

Selective Exposure in Decided and Undecided Individuals: Differential Relations to Automatic Associations and Conscious Beliefs

Personality and Social Psychology Bulletin
38(5) 559–569
© 2012 by the Society for Personality
and Social Psychology, Inc
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0146167211435981
http://pspb.sagepub.com


Silvia Galdi¹, Bertram Gawronski², Luciano Arcuri¹, and Malte Friese³

Abstract

People often show a preference for information that confirms their attitudes and beliefs, and this tendency is reduced for opinions that are not held with conviction. The present study shows that both decided and undecided individuals show a tendency to selectively expose themselves to confirmatory information, albeit with different antecedents and consequences. Whereas selective exposure in decided participants was predicted by conscious beliefs and not by automatic associations, selective exposure in undecided participants was predicted by automatic associations and not by conscious beliefs. Moreover, selective exposure led undecided participants to adopt conscious beliefs that were in line with their preexisting automatic associations. Conversely, for decided participants, selective exposure shifted automatic associations in a direction that was in line with their preexisting conscious beliefs. Implications for decision making and mutual influences of automatic associations and conscious beliefs in attitude change are discussed.

Keywords

attitude change, confirmation bias, decision making, implicit measures, selective exposure

Received October 31, 2010; revision accepted November 21, 2011

Predicting future choices and decisions is central to a variety of fields in the social sciences, such as marketing and political polling. However, accurate prediction of future preferences is not an easy task. In addition to changing preferences over time, prediction of future decisions based on self-reports is hampered if survey respondents indicate that they are undecided. In some cases, these responses may be due to the fact that people are motivated to conceal their true attitudes. In other cases, respondents may genuinely lack a clear attitude, belief, or opinion.

A significant step toward resolving this problem has been made by research showing that future choices of undecided individuals can be predicted by means of implicit measures designed to assess automatic mental associations (for a review, see Gawronski & Galdi, 2011). For example, Galdi, Arcuri, and Gawronski (2008) showed that future preferences of participants who reported being undecided about a political issue were predicted by automatic associations, but not by consciously held beliefs. In contrast, future preferences of decided participants were predicted by consciously held beliefs, but not by automatic associations. Moreover, automatic associations of undecided participants predicted changes in consciously held beliefs over a period of one week. Conversely, for decided participants, consciously held beliefs predicted changes

in automatic associations over the same period. These findings suggest that implicit measures of automatic associations might be a useful addition to the toolbox of social scientists in predicting future choices and decisions (see also Arcuri, Castelli, Galdi, Zogmaister, & Amadori, 2008; Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009; Payne et al., 2010; Rocco & Zogmaister, 2010). However, the psychological mechanisms that are responsible for the predictive power of implicit measures are still not well understood.

The main goal of the present research was to investigate selective exposure as a potential mechanism that mediates the link between automatic associations and future preferences. Specifically, we tested the hypothesis that undecided individuals have a tendency to expose themselves to information that is consistent with their automatic associations. As a result of this biased information acquisition, undecided

¹University of Padova, Padova, Italy

²University of Western Ontario, London, Ontario, Canada

³University of Basel, Basel, Switzerland

Corresponding Author:

Silvia Galdi, University of Padova, Via Venezia 8, 35131 Padova, Italy
Email: silvia.galdi@unipd.it

individuals may develop conscious beliefs that are in line with their preexisting automatic associations.

Selective Exposure and Conscious Beliefs

People often show a tendency to selectively expose themselves to information that confirms their attitudes and beliefs. Most of our friends have similar political views; we tend to read newspapers and magazines that reinforce our personal opinions; and most of us prefer watching those television shows that corroborate our existing beliefs. As a result, we tend to inhabit environments that are biased in favor of opinions with which we already agree. In the social-cognitive literature, this phenomenon has been described as *congeniality bias* or *confirmation bias*, which refers to the tendency to seek out, notice, and favor information that is consistent with one's attitudes, beliefs, and behaviors (for a meta-analysis, see Hart et al., 2009).

The most common explanation for this bias is that being exposed to information that contradicts one's attitudes and beliefs leads to cognitive inconsistency, which in turn produces aversive feelings of dissonance (Festinger, 1957). By selectively exposing oneself to information with which one agrees, people can avoid the aversive feeling caused by inconsistent information and, at the same time, find support for their preexisting attitudes, choices, and behaviors (Frey, 1986).

According to the dissonance account, selective exposure effects should be particularly pronounced for strongly held attitudes and beliefs (Festinger, 1957). In fact, one could argue that there is no potential for cognitive inconsistency, if an individual is undecided about a particular issue (Festinger, 1964; see also Gawronski & Strack, 2004). If there is no positive or negative attitude in the first place, neither favorable nor unfavorable information has the potential to produce cognitive inconsistency, which implies that selective exposure effects should be reduced or eliminated for individuals who are undecided about a particular issue. In line with this contention, a recent meta-analysis by Hart et al. (2009) found that the preference for confirmatory information was indeed weaker for attitudes and beliefs that were not held with conviction.

Selective Exposure and Automatic Associations

In the present research, we propose that even undecided individuals may show a tendency to favor specific information, which may lead them to adopt conscious beliefs that are in line with this biased set of information. Drawing on the distinction between automatic associations and self-reported propositional beliefs (Gawronski & Bodenhausen, 2006, in press; Strack & Deutsch, 2004), we argue that automatically activated associations elicit subjective feelings that are

experienced as spontaneous gut reactions. However, these gut reactions may not be explicitly endorsed as a conscious preference, if this preference cannot be justified by means of supporting arguments. Thus, to overcome their subjective state of decisional uncertainty, undecided individuals may show a tendency to selectively search for information that provides such arguments, which in turn may lead them to adopt consciously held beliefs that are in line with the biased set of newly acquired information.

