' implicit attitudes, whereas recent experiences might inform their explicit attitudes. We used smokers because they showed implicit–explicit dissociation in past research and because their implicit and explicit attitudes were negative and positive, respectively

(Swanson et al., 2001). Because early experiences with smoking are likely to be aversive, covariation between the IAT and this variable would help explain why smokers' implicit attitudes toward smoking tend to be negative. More important, the observation that implicit and explicit attitudes stem from different sources would support conceptualizing each as legitimate but distinct evaluations (Rudman, 2004).

Method

Participants

There were 82 smoking participants (52 female). Of these, 45 were undergraduate smokers who participated for partial fulfillment of course requirements. In addition, 37 smokers were recruited from the community via advertisements and were paid \$15 to participate. The student and community groups did not differ with respect to their demographic makeup (e.g., their average age was 19.8 and 20.4, respectively). The sample consisted of 40 (49%) White people, 28 (34%) Asian American people, and 14 (17%) people who reported another ethnicity.

Materials and Procedure

Social behaviors measure. Participants reported the number of cigarettes they smoked daily. The undergraduate and community groups scored similarly, $t(80) = 1.54$, *ns* ($M = 15.00$). We asked how many years they had smoked, and again, the undergraduate and community samples did not differ, $t(80) < 1.00$, *ns* ($M = 3.5$). In tandem with their demographic similarities, these data suggested that we could combine the two groups. As filler items, questions pertaining to other social behaviors (e.g., alcohol use) also appeared on this measure.

Thought-listing tasks. To assess attitude predictors, participants completed two thought-listing tasks. Instructions on each page described the type of thoughts participants should generate, followed by nine lines. Participants were asked to only list thoughts that came quickly and easily to mind. These concerned the recent experiences they had with smoking and the earliest experiences they had with smoking. Participants were instructed to write only one thought per line and to write at least five thoughts on each page. Following this, participants were instructed to return to their thoughts and to indicate, for each one, whether it was positive or negative toward smoking on a scale ranging from -3 (*extremely negative toward smoking*) to $+3$ (*extremely positive toward smoking*). Participants' scores were then summed to form indexes such that high scores reflected positively on smoking (all α s $>.75$). Because

all participants completed five thoughts as instructed, we limited these indexes to the first five thoughts to ensure comparability across participants and measures.

Explicit attitude index. Participants completed two sets of five semantic differentials, labeled “Smoking” and “Not Smoking.” The bipolar adjectives used were *good–bad*, *pleasant–unpleasant*, *sociable–unsociable*, *ugly–beautiful*, and *calming–stressful*. The endpoints ranged from -3 to $+3$. After recoding reverse-scored items, participants’ ratings were averaged for each behavior (both α s $> .79$). The difference between these was computed such that high scores indicated more favorable evaluation of smoking. A difference score was used because it provides the best counterpart to the IAT (see below).

The attitude IAT. The smoking attitude IAT (Swanson et al., 2001, Experiment 3) used pictures of rooms in which smoking stimuli (a cigarette burning in an ashtray) were either present or absent.² The eight pleasant words used were *cuddle*, *happy*, *smile*, *joy*, *warmth*, *peace*, *paradise*, and *love*. The eight unpleasant words used were *pain*, *awful*, *disaster*, *grief*, *agony*, *brutal*, *tragedy*, and *bad*. Implicit attitudes were assessed by asking people to press the same response key for either smoking or pleasant stimuli and to press the opposite response key for either nonsmoking or unpleasant stimuli (abbreviated as smoking + pleasant). These associations were then reversed (abbreviated as smoking + unpleasant). The order in which participants performed these two tasks was counterbalanced. The IAT effect is the difference in response latency when performing tasks that oblige associating smoking + pleasant, compared with smoking + unpleasant, such that high scores indicate more favorable implicit attitudes toward smoking. In this research, we followed recommended use of the *D* statistic (which standardizes the IAT effect separately for each individual; Greenwald et al., 2003).

Procedure. Participants participated in separate cubicles and used a desktop personal computer. The consent form stated that the researchers were investigating attitudes toward social behaviors (e.g., smoking, drinking, safe sex, and driving). Participants were told they would be randomly assigned to answer questions in depth about one of these behaviors (in all cases, smoking). Participants then completed the explicit and implicit measures in the order described above. Order of the thought-listing tasks was counterbalanced (a procedural variable that did not affect results). Once completed, participants placed their materials in a manila envelope. The experimenter then started Inquisit, a program that randomly presented items within each attitude measure. The IAT was administered

exactly as in past research (Swanson et al., 2001, Experiment 3). All participants were debriefed and compensated after completion of the IAT.

Results and Discussion

Preliminary Analyses

Initial analyses showed no significant differences for Study 1’s variables as a function of participants’ gender or compensation. Therefore, we collapsed the data across these variables. Table 1 (bottom rows) shows the summary statistics. High scores on all variables reflect favorably on smoking.

Attitudes. Replicating Swanson et al. (2001), smokers showed negative implicit but positive explicit attitudes toward smoking. The effect sizes (Cohen’s *d*) were $-.53$ and $.35$, respectively.³ Not shown in Table 1, IAT scores predicted the amount of cigarettes smoked daily, $r(80) = .30$, $p < .01$, as did explicit attitudes, $r(80) = .37$, $p < .001$. That is, smokers showed more favorable attitudes toward their habit the more they engaged in it.⁴ However, echoing Swanson et al., smokers’ implicit and explicit attitudes did not converge, $r(80) = .15$, *ns* (see Table 1).

Early and recent experiences. As expected, Table 1 shows that smokers reported more negative early, compared with recent, experiences with smoking, $t(81) = 4.35$, $p < .001$. Sample statements for early experiences included childhood events (e.g., “I hated being stuck in the car when my mom smoked”) and memories of their first cigarettes (e.g., “I felt dizzy and sick the first time I smoked”). By contrast, recent experiences were relatively positive (e.g., “I smoked with my friend Chris at a bar last night”).

Sources of Smokers’ Attitudes

The primary goal was to examine whether implicit and explicit attitudes might stem from different sources of information. Table 1 shows the correlations between smokers’ attitudes and the thought-listing tasks. As can be seen, the IAT reliably covaried with early experiences with smoking but negligibly with recent experiences. The difference between these two correlations was reliable, $z = 2.40$, $p < .05$. By contrast, explicit attitudes covaried significantly with recent experiences with smoking but negligibly with early experiences. The difference between these two correlations was also reliable, $z = 2.43$, $p < .05$.