The assumption that automatic associations are experienced as spontaneous gut reactions is consistent with previous research showing that the correspondence between implicit measures of automatic associations and explicit measures of consciously held beliefs increases when participants are instructed to focus on their feelings toward an attitude object (e.g., Gawronski & LeBel, 2008; Jordan, Whitfield, & Zeigler-Hill, 2007; Ranganath, Smith, & Nosek, 2008; Smith & Nosek, 2011). These results suggest that individuals are experientially aware of the spontaneous gut reactions resulting from automatically activated associations, although spontaneous gut responses may not necessarily be reflected in consciously endorsed beliefs (Gawronski, Hofmann, & Wilbur, 2006; Hofmann & Wilson, 2010). According to Fazio's (2007) MODE model, such dissociations should emerge when people have the motivation and the opportunity to engage in a deliberate analysis of individual attributes of an attitude object. Similarly, Gawronski and Bodenhausen's (2006, in press) associative-propositional evaluation model claims that the impact of association-related gut responses on self-reported judgments should be reduced when the evaluation implied by a gut response is inconsistent with other momentarily considered information (e.g., Gawronski, Peters, Brochu, & Strack, 2008; Gawronski & Strack, 2004). These predictions have been confirmed in a number of studies showing that the correspondence between implicit and explicit measures systematically varies as a function of cognitive elaboration and informational consistency (for a review, see Hofmann, Gschwendner, Nosek, & Schmitt, 2005).

Applied to the present question, we argue that the gut responses elicited by automatic associations may lead undecided individuals to favor information that is in line with their spontaneous gut response. Thus, even though selective exposure in undecided individuals may not be related to consciously endorsed beliefs about an attitude object (Hart et al., 2009), automatic associations may produce a tendency in undecided individuals to selectively expose themselves to information that is consistent with these associations. To the extent that this newly acquired information shifts conscious beliefs in the direction of that information, undecided individuals may adopt conscious beliefs that are in line with their preexisting automatic associations. In colloquial terms, one could say that people who are undecided about two available options may sometimes have a gut feeling that one of them may be better than the other, even though they may not be confident enough to explicitly endorse this feeling as a

conscious preference. However, their gut feeling may lead them to search for information that is consistent with this feeling, which in turn supports the formation of conscious beliefs that are in line with the gut response.

This situation should be different for decided individuals who, generally, hold strong conscious beliefs. For these individuals, exposure to information that contradicts their conscious beliefs should produce aversive feelings of dissonance, which in turn should lead them to favor information that is consistent with their beliefs (Festinger, 1957; Frey, 1986). This preference may also override potential influences of automatic associations, such that information that supports conscious beliefs may bolster these beliefs against “nagging doubts” arising from automatic associations that are inconsistent with conscious beliefs (see Jordan, Spencer, Zanna, Hoshino-Browne, & Correll, 2003; Petty, Tormala, Briñol, & Jarvis, 2006). In fact, this bolstering information may create new associations in memory, such that selective exposure in decided individuals may shift automatic associations in the direction of preexisting conscious beliefs (cf. Galdi et al., 2008; Peters & Gawronski, 2011).

By selectively exposing themselves to information that is consistent with conscious beliefs, decided individuals can maintain confidence about their personal beliefs in two ways. First, it prevents aversive feelings of dissonance arising from information that is inconsistent with their conscious beliefs. Second, it can “neutralize” spontaneous gut responses that are potentially inconsistent with consciously held beliefs by bringing automatic associations in line with these beliefs. In fact, if decided individuals selectively exposed themselves to information that is consistent with their (oppositely valenced) automatic associations, potential doubts from both sources would be increased, creating an unpleasant state that individuals usually try to avoid (see Briñol & Petty, 2009). On one hand, decided individuals may experience unpleasant feelings of dissonance arising from information that is inconsistent with their conscious beliefs (Frey, 1986). On the other hand, they may experience unpleasant feelings arising from discrepancies between automatic association and consciously held beliefs (Rydell, McConnell, & Mackie, 2008). This situation is different for undecided individuals who do not hold conscious beliefs with conviction, which implies that there is less potential for inconsistency with these beliefs (see Hart et al., 2009).

The Present Research

The above-mentioned considerations imply that conscious beliefs should show a stronger predictive relation to selective exposure for decided compared with undecided individuals. Conversely, automatic associations should show a stronger predictive relation to selective exposure for undecided compared with decided individuals. To test these predictions, participants in the present study completed measures of automatic associations and conscious beliefs

regarding the inclusion of Turkey into the European Union (EU).¹ A week later, the same participants completed a selective exposure task, in which they were presented with pairs of headlines that suggested either a favorable or unfavorable article on the inclusion of Turkey into the EU. For each pair of headlines, participants were asked to choose the article they preferred to read. After the selection task, participants were invited to read the articles they had chosen and to complete the two measures of automatic associations and conscious beliefs a second time.

Method

Participants

Residents of Northern Italy were approached by a female experimenter in public places during the period from March to August, 2009. A total of 113 individuals agreed to participate in the study (64 women; 49 men). These individuals were visited by the experimenter at their homes, where they completed the relevant tasks individually in a quiet room on a laptop computer. Participants were visited by the same experimenter on two measurement occasions, which were 1 week apart for all participants. The 1-week delay was included to avoid possible carryover effects between the premeasures and postmeasures, and to reduce the likelihood of practice effects in the implicit measure due to the repeated use of the same task within a relatively short interval (see Greenwald & Nosek, 2001). Participants' age ranged from 18 to 70 years with a mean age of 31.14 years ($SD = 12.22$). All subjects participated in the study voluntarily without monetary compensation.