In addition, we regressed IAT scores on early experiences after holding recent experiences constant. Results showed a main effect for early experiences, $\beta = .28$,

TABLE 1: Means, Standard Deviations, and Correlations Between Measures (Study 1)

	<i>Attitude IAT</i>	<i>Explicit Attitude</i>	<i>Early Experiences</i>	<i>Recent Experiences</i>
Explicit attitude	.15			
Early experiences	.33**	.04		
Recent experiences	.06	.34**	.10	
Mean	-0.36	0.43	-1.92	0.32
Standard deviation	0.68	1.22	1.61	3.06

NOTE: IAT = Implicit Attitude Test. The IAT is shown in *D* statistic form (Greenwald, Nosek, & Banaji, 2003). High scores on all variables reflect favorably on smoking.

** $p < .01$.

$p = .01$, but not for recent experiences, $\beta = -.09$, *ns*. Finally, we regressed explicit attitudes on recent experiences after holding early experiences constant. Results showed a main effect for recent experiences, $\beta = .28$, $p = .01$, but not for early experiences, $\beta = .03$, *ns*.

In sum, Study 1's results support the developmental sources hypothesis and suggest that the two attitudes are distinct, in part, because they can reflect different events. Because early experiences with smoking were more unfavorable, compared with recent events, they also help to explain why smokers' implicit attitudes were negative (see also Swanson et al., 2001).

STUDY 2

Study 2 examined whether early experiences might inform implicit sizeism (i.e., preference for slim compared with heavyweight people). As in the past, we expected participants' own weight to result in ingroup bias (Rudman et al., 2002); however, if participants' childhood weight uniquely predicted implicit (but not explicit) attitudes after controlling for present weight, results would support the developmental sources hypothesis. In addition, we asked people to report their parents' weight when they were young, their attitudes toward their parents, and to identify their primary caregiver. We expected people raised primarily by heavyweight mothers to prefer heavy to slim people, provided they liked her (suggesting their experiences with her were positive).⁵ We did not expect this pattern for explicit attitudes, given past research showing that maternal attitudes predicted gender attitudes but only when using the IAT (Rudman & Goodwin, 2004). Study 2 provides a more stringent test of the developmental sources hypothesis because we used explicit parental attitudes (as opposed to the IAT) as a means of ruling out method variance, which might explain Rudman and Goodwin's (2004) results. As in Study 1, if implicit and explicit attitudes stem from different sources, results would again support conceptualizing each as legitimate but distinct evaluations.

Method

Participants

There were 197 undergraduate participants (121 female). Of participants, 104 (53%) were White, 43 (22%) were Asian American, 18 (9%) were African American, 15 (8%) were Latino, and 17 (8%) were people who reported another ethnicity.

Materials and Procedure

The attitude IAT. The body weight attitude IAT (Rudman et al., 2002) used Study 1's 16 pleasant and unpleasant words. The stimuli used to represent slim were *slim, lanky, slender, thin, lean, slight, trim, and skinny*. The stimuli used to represent heavy were *heavy, overweight, chubby, fat, obese, plump, large, and stout*. The order in which participants performed the slim + pleasant and heavy + pleasant tasks was counterbalanced (a procedural variable that did not affect results). The IAT effect was computed such that high scores indicate more favorable implicit attitudes toward slim, compared with heavyweight, people.

Explicit attitude index. Participants completed two thermometers on which they separately indicated their attitudes toward slim and heavyweight people on scales ranging from 1 (*very cold, unfavorable*) to 10 (*very warm, favorable*). To parallel the IAT, the difference between these was computed such that high scores indicate a more favorable evaluation of slim people.

Parental measures. Participants completed two thermometers on which they separately indicated their attitudes toward their mother and father on scales ranging from 1 (*very cold, unfavorable*) to 10 (*very warm, favorable*). We also included several filler items (e.g., women, men, conservatives, liberals) to bolster the cover story. In addition, we asked participants to indicate whether their primary caregiver when they were small was their mother, father, both equally, or neither. The caregiver index was coded 1 (neither), 2 (father), 3 (both equally),

TABLE 2: Means, Standard Deviations, and Correlations Between Measures (Study 2)

	<i>Attitude IAT</i>	<i>Explicit Attitude</i>	<i>Early Weight</i>	<i>Present Weight</i>
Explicit attitude	.12			
Early weight	-.22**	-.11		
Present weight	-.21**	-.24**	.63**	
Mean	0.41	1.85	3.36	3.55
Standard deviation	0.43	3.24	1.52	1.30

NOTE: IAT = Implicit Attitude Test. The IAT is shown in *D* statistic form (Greenwald, Nosek, & Banaji, 2003). High scores on attitude measures reflect stronger preference for slim than heavy people. Participants' early weight (when growing up) and present weight were measured on scales ranging from 1 (*very thin*) to 7 (*very heavy*).

** $p < .01$.

and 4 (mother). Finally, participants responded to two items ("How would you describe your mother [father] when you were growing up?") on scales ranging from 1 (*very thin*) to 7 (*very heavy*) to assess their parents' weight when they were young.

Participant weight measures. To assess their own weight when they were young and at the present time, participants responded to two items ("How would you describe your weight when you were growing up [right now]?") on scales ranging from 1 (*very thin*) to 7 (*very heavy*). Although these items covaried, $r(195) = .63$, $p < .001$, we kept them as separate indexes to test our hypotheses.

Procedure. Participants participated in separate cubicles and used a desktop personal computer. The consent form stated that the researchers were investigating attitudes toward social groups (e.g., men and women, conservatives and liberals, slim and heavy people). Participants were told they would be randomly assigned to answer questions in depth about one of these groups (in all cases, slim and heavy people). Participants then completed the IAT and explicit measures in the order described above using Inquisit (again, the program randomly presented items within each measure). The decision to administer the IAT prior to the explicit measures (as opposed to vice versa in Study 1) was done to assess whether Study 1's findings might have been biased by participants' conscious deliberation of early versus recent experiences. All participants were debriefed and compensated when they were finished.

Results and Discussion

Predicting Body Weight Attitudes

The bottom of Table 2 shows that people on average preferred slim to heavyweight people on both the IAT and the explicit attitude index but especially on the former ($d_s = .95$ and $.57$, corresponding to large and moderate effects, respectively). As in past research, there was

only weak (albeit positive) covariation between implicit and explicit attitudes, $p = .10$ (Rudman et al., 2002).

Childhood versus current weight. Table 2 also shows correlations between the attitude measures and participants' weight assessments. As expected, the IAT negatively covaried with people's weight when they were growing up. That is, the heavier people were when they were growing up, the less implicit prejudice they showed toward heavyweight people. By contrast, explicit prejudice was not related to this developmental event. Instead, people's present weight was reliably linked to explicit attitudes as well as to the IAT, suggesting that currently overweight people were less prejudiced toward heavyweight people, irrespective of measure. This supports our attitude measures' known groups validity (see also Rudman et al., 2002). We next turned to the hypothesis that early experiences would inform the IAT more than present events.

After standardizing all variables, we compared the ability of childhood and current weight to predict implicit and explicit attitudes in separate regression equations. Gender (coded as 1 = *men*, 2 = *women*) was entered as a covariate, although it did not have a reliable effect on any of the variables, all $t_s < 1.93$, $p_s > .06$. Our main goal was to determine which of the weight assessments might uniquely predict implicit and explicit attitudes (if either) when both were entered simultaneously as predictors. Table 3 (Model 1) shows the results separately for the IAT and explicit attitude analyses. As can be seen, the IAT was uniquely predicted by participants' childhood weight but not their current weight, whereas explicit attitudes showed the reverse pattern. These findings support our hypothesis that developmental events can inform implicit evaluations more so than current events.

The role of maternal caregiving. Additional support for the developmental sources hypotheses would emerge if IAT scores were moderated by experiences with early

TABLE 3: Regression Analyses (Study 2)

	Implicit Attitudes		Explicit Attitudes	
	β	t	β	t
Model 1				
Participant gender	-.08	1.14	-.01	0.09
Cross-method attitude	.03	0.38	.09	1.05
Early weight	-.18	2.49*	.04	0.47
Present weight	-.07	0.83	-.23	2.45*
Model 2				
Maternal attitude	.23	2.91*	.28	3.53**
Maternal weight	-.03	0.38	-.07	0.94
Caregiver	.05	0.70	-.13	1.86
Maternal Attitude \times Maternal Weight	-.09	1.10	-.12	1.56
Maternal Attitude \times Caregiver	-.04	0.40	-.14	1.57
Maternal Weight \times Caregiver	-.03	0.37	-.05	0.78
Attitude \times Weight \times Caregiver	-.19	2.05*	.04	0.44

NOTE: Standardized regression coefficients are shown. Participant gender was coded 1 (*male*) and 2 (*female*). In Model 1, the cross-method attitude variables in the implicit and explicit attitude analyses are the thermometer index and the Implicit Attitude Test, respectively. Caregiver reflects who raised participants when they were small and was coded 1 (neither), 2 (father), 3 (both equally), 4 (mother). Overall Rs for Model 1 were .28, $p < .01$, and .23, $p < .05$, for the implicit and explicit measures, respectively. Overall Rs for Model 2 were .31, $p < .01$, for both measures.

* $p < .05$. ** $p < .01$.

caregivers (Rudman & Goodwin, 2004). After standardizing variables, we separately regressed the IAT and explicit attitudes on maternal attitude, maternal weight when participants were young, the caregiver index, and their interactions. Gender was not included because it had negligible effects on all of the variables, all $ts < 1.00$, *ns*.

Table 3 (bottom half) shows the results. As can be seen, both implicit and explicit attitudes were positively predicted by maternal attitude. However, we expected people raised primarily by their mothers to show less implicit prejudice toward heavyweight people, provided their mother was overweight when they were growing up and they liked her. The anticipated three-way interaction emerged in the IAT analysis but not in the explicit attitude analysis. To pursue the IAT finding, we compared people raised primarily by a maternal caregiver ($n = 113$; 57%) to the remaining sample ($n = 84$; 43%). The latter group was comprised of 70 people raised equally by both parents (36%), 8 people raised by neither parent (4%), and 6 people raised primarily by a paternal caregiver (3%). Results for people primarily raised by their mother showed the predicted Maternal Weight \times Maternal Attitude interaction, $\beta = -.24$, $p = .01$. Results for the comparison group showed only a main effect for maternal attitude, $\beta = .27$, $p < .05$; the two-way interaction was weak and in the opposite direction, $\beta = .13$, *ns*.

To illustrate these findings, Figure 1 displays the regression lines predicting implicit bias as a function of maternal weight while growing up for participants scoring two standard deviations above and below the mean on the maternal attitude index. The top half of Figure 1 shows

the pattern for people whose primary caregiver was maternal. As expected, these participants implicitly favored heavyweight people to the extent they liked their overweight mother. Moreover, they implicitly favored slim people to the extent they liked their mother and she was slim. By contrast, the bottom half of Figure 1 shows only that people who did not have a primary maternal caregiver tended to prefer slim people if they liked their mothers, irrespective of maternal weight.

In sum, Study 2's focal findings were that weight while growing up was a unique predictor of implicit sizeism (after controlling for present weight), whereas the opposite pattern was shown for explicit attitudes. In addition, positive experiences with a maternal caregiver influenced implicit (but not explicit) attitudes in a direction that favored her weight when people were young. In concert with Study 1 (and Rudman & Goodwin, 2004), these results provide promising support for the hypothesis that developmental events influence implicit attitudes (Greenwald & Banaji, 1995; Wilson et al., 2000).