Procedure and Materials

At the beginning of the first session (Time 1), participants were asked to read a pretested, neutral essay about the inclusion of Turkey into the EU and to indicate whether they were in favor of Turkey's inclusion, against Turkey's inclusion, or undecided. Immediately afterwards, participants were presented with five pictures symbolizing the integration of Turkey into the EU (e.g., flags of the EU and Turkey; a map of the European continent with the current EU countries being highlighted in yellow and Turkey being highlighted in red). Participants were instructed to keep in mind that these pictures had been selected to represent the inclusion of Turkey into the EU. The pictures were then used as target stimuli in a Single Category Implicit Association Test (SC-IAT; Karpinski & Steinman, 2006) designed to assess automatic evaluative associations regarding Turkey's inclusion into the EU. As attribute stimuli, we used five pleasant words (*progress, happiness, security, gain, freedom*) and five unpleasant words (*pain, danger, loss, disaster, violence*). To ensure that participants encode the images as symbols of Turkey's inclusion into the EU rather than

Turkey as a country (e.g., destination for vacation), we used the phrase *Turkey into the EU* as a label for the target category (cf. De Houwer, 2001; Govan & Williams, 2004); for the attribute categories, we used the labels *positive* and *negative*. In the first block of the task, participants were presented with positive and negative words, which had to be categorized as quickly as possible in terms of their valence by pressing one of two response keys (D = positive; K = negative). This practice block was followed by two critical blocks, in which participants had to respond to positive and negative words and to pictures representing the inclusion of Turkey into the EU. In one of the two blocks, participants were asked to press the K key when they saw a negative word and to press the D key when they saw a positive word or a picture representing Turkey's inclusion. In the other critical block, participants were asked to press the K key when they saw a negative word or a picture representing Turkey's inclusion and to press the D key when they saw a positive word. The practice block included a total of 20 trials; the two critical blocks each comprised a total of 40 trials. All presented stimuli were selected randomly by the computer. The number of required left-hand and right-hand responses were kept equal in the two combined blocks, such that the five pictures and the five word stimuli that were mapped onto the same response key were each presented twice, whereas the five word stimuli that were mapped onto the other response key were presented 4 times. The order of the two critical blocks was counterbalanced across participants.

In addition to the SC-IAT, participants were asked to complete a survey, including 12 items designed to assess participants' conscious beliefs about Turkey's inclusion into the EU. The questions addressed four general themes, including cultural issues (three items on historical and traditional differences between the current European countries and Turkey), social issues (three items on the consequences of Turkey's inclusion for immigration, security, and the international influence of the EU), economic issues (four items on the effects of Turkey's inclusion on the expansion of the EU market, the EU energy supply, and the allocation of EU funds to underdeveloped rural areas), and religious issues (two items on the consequences of including a predominantly Muslim country into the EU). Conscious beliefs were assessed with 7-point rating scales ranging from 1 (*disagree*) to 7 (*agree*). All items were phrased in a manner that they had a clear positive or negative connotation. The order of the SC-IAT and the survey measure were counterbalanced across participants.

One week later (Time 2), participants were visited by the same experimenter a second time to complete the selective exposure task. On each trial of the task, participants were presented with two news headlines, one suggesting an article that favors Turkey's inclusion into the EU and the other one suggesting an article that opposes Turkey's inclusion. For each pair of headlines, participants were instructed to choose the article that they preferred to read. The task included

forced choices between six pairs of headlines. After completion of the task, participants were invited to read the six articles they had chosen. The 12 news headlines and their corresponding articles were selected from Italian daily newspapers published during the period of 2004 to 2009. The materials were selected on the basis that both the headlines and the articles unambiguously endorsed a view that either supported or opposed Turkey's inclusion into the EU. After reading the articles, participants completed the SC-IAT and the survey measure a second time. The order of the two measures was again counterbalanced across participants. At the end of the second session, participants were thanked and fully debriefed.

Results

Data Aggregation

To calculate SC-IAT scores of automatic associations at Time 1 and Time 2, trials with response latencies less than 300 ms (0.26% of trials at Time 1; 0.15% at Time 2) and more than 3,000 ms (0.02% of trials at Time 1; 0.00% of trials at Time 2) were excluded. Following the procedures of Greenwald, Nosek, and Banaji's (2003) D-600 algorithm, latencies from incorrect responses (3.22% of trials at Time 1; 2.74% of trials at Time 2) were replaced with the mean value of all correct responses within a given block plus an error penalty of 600 ms. SC-IAT scores were calculated by subtracting the mean latency in the *Turkey-negative* block from the mean latency in the *Turkey-positive* block divided by the inclusive standard deviation of the two critical blocks. Thus, higher SC-IAT scores reflect more positive associations regarding the inclusion of Turkey into the EU. To estimate the reliability of the SC-IAT, we calculated two SC-IAT scores for each of the two measurement occasions: one using the first half of the two combined blocks and another one using the second half of the two combined blocks. Estimates of internal consistency were satisfactory for the SC-IAT at both measurement occasions (Cronbach's $\alpha = .76$ and $.81$, respectively). Indices of conscious beliefs about Turkey's inclusion into the EU at Time 1 and Time 2 were calculated by reverse coding negatively phrased items and then averaging the responses on the 12 items, such that higher values reflect more positive beliefs (Cronbach's $\alpha = .81$ and $.89$, respectively). In addition, we calculated an index of selective exposure reflecting the proportion of trials on which participants chose a headline that favored Turkey's inclusion.