STUDY 3

The primary aim of Study 3 was to examine whether developmental events might influence implicit attitudes toward dreams, an attitude object that is not stigmatized or likely to be reactive. If participants' early experiences with dreams are more predictive of implicit attitudes than their current experiences, more support for the developmental sources hypothesis will be shown. Because people are likely to vary with respect to their

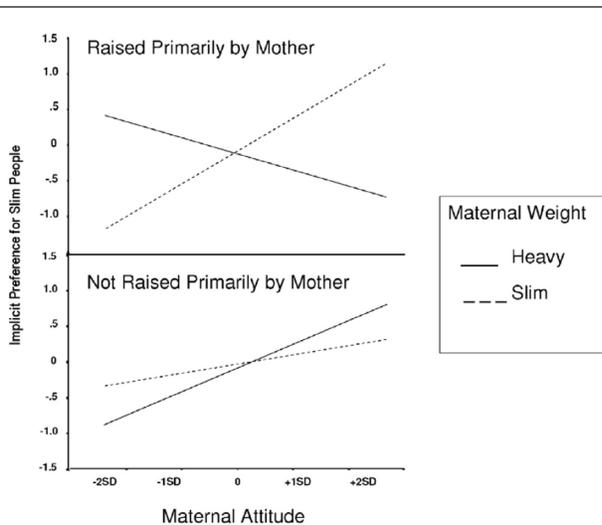


Figure 1 Regression lines predicting Implicit Attitude Test–assessed preference for slim over heavy people as a function of maternal attitude and maternal weight (Study 2). All variables were standardized. The top half shows results for people raised primarily by their mother ($n = 113$). The bottom half shows results for people not raised primarily by their mother ($n = 84$). Regression lines were estimated using unstandardized regression coefficients.

ability to remember their dreams, we assessed participants' dream recall to control for individual differences in our analyses. Doing so also allowed us to test whether implicit attitudes guide reports of early events (which may be poorly recalled), a competing explanation for their covariation (Ross, 1989). In addition, we tested attitude elaboration as a possible mechanism for the developmental sources hypothesis.⁶

Method

Participants

There were 127 undergraduate participants (75 female) who participated in exchange for partial fulfillment of a research requirement. Of participants, 63 (50%) were White, 38 (30%) were Asian American, 10 (8%) were African American, 6 (5%) were Latino, and 10 (8%) were people who reported another ethnicity.

Materials and Procedure

The dream IAT. The dream IAT contrasted good and bad attributes with dreaming and awake. The stimuli used to represent dreaming were *dreams*, *dreaming*, and *asleep*. The stimuli used to represent awake were *awake*, *wakeful*, and *alert*. The stimuli used to represent good were *good*, *happy*, *luck*, *beauty*, and *safe*, whereas the stimuli to represent bad were *bad*, *danger*, *ugly*, *fear*, and

poison. The order in which participants performed the dreaming + pleasant and awake + pleasant tasks was counterbalanced. The IAT effect was computed such that high scores indicate more favorable implicit attitudes toward dreaming compared with awake.

Dream experiences. Participants completed two questions pertaining to their dreaming experiences. These were "When I was young my dreams were a source of pleasure" and "Nowadays, for the most part my dreams tend to be pleasant." Because not everyone remembers their dreams, two items were included for use as covariates. These were "When I was young, I never (or rarely) remembered my dreams" and "Nowadays, I never (or rarely) remember my dreams." Each item used a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Procedure. Participants completed the measures in separate cubicles using a desktop personal computer. Participants completed the explicit measures (individual items were randomly presented) followed by the IAT. All participants were debriefed when they were finished.

Results and Discussion

The bottom of Table 4 shows that, on average, participants implicitly preferred wakefulness to dreaming ($d = -.87$). Nonetheless, participants indicated relatively positive current experiences with dreaming. In fact, they reported more positive current dreams than childhood dreams, $t(126) = 4.27$, $p < .001$. It was unexpected, and it is not shown in Table 1, that men ($M = 4.88$, $SD = 1.52$) scored higher on the current dream quality measure than did women ($M = 4.26$, $SD = 1.24$), $t(125) = 2.50$, $p < .05$. There were no gender differences for the quality of childhood dreams, $t(125) = 1.56$, *ns*.

Table 4 also shows correlations between the explicit measures and the IAT. In support of the developmental sources hypothesis, the IAT positively covaried with people's childhood dream experiences. That is, the more people reported that dreaming was a pleasurable experience as a child, the more they implicitly preferred dreaming to being awake. As expected, current dream quality was unrelated to the IAT. The difference between these two correlations was reliable, $z = 2.05$, $p < .05$, which suggests that early pleasurable dreams informed implicit attitudes more than current experiences.

On average, participants reported remembering their dreams as a child more so than at present, $t(126) = 3.95$, $p < .001$ ($M_s = 4.85$ vs. 4.24 , $SD_s = 1.73$ and 1.94 , respectively). In addition, women recalled their current dreams more so than did men, $t(125) = 2.53$, $p < .05$ ($M_s = 4.60$ vs. 3.73 , $SD_s = 1.85$ and 1.97 ,

TABLE 4: Means, Standard Deviations, and Correlations Between Measures (Study 3)

	<i>Attitude IAT</i>	<i>Current Dreams</i>	<i>Childhood Dreams</i>
Current dream quality	-.04		
Childhood dream quality	.21*	.25*	
Mean	-0.26	4.52	3.85
Standard deviation	0.30	1.39	1.49

NOTE: IAT = Implicit Attitude Test. The IAT is shown in *D* statistic form (Greenwald, Nosek, & Banaji, 2003). High scores on the IAT reflect implicitly favoring dreaming over wakefulness. High scores on the current and childhood dream quality indexes reflect more pleasurable experiences with dreaming at present and when young, respectively.

* $p < .05$.

TABLE 5: Regression Analyses (Study 3)

	<i>Implicit Attitudes</i>	
	β	<i>t</i>
Current dream quality	.01	0.08
Childhood dream quality	.22	2.37*
Current dream memory	-.01	0.08
Childhood dream memory	-.03	0.27
Participant gender	.08	0.79

NOTE: Standardized regression coefficients are shown. High scores on the Implicit Attitude Test reflect implicitly favoring dreaming over wakefulness. High scores on the current pleasant dreams and childhood pleasant dreams indexes reflect more pleasurable experiences with dreaming at present and when young, respectively. High scores on the current dream and childhood dream memory indexes reflect recall for dreams at present and when young, respectively. Participant gender was coded 1 (*male*) and 2 (*female*).

* $p < .05$.

respectively). There were no gender differences for remembering childhood dreams, $t(125) < 1.00$, *ns*.

To provide a more stringent test of the developmental sources hypotheses, we regressed IAT scores on current dream quality and memory, childhood dream quality and memory, and participant gender. Table 5 shows the results. As can be seen, only childhood dream quality significantly predicted implicit attitudes. The remaining coefficients were negligible. Thus, childhood events uniquely predicted implicit attitudes. By contrast, current dream experiences remained a negligible predictor of implicit attitudes.