Descriptive Analyses

Of the 113 participants, 40 reported being in favor of Turkey's inclusion into the EU, 20 reported being against Turkey's inclusion, and 53 reported being undecided. Descriptive statistics of all measures are presented in Table 1;

Table 1. Means and Standard Deviations of Automatic Associations, Conscious Beliefs, and Selective Exposure for Participants Who Reported to be in Favor of Turkey's Inclusion Into the European Union, Against Turkey's Inclusion, or Undecided

	In favor (<i>n</i> = 40)		Undecided (<i>n</i> = 53)		Against (<i>n</i> = 20)		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Automatic associations	0.22 ^a	0.29	0.04 ^{a,b}	0.49	-0.22 ^b	0.44	7.10	.001
Time 1	0.17 ^a	0.36	0.03 ^a	0.44	-0.26 ^b	0.34	8.09	.001
Time 2								
Conscious beliefs	4.55 ^a	0.58	3.65 ^b	0.54	2.99 ^c	0.62	56.58	<.001
Time 1	4.71 ^a	0.69	3.96 ^b	0.83	3.12 ^c	0.78	29.21	<.001
Time 2								
Selective exposure	0.56 ^a	0.27	0.47 ^a	0.24	0.28 ^b	0.28	7.91	.001

Note: Mean values within rows that do not share the same superscript are significantly different at the $p = .05$ level (Bonferroni).

zero-order correlations between all variables are presented in Table 2. Results from univariate ANOVAs revealed significant differences between the three groups of participants on all five measures: automatic associations at Time 1, automatic associations at Time 2, conscious beliefs at Time 1, conscious beliefs at Time 2, and selective exposure (see Table 1). The general pattern underlying these differences is that participants who reported being in favor of Turkey's inclusion showed more favorable responses on all measures compared with participants who reported being against Turkey's inclusion, with undecided participants showing scores somewhere in-between the two groups of decided participants. With regard to the correlation analyses, the most noteworthy finding for the current investigation is that selective exposure showed a significant positive correlation with conscious beliefs at Time 1 for participants who favored or opposed Turkey's inclusion, but not for participants who reported being undecided (see Table 2). In contrast, automatic associations at Time 1 showed a significant positive correlation with selective exposure for undecided participants, but not for the two groups of decided participants. These results provide preliminary support for our hypothesis that selective exposure has different antecedents in decided and undecided participants.

Antecedents of Selective Exposure

To provide a more stringent test of our hypothesis about the differential antecedents of selective exposure, participants who reported being against or in favor of Turkey's inclusion into the EU were merged into a single group of decided participants. Selective exposure scores were then simultaneously regressed onto automatic associations and conscious beliefs at Time 1 separately for decided ($n = 60$) and undecided ($n = 53$) participants (see Figure 1). In line with our predictions, the results showed that selective exposure in decided participants was significantly predicted by conscious beliefs, $B = .21$, $SE = .04$, $t(57) = 5.69$, $p < .001$, $R^2 = .33$, and not by automatic associations, $B = -.03$, $SE = .09$, $t(57) = -0.36$, $p = .72$,

$R^2 = .001$. In contrast, selective exposure in undecided participants was significantly predicted by automatic associations, $B = .25$, $SE = .06$, $t(50) = 4.34$, $p < .001$, $R^2 = .26$, and not by conscious beliefs, $B = .09$, $SE = .05$, $t(50) = 1.63$, $p = 0.11$, $R^2 = .04$. To test whether the obtained relations significantly differed for decided and undecided participants, we conducted a multiple regression moderator analysis in which standardized scores of selective exposure were simultaneously regressed onto standardized scores of automatic associations at Time 1, conscious beliefs at Time 1, decidedness (dummy-coded), and all of their interactions (see Table 3). Confirming our predictions, this analysis revealed a significant two-way interaction of decidedness and automatic associations, $B = -.46$, $SE = .18$, $t(105) = -2.59$, $p = .01$, and a marginal interaction of decidedness and conscious beliefs, $B = .34$, $SE = .20$, $t(105) = 1.84$, $p = .07$.

A potential concern is that some of our measures may show larger variance for decided compared with undecided participants due to the integration of participants who favored and opposed Turkey's inclusion into the EU. Such differences in variance could potentially distort the multiple regression findings in favor of the predicted dissociation. Consistent with this concern, Levene's tests revealed that the variance in conscious beliefs at Time 1 was indeed significantly larger for decided than undecided participants ($SD_{undecided} = .54$; $SD_{decided} = .95$), $F(1, 111) = 25.74$, $p < .001$.² This result suggests that the obtained dissociation in the predictive power of conscious beliefs might be due to purely statistical differences in variances rather than genuine differences in the covariations with selective exposure. To rule out this concern, we reran the multiple regression analyses separately for participants who supported or opposed Turkey's inclusion into the EU. These two groups did not show any differences to undecided participants with regard to their variances on the measure of conscious beliefs (all F s < 1 , $ps > .40$). Supporting our interpretation in terms of genuine differences in covariations with selective exposure, the results showed that selective exposure was predicted by conscious beliefs for both groups of decided participants

Table 2. Zero-Order Correlations Between Automatic Associations, Conscious Beliefs, and Selective Exposure for Participants Who Reported to Be in Favor of Turkey's Inclusion Into the European Union, Against Turkey's Inclusion, or Undecided

	1	2	3	4	5
In favor (<i>n</i> = 40)					
1. Automatic associations–Time 1	—				
2. Automatic associations–Time 2	.43**	—			
3. Conscious beliefs–Time 1	.23	.16	—		
4. Conscious beliefs–Time 2	.14	.10	.74***	—	
5. Selective exposure	.15	.35*	.54***	.60***	—
Undecided (<i>n</i> = 53)					
1. Automatic associations–Time 1	—				
2. Automatic associations–Time 2	.31*	—			
3. Conscious beliefs–Time 1	-.01	.19	—		
4. Conscious Beliefs–Time 2	.34*	.44**	.64***	—	
5. Selective exposure	.51***	.61***	.19	.61***	—
Against (<i>n</i> = 20)					
1. Automatic associations–Time 1	—				
2. Automatic associations–Time 2	.01	—			
3. Conscious beliefs–Time 1	.21	.32	—		
4. Conscious beliefs–Time 2	.25	.61**	.80***	—	
5. Selective exposure	.05	.77***	.54*	.60**	—

* $p < .05$. ** $p < .01$. *** $p < .001$.

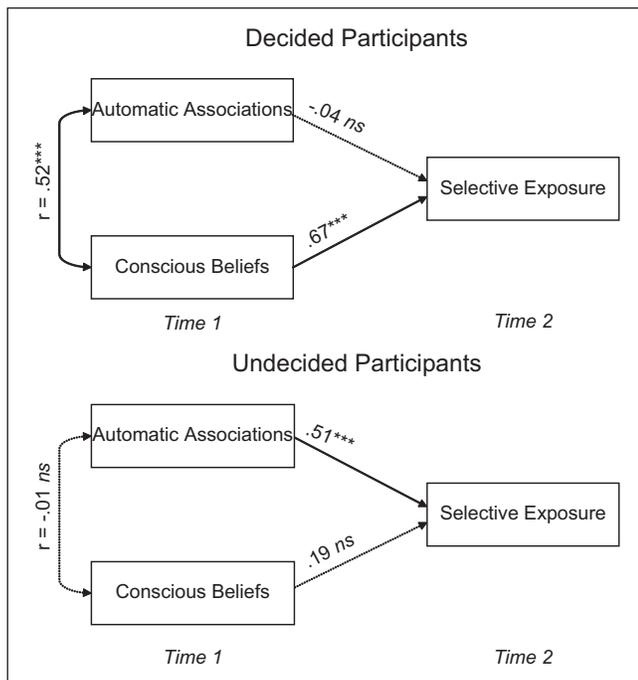


Figure 1. Prediction of selective exposure by automatic associations and conscious beliefs for participants who indicated to be decided (*n* = 60) or undecided (*n* = 53) about the inclusion of Turkey into the European Union.

Note: *ns* = not significant. The figure shows standardized beta coefficients of simultaneous multiple regression analyses. Higher scores in the three variables indicate more favorable automatic associations, more favorable conscious beliefs, and higher exposure to favorable information, respectively.

* $p < .05$. ** $p < .01$. *** $p < .001$.

[$B = .24$, $SE = .06$, $t(37) = 3.77$, $p = .001$, $R_p^2 = .27$ for participants in favor of Turkey's inclusion; $B = .25$, $SE = .09$, $t(17) = 2.66$, $p = .02$, $R_p^2 = .29$ for participants against Turkey's inclusion]; automatic associations failed to predict selective exposure for both groups [$B = .02$, $SE = .13$, $t(37) = 0.16$, $p = .87$, $R_p^2 = .001$ for participants in favor of Turkey's inclusion; $B = -.04$, $SE = .13$, $t(17) = -0.34$, $p = .74$, $R_p^2 = .005$ for participants against Turkey's inclusion].

Consequences of Selective Exposure

To investigate the effects of selective exposure on changes in automatic associations from Time 1 to Time 2 and changes in conscious beliefs from Time 1 to Time 2, we regressed automatic associations at Time 2 onto selective exposure controlling for automatic associations at Time 1 (i.e., prediction of residualized changes in automatic associations from Time 1 to Time 2 by selective exposure) and conscious beliefs at Time 2 onto selective exposure controlling for conscious beliefs at Time 1 (i.e., prediction of residualized changes in conscious beliefs from Time 1 to Time 2 by selective exposure). Selective exposure significantly predicted residualized changes in automatic associations and conscious beliefs over time for both decided [$B = .70$, $SE = .14$, $t(59) = 4.89$, $p < .001$, $R_p^2 = .24$ for automatic associations; $B = .66$, $SE = .26$, $t(59) = 2.59$, $p = .01$, $R_p^2 = .02$ for conscious beliefs] and undecided participants [$B = 1.12$, $SE = .24$, $t(52) = 4.72$, $p < .001$, $R_p^2 = .28$ for automatic associations; $B = 1.74$, $SE = .29$, $t(52) = 6.01$, $p < .001$, $R_p^2 = .25$ for conscious beliefs]. These findings are consistent with our hypotheses that

Table 3. Regression Results for the Prediction of Selective Exposure by Standardized Scores of Automatic Associations at Time 1 (AA1), Conscious Beliefs at Time 1 (CBI), Decidedness (DEC), and Their Interactions

Predictor	B	SE	t	p
AA1	.401	.109	3.660	<.001
CBI	.245	.174	1.408	.162
DEC	-.174	.174	-0.997	.321
AA1 × CBI	-.040	.166	-0.242	.809
DEC × CBI	.374	.204	1.837	.069
DEC × AA1	-.461	.178	-2.590	.011
DEC × AA1 × CBI	.000	.202	0.002	.998

Note: $R^2 = .38$, $F(7, 105) = 9.14$, $p < .00$.