Do Implicit Attitudes Bias Reports of Childhood Dreams?

Asking people to report how well they recalled their dreams allowed us to test a competing explanation for the link between implicit attitudes and childhood dream experiences. Because our research relies on early memories (which may be poor), and when recollections are poor attitudes may guide them, it was possible that implicit attitudes influenced reports of childhood dreams. Although meta-analyses of the attitude–memory

relationship have yielded inconsistent findings (Johnson, 1991; Roberts, 1985), there have been compelling demonstrations that people reconstruct their histories using their attitudes (Ross, 1989).

Support for this explanation would emerge if reports of childhood dreams were predicted by an interaction between IAT scores and childhood dream memory. That is, participants who poorly recalled their childhood dreams should be especially likely to rely on their implicit attitudes when they reported their quality, compared with participants who recalled their childhood dreams well. To test this possibility, we standardized all variables and regressed childhood dream quality on the IAT, childhood memory, and their interaction. The results showed only a significant main effect for childhood dream quality, $\beta = .21$, $p < .05$. There was also a marginal main effect for childhood dream memory, $\beta = .17$, $p = .06$ (i.e., people who remembered their childhood dreams well tended to report they were pleasurable). However, the two-way interaction was weak, $\beta = -.02$, *ns*. Thus, people with poor memories did not seem to rely on their implicit attitudes when they reported their childhood dream experiences.

Developmental Experiences or Attitude Elaboration?

Another possibility is that attitudes informed by childhood events might be elaborated on by the time people reach adulthood. If so, early experiences may be a source for implicit attitudes because they have had more time to be incorporated into the attitude, compared with recent events. The result would be a well-practiced and well-elaborated evaluation—one that began in childhood, and is likely resistant to change (Eagly & Chaiken, 1993). If this is the case, we might expect people with similar childhood and current dream experiences to show stronger covariation between childhood dream quality and IAT scores, compared with people whose childhood and current dreams are mismatched. The matched group will have had many years to elaborate on the valence of their implicit attitude (e.g., that dreams are pleasant). By

contrast, the mismatched group's current experiences might weaken or nullify childhood events as a source for implicit attitudes. If so, we would expect an interaction between childhood and current dream quality to predict dream IAT scores.

To test this possibility, we standardized all variables and regressed the IAT on childhood dream quality, current dream quality, and their interaction. Results showed only a significant main effect for childhood dream quality, $\beta = .23, p = .01$. The main effect for current dream quality was negligible, $\beta = -.09, ns$, as was the two-way interaction, $\beta = -.03, ns$. Comparable results were revealed after controlling for the memory indexes and participant gender, which yielded the same effect for childhood dream quality, $\beta = .23, p = .01$, but otherwise weak effects, all $\beta s < .06, ns$. Thus, having consistent experiences and, therefore, a well-elaborated attitude does not appear to be key to understanding why early experiences inform implicit attitudes more so than recent events.

In sum, Study 3 continued to support the developmental sources hypothesis using a less reactive attitude object, compared with smoking and body weight. In addition, we did not find support for the idea that people use their implicit attitudes to guide reports of their childhood experiences. We also did not find support for the hypothesis that early experiences inform implicit attitudes because they lead to well-elaborated attitudes. Instead, our results are consistent with early theorizing that implicit attitudes, like implicit memories, are informed by traces of past experience (Greenwald & Banaji, 1995). Although they may be largely forgotten (or at least, not routinely pondered), they may nonetheless condition automatic attitudes.

GENERAL DISCUSSION

In three studies, we investigated the hypothesis that implicit attitudes are informed by developmental more than recent events (Greenwald & Banaji, 1995; Rudman, 2004; Wilson et al., 2000). In Studies 1 and 2, we used attitude objects that have yielded dissociation between implicit and explicit attitudes in the past (smoking and body size). Although this dissociation might be readily explained by discounting explicit attitudes (because of smokers' motives to justify smoking or normative pressures to be nonprejudiced), we found evidence for an additional explanation. In each case, developmental events uniquely predicted implicit attitudes, whereas recent events uniquely predicted explicit attitudes. Study 1 found that smokers' implicit attitudes toward smoking were predicted by early experiences with smoking, whereas their explicit attitudes were

predicted by recent experiences with their habit. Study 2 found that participants' weight when they were growing up was a unique predictor of implicit sizeism (after controlling for present weight), whereas explicit attitudes were predicted only by participants' current (not early) weight assessment. In addition, people who were raised primarily by beloved mothers implicitly preferred people similar to her weight (i.e., either slim or heavy) while they were growing up, whereas people not raised primarily by their mothers did not show this pattern. Finally, Study 3 found that implicit attitudes toward dreams were predicted by the quality of people's childhood (not current) dreams. This was true even after we controlled for current dream experiences and dream recall. In concert, these results cohere with theorizing (and recent evidence) that developmental events (a) may inform implicit attitudes more so than recent events and (b) are more predictive of implicit than explicit attitudes (Greenwald & Banaji, 1995; Rudman, 2004; Rudman & Goodwin, 2004). In so doing, they bolster the premise that people may hold dual attitudes toward objects that can differ in valence when they stem from disparate sources of information (Wilson et al., 2000).

Early Experiences or Affective Experiences?

Study 1 suggested that early experiences with smoking are likely to be negative, even for smokers, which may condition automatic attitudes in an antismoking direction. Because these experiences can be strongly emotional (i.e., physiologically aversive), the affective nature of these experiences may be at least as important as their temporality. Study 2 suggested that early identification with being overweight, or being raised by an overweight mother, might condition automatic attitudes in a proheavy direction. These developmental events are also likely to be emotional, given that people do not develop their self-concepts or bond with early caregivers in an affectively neutral state (Rudman & Goodwin, 2004). In Study 3, we used childhood dreams, which are also likely to be emotional and may involve particularly vivid experiences (Bulkeley, Broughton, Sanchez, & Stiller, 2005).