(a) *selective exposure* in undecided individuals may lead them to adopt conscious beliefs that are in line with their preexisting automatic associations, and (b) *selective exposure* in decided participants may shift their automatic associations in a direction that is in line with their preexisting conscious beliefs.

To further investigate the mutual relations between automatic associations and conscious beliefs implied by this hypothesis, we conducted a two-wave-two-variable panel analysis in which automatic associations and conscious beliefs at Time 2 were regressed onto automatic associations and conscious beliefs at Time 1, respectively (see Figure 2). Replicating earlier findings by Galdi et al. (2008), the results showed that automatic associations at Time 1 significantly predicted residualized changes in conscious beliefs for undecided, $B = .59$, $SE = .16$, $t(50) = 3.61$, $p = .001$, $R^2 = .12$, but not for decided participants, $B = .06$, $SE = .18$, $t(57) = 0.36$, $p = .72$, $R^2 = .001$. Conversely, conscious beliefs at Time 1 significantly predicted residualized changes in automatic associations for decided participants, $B = .17$, $SE = .05$, $t(57) = 3.01$, $p = .004$, $R^2 = .11$, but not for undecided participants, $B = .16$, $SE = .11$, $t(50) = 1.51$, $p = .14$, $R^2 = .04$.

To test our hypothesis that the obtained mutual relations between automatic associations and conscious beliefs were mediated by selective exposure (Baron & Kenny, 1986), we reran the multiple regression analyses, additionally including selective exposure as a predictor (see Figure 3). Confirming our hypothesis, selective exposure predicted residualized changes in conscious beliefs for undecided participants, $B = 1.53$, $SE = .34$, $t(50) = 4.49$, $p < .001$, $R^2 = .14$, with the effect of automatic associations being reduced to nonsignificance, $B = .21$, $SE = .16$, $t(50) = 1.27$, $p = .21$, $R^2 = .01$. Moreover, selective exposure in decided participants predicted residualized changes in automatic associations, $B = .65$, $SE = .18$, $t(57) = 3.59$, $p = .001$, $R^2 = .13$, with the effect of conscious beliefs being reduced to nonsignificance, $B = .03$, $SE = .06$, $t(57) = 0.47$, $p = .64$, $R^2 = .002$. Sobel tests revealed that the obtained indirect effects were statistically

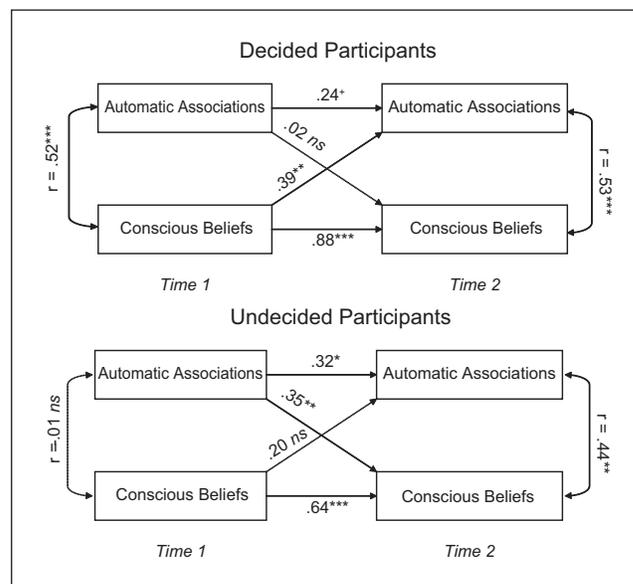


Figure 2. Stability (horizontal arrows) and change (diagonal arrows) in automatic associations and conscious beliefs from Time 1 to Time 2 (1 week apart) for participants who indicated to be decided ($n = 60$) or undecided ($n = 53$) about the inclusion of Turkey into the European Union.

Note: ns = not significant. The figure shows standardized beta-coefficients of simultaneous multiple regression analyses using a two-wave-two-variable panel design.

+ $p < .07$. * $p < .05$. ** $p < .01$. *** $p < .001$.

significant in both cases: $Z = 3.15$, $p = .002$ for the indirect effect of conscious beliefs on residualized changes in automatic associations in decided participants; $Z = 3.08$, $p = .002$ for the indirect effect of automatic associations on residualized changes in conscious beliefs in undecided participants.

Discussion

The present results show that both decided and undecided individuals selectively expose themselves to confirmatory information, albeit with different antecedents and consequences. Whereas conscious beliefs tended to show a stronger predictive relation to selective exposure for decided compared with undecided participants (see Hart et al., 2009), automatic associations revealed the reverse pattern, such that automatic associations predicted selective exposure for undecided, but not for decided, participants. Selective exposure was further related to corresponding changes in automatic associations and conscious beliefs, such that both shifted in line with the biased set of newly acquired information. As a result, selective exposure led undecided participants to adopt conscious beliefs that were in line with their preexisting automatic associations. Conversely, for decided participants, selective exposure shifted auto-

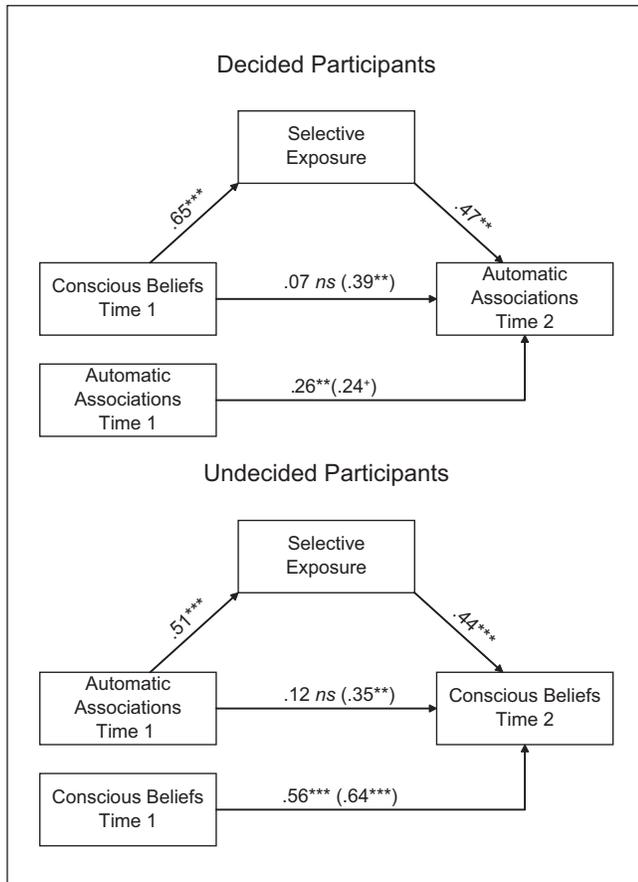


Figure 3. mediation analyses testing indirect effects of conscious beliefs at Time 1 on residualized changes in automatic associations at Time 2 via selective exposure in decided participants ($n = 60$) and indirect effects of automatic associations at Time 1 on residualized changes in conscious beliefs at Time 2 via selective exposure in undecided participants ($n = 53$).

Note: *ns* = not significant. Higher scores in the three variables indicate more favorable automatic associations, more favorable conscious beliefs, and higher exposure to favorable information, respectively.
 $+p < .07$. $*p < .05$. $**p < .01$. $***p < .001$.

matic associations in a direction that was in line with their preexisting conscious beliefs.

Implications for Selective Exposure

These findings have important implications for research on selective exposure. Previous studies have shown that the preference for confirmatory information is weaker for attitudes and beliefs that are not held with conviction (see Hart et al., 2009). This pattern was replicated in the current study, showing that consciously held beliefs revealed a stronger predictive relationship to selective exposure for decided compared with undecided participants. To the extent that avoidance of dissonance is the driving force behind selective exposure effects (Frey, 1986), it seems reasonable to assume

that undecided individuals show reduced preferences for particular information, because there is no potential for cognitive inconsistency if an individual is undecided about a particular issue (Festinger, 1964; see also Gawronski & Strack, 2004). However, to our knowledge, previous studies in this area exclusively investigated conscious beliefs as an antecedent of selective exposure, but they did not include measures of automatic associations. The current research suggests that even undecided individuals show a predictable preference for particular information, namely, information that is consistent with their automatic associations. Drawing on current theorizing about the relation between automatic associations and conscious beliefs (e.g., Fazio, 2007; Gawronski & Bodenhausen, 2006; Hofmann & Wilson, 2010), we argued that automatic associations elicit spontaneous gut feelings even if undecided individuals are not confident enough to explicitly endorse these feelings in a conscious preference (see Hofmann et al., 2005). Nevertheless, spontaneous gut responses may lead undecided individuals to favor information that is in line with their gut response. These assumptions were confirmed in the current study demonstrating that, even though conscious beliefs were not significantly related to selective exposure in undecided individuals, these individuals nevertheless showed a predictable preference for particular information, in which they selectively exposed themselves to information that was consistent with their automatic associations.³

An interesting question in this context concerns the relation between our findings and earlier research showing enhanced cognitive elaboration as a result of discrepancies between automatic associations and conscious beliefs (e.g., Briñol, Petty, & Wheeler, 2006; Rydell et al., 2008). For example, Briñol et al. (2006) argued that discrepancies between automatic associations and conscious beliefs increase the motivation to engage in effortful processing of discrepancy-related information to reduce these discrepancies. Along the same lines, Rydell et al. (2008) argued that discrepancies between automatic associations and conscious beliefs create feelings of discomfort, which in turn enhances the cognitive elaboration of discrepancy-related information. The present study expands on this research by showing that the processing of discrepancy-related information may not necessarily be unbiased despite discrepancy-related increases in cognitive elaboration. Specifically, the current findings suggest that discrepancies between automatic associations and conscious beliefs may lead individuals to selectively search for particular information, such that decided individuals may search for information that is consistent with their conscious beliefs, whereas undecided individuals may search for information that is consistent with their automatic associations. This conclusion is in line with current theorizing in research on persuasion, stating that enhanced cognitive elaboration does not necessarily imply that the processing of persuasive information is unbiased (e.g., Chen & Chaiken, 1999; Petty & Wegener, 1999).