There are at least three reasons to suspect that early experiences may need to be emotional to influence implicit attitudes. First, it has been argued that implicit attitudes stem from an associative learning system, whereas explicit attitudes stem from a reflective learning system; the former is more influenced by emotion, whereas the latter is more influenced by accuracy (DeCoster, Banner, Smith, & Semin, 2006; Smith & DeCoster, 2000; Strack & Deutsch, 2004). Second, recent experiences have influenced implicit attitudes through affective means. For example, White people

enrolled in diversity education showed reduced pro-White IAT scores at the end of the course, but emotion-based factors predicted this result (e.g., liking for the Black professor, making friends with Black people, and reduced fear of Black people; Rudman, Ashmore, & Gary, 2001). These findings converge with neuroscientific evidence suggesting that automatic pro-White attitudes may stem from emotional conditioning (Phelps et al., 2000). Third, acute affective manipulations—clearly a recent event—have also been found to influence implicit evaluations. For example, threats to self-worth have been shown to increase automatic intergroup biases (Frantz, Cuddy, Burnett, Ray, & Hart, 2004; Govan, Williams, & Case, 2005) as well as implicit self-esteem (Rudman, Dohn, & Fairchild, in press). Moreover, an anger manipulation was also found to exacerbate automatic intergroup bias (DeSteno, Dasgupta, Bartlett, & Caidric, 2004). Thus, both early experiences and recent events might influence implicit attitudes because they represent affective experiences.

This is not to imply that context effects, such as priming manipulations, will influence implicit attitudes through affective means or that affective experiences are a necessary factor in attitude conditioning (e.g., Gregg, Seibt, & Banaji, 2006; Olson & Fazio, 2002) but, instead, to suggest a possible means by which early experiences serve as a source for implicit attitudes. With respect to priming manipulations, exposure to admired Blacks and disliked Whites (Dasgupta & Greenwald, 2001), violent and misogynistic rap music (Rudman & Lee, 2002), and vividly imagining heroic women (Blair, Ma, & Lenton, 2001) have modified implicit associations (see Blair, 2002, for a review). In these cases, it is likely that priming manipulations increase the accessibility of certain aspects of attitude objects (e.g., by bringing subtypes to mind), and response latency measures may be more sensitive to this kind of cognitive flexibility.

More generally, as with explicit measures, implicit measures have been used successfully as both trait and state measures of attitudes. When researchers are interested in trait-level evaluations, developmental sources may have more influence on implicit attitudes than when contextual effects are evoked. However, while implicit attitudes are context sensitive, this does not mean that they are completely malleable, much less overwritten; it is likely that they return to a stable state following induced fluctuations. Consistent with this view, there is some evidence that implicit attitudes are linked to the associative learning system, which is thought to be more resistant to change than the reflective, rule-based system (DeCoster et al., 2006; see also Gregg et al., 2006; Smith & DeCoster, 2000; Strack & Deutsch, 2004; Wilson et al., 2000).

Implications for Implicit and Explicit Attitude Dissociation

Taken together, these findings point to different events contributing to implicit and explicit attitudes, suggesting a reason why they are often dissociated. Although we have focused on developmental sources as one factor that may distinguish implicit from explicit attitudes, there are many others that we did not address. For example, implicit and explicit attitudes may diverge for methodological reasons or for reasons having to do with social desirability bias or other motives. As described in the introduction, past research has supported these explanations for their dissociation (e.g., Dunton & Fazio, 1997; Fazio et al., 1995; Nosek, 2005; Swanson et al., 2001).

Theoretically, if one were able to identify and statistically control for all of the factors that differentially impact implicit and explicit evaluations, their linkage should dramatically increase. In this research, we focused on developmental (and likely emotional) experiences, but other candidates have been identified as sources for implicit (more than explicit) attitudes, including cognitive consistency pressures and cultural evaluations (for a review, see Rudman, 2004). However, because implicit and explicit attitudes can share similarities as well as differences in their underlying sources (e.g., in Study 1, they each covaried with smoking frequency), it is not the case that their predictors are always independent. That is, we are not implying that implicit and explicit attitudes necessarily stem from different sources, much less that they exist utterly independent of one another. Indeed, the resounding fact revealed by meta-analyses of their convergence is that their overlap is highly variable (e.g., Blair, 2001, Dovidio et al., 2001; see also Nosek, 2005; Nosek et al., 2002). Instead, we are suggesting that one possible means by which this variability might be understood concerns investigating similarities and differences in their underlying sources. When the underlying sources are disparate, we ought not to dismiss self-reports as untrustworthy or implicit attitudes as invalid but, rather, view each as reflecting a particular aspect of an attitude—which may be more complex than even the term *dual attitudes* can convey (Wilson et al., 2000).

Limitations and Future Directions

We found evidence for developmental sources of implicit attitudes using the IAT, but other measures will be necessary to lend confidence to our hypothesis. In this regard, resolving the distinctions between various response latency measures would be helpful (Fazio & Olson, 2003). For example, it has been suggested that

priming techniques are more sensitive to the stimuli used in the task, whereas the IAT may be more category based (Livingston & Brewer, 2002). In addition, various techniques may rest on disparate psychological processes (e.g., spreading activation for priming, response competition for the IAT; Fazio & Olson, 2003).

In fact, there is some evidence that priming techniques are influenced by recent more than early experiences. Specifically, White college students' experiences with Black people in high school (but not middle school) covaried with intergroup bias on a priming task (Towles-Schwen & Fazio, 2001), suggesting that implicit racial attitudes are continuously updated. By contrast, cross-sectional research using the IAT suggests that implicit racial attitudes develop by age 6 (in a pro-ingroup direction) and remain constant through adulthood, whereas explicit attitudes shift by age 10 and become egalitarian by adulthood (Baron & Banaji, 2006). Future research is needed to illuminate these discrepancies, but because Towles-Schwen and Fazio's (2001) results are similar to those found by Rudman et al. (2001) using the IAT, it might be the case that recent affective experiences with Black people can account for their results. We have suggested that developmental events influence implicit attitudes when they carry an emotional impact; if so, their modification might well depend on emotional experiences of similar magnitude.

As a means of testing the limits of the development sources hypothesis, future research should directly compare the influence of early and recent affective experiences on implicit attitudes. For example, a smoker recently diagnosed with cancer or a heavyweight person with diabetes might alter their implicit attitudes through these significant events. Whereas it might also be that smokers and heavyweight people are frequently exposed to issues of illness and death as well as social disapproval—clearly emotional events—people who engage in stigmatized behaviors are well practiced at self-defense (e.g., Crocker & Major, 1989; Swanson et al., 2001). Nonetheless, a unique and significant emotional event might significantly alter implicit attitudes, overwriting the influence of developmental experiences. In line with this possibility, negative life events have been found to reduce implicit self-esteem (DeHart & Pelham, 2007), although the longevity of this effect is unknown.

Investigations of theoretical distinctions between implicit and explicit attitudes are unavoidably confounded by methodological differences. There is no process-pure measure of implicit and explicit constructs (Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005), although it is clear that response latency measures yield relatively more automatic responses than do self-reports. Similar to the debate in the implicit memory literature, dissociations between implicit and explicit attitudes might be derived

from separate systems or from each task demanding different operations (or both; Roediger, 1990). Our view is that, beyond the motivational pressures (e.g., for consistency and self-presentation) induced by self-reports, they are also likely to call to mind recent (and therefore accessible) experiences. For example, it is difficult to conceive of a smoker reflecting on his or her early, aversive experiences with the habit when reporting his or her attitude. Even if the smoker is first reminded of these (as smokers were in Study 1), the information is likely to be excluded as irrelevant to the here-and-now explicit task. Similarly, when people report their gender attitudes, it seems improbable that maternal attitudes would spring to mind and even if they did, they would likely be judged as inapplicable when rating women and men in general (Rudman & Goodwin, 2004). However, if you asked people to reflect vividly and at length on their early experiences with an attitude object, their recollections might well influence reported attitudes, provided they were judged to be relevant. Thus, our point is not that implicit and explicit attitudes necessarily stem from different sources but that, by default, implicit attitudes may be conditioned by developmental events (provided they are emotional) more so than are explicit attitudes. The goal of this research was to provide direct tests of this possibility, but clearly more evidence is necessary before strong conclusions are warranted.

Conclusion

This research suggests that implicit and explicit attitudes differ, in part, because they can be derived from different sources. In three studies, implicit attitudes were informed by early (and likely affective experiences) more so than recent events (which influenced explicit attitudes in Studies 1 and 2). Thus, implicit measures can reveal aspects of an attitude object that are likely to be overlooked when self-reports are the sole means of assessment. However, we argue that this does not necessarily undermine the legitimacy of explicit attitudes but, instead, points to a conceptual distinction between automatic and controlled evaluations. As a result, researchers might embrace more theoretically complex notions of what an attitude is while humbly acknowledging the limitations of the tools we use to measure evaluations.

NOTES

1. We report the effect sizes from Study 3, in which the researchers used an Implicit Association Test that contrasted smoking with no smoking because it was well validated (e.g., smokers scored higher than did nonsmokers, and it covaried with self-reports when nonsmokers and smokers were combined). We therefore adopted the Implicit Association Test in this work. However, in all three experiments, smokers showed negative implicit attitudes toward smoking, whereas their explicit attitudes were positive.

2. The pictures depicted the following: bedside table with lamp and clock radio; end table with lamp and book open, facing down; kitchen table with newspaper spread open and a coffee mug; an outdoor table with chairs and two glasses of water.

3. By convention, small, medium, and large effect sizes correspond to .20, .50, and .80, respectively (Cohen, 1988).

4. The correlations between smokers' implicit and explicit attitudes and the duration of their habit were unreliable, $r_s = .12$ and $.11$, respectively.

5. Although an analogous pattern would be anticipated for people raised by their fathers, we did not have sufficient power to test it. That is, people raised primarily by their fathers should prefer heavy to slim people, provided their father was overweight when they were young and they liked him.

6. We thank an anonymous reviewer for pointing out that implicit attitudes may inform reports of early experiences and for suggesting that early experiences may lead to greater attitude elaboration over time.

REFERENCES

- Banaji, M. R. (2001). Implicit attitudes can be measured. In H. L. Roediger, J. S. Nairne, I. Neath, & A. M. Surprenant (Eds.), *The nature of remembering: Essays in honor of Robert G. Crowder* (pp. 117-150). Washington, DC: American Psychological Association.
- Baron, A. S., & Banaji, M. R. (2006). The development of implicit attitudes: Evidence of race evaluations from ages 6 and 10 and adulthood. *Psychological Science, 17*, 53-58.
- Blair, I. V. (2001). Implicit stereotypes and prejudice. In G. B. Moskowitz (Ed.), *Cognitive social psychology: The Princeton symposium on the legacy and future of social cognition* (pp. 359-374). Mahwah, NJ: Lawrence Erlbaum.
- Blair, I. V. (2002). The malleability of automatic stereotypes and prejudice. *Personality and Social Psychology Review, 6*, 242-261.
- Blair, I. V., Ma, J. E., & Lenton, A. P. (2001). Imagining stereotypes away: The moderation of implicit stereotypes through mental imagery. *Journal of Personality and Social Psychology, 81*, 828-841.
- Breckler, S. J., & Greenwald, A. G. (1986). To whom is the self presented? In Schlenker, B. R. (Ed.), *The self and social life* (pp. 126-145). New York: McGraw-Hill.
- Bulkeley, K., Broughton, B., Sanchez, A., & Stiller, J. (2005). Earliest remembered dreams. *Dreaming, 15*, 205-222.
- Cai, H., Sriram, N., Greenwald, A. G., & McFarland, S. G. (2004). The Implicit Association Test's *D* measure can minimize a cognitive skill confound: Comment on McFarland and Crouch (2002). *Social Cognition, 22*, 673-684.
- Cohen, J. (1988). *Statistical power for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.
- Conrey, F. R., Sherman, J. W., Gawronski, B., Hugenberg, K., & Groom, C. (2005). Separating multiple processes in implicit social cognition: The Quad-Model of implicit task performance. *Journal of Personality and Social Psychology, 89*, 469-487.
- Crocker, J., & Major, B. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review, 96*, 608-630.
- Dasgupta, N., & Greenwald, A. G. (2001). Exposure to admired group members reduces automatic intergroup bias. *Journal of Personality and Social Psychology, 81*, 800-814.
- DeCoster, J., Banner, M. J., Smith, E. R., & Semin, G. R. (2006). On the inexplicability of the implicit: Differences in the information provided by implicit and explicit tests. *Social Cognition, 24*, 5-21.
- DeHart, T., & Pelham, B. W. (2007). Fluctuations in state implicit self-esteem in response to daily negative events. *Journal of Experimental Social Psychology, 43*, 157-165.
- DeSteno, D., Dasgupta, N., Bartlett, M. Y., & Caidric, A. (2004). Prejudice from thin air: The effect of emotion on automatic intergroup attitudes. *Psychological Science, 15*, 319-324.
- Dovidio, J. F., & Fazio, R. H. (1992). New technologies for the direct an indirect assessment of attitudes. In J. M. Tanur (Ed.), *Questions about questions: Inquiries into the cognitive bases of surveys* (pp. 204-237). New York: Russell Sage Foundation.
- Dovidio, J. F., Kawakami, K., & Beach, K. R. (2001). Implicit and explicit attitudes: Examination of the relations between measures of intergroup bias. In R. Brown & S. Gaertner (Eds.), *Blackwell handbook of social psychology: Intergroup processes* (pp. 175-197). Oxford, UK: Blackwell.
- Dunton, B. C., & Fazio, R. H. (1997). An individual difference measure of motivation to control prejudiced reactions. *Personality and Social Psychology Bulletin, 23*, 316-326.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Ft. Worth, TX: Harcourt, Brace, Jovanovich.
- Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75-109). San Diego, CA: Academic Press.
- Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes. A bona fide pipeline? *Journal of Personality and Social Psychology, 69*, 1013-1027.
- Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology, 54*, 297-327.
- Frantz, C. M., Cuddy, A. J. C., Burnett, M., Ray, H., & Hart, A. (2004). A threat in the computer: The race Implicit Association Test as a stereotype threat experience. *Personality and Social Psychology Bulletin, 30*, 1611-1624.
- Govan, C., Williams, K., & Case, T. (2005). *Tolerant on the outside, intolerant on the inside: Dual responses to ostracism*. Manuscript submitted for publication.
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*, 4-27.
- Greenwald, A. G., Banaji, M. R., Rudman, L. A., Farnham, S. D., Nosek, B. A., & Mellott, D. S. (2002). A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychological Review, 109*(1), 3-25.
- Greenwald, A. G., & Nosek, B. A. (2001). The health of the Implicit Association Test at age 3. *Zeitschrift fuer Experimentelle Psychologie, 48*, 85-93.
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*, 197-216.
- Gregg, A. P., Seibt, B., & Banaji, M. R. (2006). Easier done than undone: Asymmetry in the malleability of implicit preferences. *Journal of Personality and Social Psychology, 90*, 1-20.
- Johnson, B. T. (1991). Insights about attitudes: Meta-analytic perspectives. *Personality and Social Psychology Bulletin, 17*, 289-299.
- Livingston, R. W., & Brewer, M. B. (2002). What are we really priming? Cue-based versus category-based processing of facial stimuli. *Journal of Personality and Social Psychology, 82*, 5-18.
- Mierke, J., & Klauer, K. C. (2003). Method-specific variance in the Implicit Association Test. *Journal of Personality and Social Psychology, 85*, 1180-1192.
- Nosek, B. A. (2005). Moderators of the relationship between implicit and explicit evaluation. *Journal of Experimental Psychology: General, 134*, 565-584.
- Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dynamics: Theory, Research, and Practice, 6*, 101-115.
- Nosek, B. A., Greenwald, A. G., & Banaji, M. R. (2007). 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.
- Olson, M. A., & Fazio, R. H. (2002). Implicit acquisition and manifestation of classically conditioned attitudes. *Social Cognition, 20*, 89-104.

- Phelps, E. A., O'Connor, K. J., Cunningham, W. A., Gatenby, J. C., Funayama, E. S., Gore, J. C., et al. (2000). Amygdala activation predicts performance on indirect measures of racial bias. *Journal of Cognitive Neuroscience*, *12*, 729-738.
- Poehlman, T. A., Uhlmann, E., Greenwald, A. G., & Banaji, M. R. (2004). *Understanding and Using the Implicit Association Test: III. Meta-analysis of predictive validity*. Manuscript submitted for publication.
- Roberts, J. V. (1985). The attitude-memory relationship after 40 years: A meta-analysis of the literature. *Basic and Applied Social Psychology*, *6*, 221-241.
- Roediger, H. L. (1990). Implicit memory: Retention without remembering. *American Psychologist*, *45*, 1043-1056.
- Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review*, *96*, 341-357.
- Rudman, L. A. (2004). Sources of implicit attitudes. *Current Directions in Psychological Science*, *13*(2), 80-83.
- Rudman, L. A., Ashmore, R. D., & Gary, M. L. (2001). "Unlearning" automatic biases: The malleability of implicit stereotypes and prejudice. *Journal of Personality and Social Psychology*, *81*, 856-868.
- Rudman, L. A., Dohn, M. C., & Fairchild, K. (in press). Implicit self-esteem compensation: Automatic threat defense. *Journal of Personality and Social Psychology*.
- Rudman, L. A., Feinberg, J. M., & Fairchild, K. (2002). Minority members' implicit attitudes: Ingroup bias as a function of group status. *Social Cognition*, *20*, 294-320.
- Rudman, L. A., & Goodwin, S. A. (2004). Gender differences in automatic ingroup bias: Why do women like women more than men like men? *Journal of Personality and Social Psychology*, *87*, 494-509.
- Rudman, L. A., Greenwald, A. G., Mellott, D. S., & Schwartz, J. L. K. (1999). Measuring the automatic components of prejudice: Flexibility and generality of the Implicit Association Test. *Social Cognition*, *17*(4), 1-29.
- Rudman, L. A., & Lee, M. R. (2002). Implicit and explicit consequences of exposure to violent and misogynous rap music. *Group Processes and Intergroup Relations*, *5*, 133-150.
- 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.
- Swanson, J. E., Rudman, L. A., & Greenwald, A. G. (2001). Using the Implicit Association Test to investigate attitude-behavior consistency for stigmatized behavior. *Cognition and Emotion*, *15*, 207-230.
- Towles-Schwen, T., & Fazio, R. H. (2001). On the origins of racial attitudes: Correlates of childhood experiences. *Personality and Social Psychology Bulletin*, *27*, 162-175.
- Wilson, T. D., Lindsey, S., & Schooler, T. Y. (2000). A model of dual attitudes. *Psychological Review*, *107*, 101-126.

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