Implications for Attitude Change

By investigating selective exposure as a mediator of dynamic influences between automatic associations and conscious beliefs, the current findings also provide important insights for research on attitude change. Recent theorizing (e.g., Gawronski & Bodenhausen, 2006, in press) and empirical evidence (e.g., Whitfield & Jordan, 2009) suggest that automatic associations and conscious beliefs can mutually influence each other, a pattern that also emerged in the current study. Replicating earlier findings by Galdi et al. (2008), we found that for undecided participants, automatic associations predicted changes in conscious beliefs. Conversely, for decided participants, conscious beliefs predicted changes in automatic associations. However, going beyond Galdi et al.'s longitudinal results, the present research provides deeper insights into the mechanisms underlying these effects. Specifically, in Galdi et al.'s research, it remained unclear (a) how exactly automatic associations and conscious beliefs influenced each other and (b) why the obtained influences differed for decided and undecided participants. The present findings suggest that selective exposure may function as an important mediator for mutual influences between automatic associations and conscious beliefs. In the current study, selective exposure predicted changes in both automatic associations and conscious beliefs, such that both shifted in the direction of the newly acquired information. Importantly, although these shifts occurred for both decided and undecided participants, the two groups differed in terms of the respective antecedent of selective exposure. Whereas selective exposure in decided participants was primarily predicted by conscious beliefs, selective exposure in undecided participants was primarily predicted by automatic associations. Thus, the current findings explain *how* automatic associations and conscious beliefs can influence each other, and the obtained asymmetry in the prediction of selective exposure also explains *why* these influences may differ for decided and undecided individuals. Whereas the *how*-question is answered by the influence of the biased set of information that individuals expose themselves to, the *why*-question is answered by the finding that selective exposure was predicted by conscious beliefs in decided individuals and by automatic associations in undecided individuals.

Implications for Decision Making

Finally, the present findings also contribute to the broader literature on information processing biases in decision making. Previous research has shown that decision-making processes can be divided into different stages, and these stages tend to be associated with different strategies of information processing (e.g., Gollwitzer, 1990). By demonstrating differential antecedents of selective exposure in decided and undecided participants, the present findings provide deeper insights into the sources of biased information processing at different stages of

the decision-making process. Specifically, one could argue that undecided individuals often have automatic associations that are not reflected in consciously held beliefs, and the gut responses resulting from these associations may lead them to selectively expose themselves to information that is consistent with their gut response. As a result, conscious beliefs may shift in a direction that is consistent with preexisting automatic associations, and these newly acquired beliefs may ultimately serve as a basis for deliberate choice decisions. For instance, in the political domain, undecided voters may have automatic positive associations for one candidate and less favorable associations for another candidate, which may lead them to selectively search for information that supports the preference implied by automatic associations. Consistent with the notion of confabulation (Wilson & Bar-Anan, 2008), this information may then provide a rational justification for their voting choice, even though the choice was rooted in mental structures that existed before the preference-rationalizing information was acquired. In line with this assumption, Galdi et al. (2008) found that future political choices of undecided participants were predicted by automatic associations but not by conscious beliefs, whereas future political choices of decided participants were predicted by conscious beliefs but not by automatic associations (for related evidence, see Arcuri et al., 2008; Greenwald et al., 2009; Payne et al., 2010; Roccoato & Zogmaister, 2010). The current findings provide deeper insights into the mechanisms that may underlie these findings, suggesting that selective exposure may be a driving force behind the differential relation of future choices to automatic associations and conscious beliefs in decided versus undecided individuals.

Conclusion

Predicting future choices and decisions on the basis of self-report measures is a difficult task, given that respondents often report being undecided. The development of implicit measures represents a significant step toward overcoming this problem, in that implicit measures have been shown to predict future preferences of individuals who report being undecided (e.g., Galdi et al., 2008). The current findings provide deeper insights into the mechanisms that are responsible for the predictive power of implicit measures, showing that selective exposure functions as mediator in link between automatic associations and future preferences.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1. The inclusion of Turkey into the EU is controversially debated among the citizens of current EU states. Arguments in favor of

Turkey's integration include the expansion of the European market and increased political weight of the EU in the rest of the world; arguments against Turkey's integration include concerns about violations of human rights in Turkey and about conflicts between Turkey's Islamic traditions and predominantly Christian values in other European countries. During the period of our data collection, the inclusion of Turkey into EU was not extensively discussed in the Italian media, which we deemed functional for two reasons. First, it facilitated the recruitment of participants who identified themselves as undecided. Second, it reduced the likelihood that participants would be exposed to issue-relevant information over and above their preexisting knowledge and the information they were exposed to in our study.

2. There were no significant differences in variances for any of the other measures (all F s < 2.68 and all p s > .10). Note that, although variances in automatic associations at Time 1 did not significantly differ for decided and undecided participants, the standard deviation tended to be somewhat higher for decided compared with undecided participants ($SD_{\text{undecided}} = .04$; $SD_{\text{decided}} = .07$). This pattern stands in contrast to the assumption that the obtained findings for automatic associations might be due to unequal variances, given that automatic associations predicted selective exposure in undecided but not decided participants.
3. According to our theorizing, automatic associations elicit spontaneous gut feelings, which in turn represent the driving force behind selective exposure effects in undecided participants. Thus, it is important to note that explicit measures may show similar effects as the Single Category Implicit Association Test (SC-IAT) in the current study, if these measures are particularly designed to capture self-reports of spontaneous gut feelings (e.g., Gawronski & LeBel, 2008; Jordan, Whitfield, & Zeigler-Hill, 2007; Ranganath, Smith, & Nosek, 2008; Smith & Nosek, 2011).

References

- Arcuri, L., Castelli, L., Galdi, S., Zogmaister, C., & Amadori, A. (2008). Predicting the vote: Implicit attitudes as predictors of the future behavior of decided and undecided voters. *Political Psychology, 29*, 369-387.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.
- Briñol, P., & Petty, R. E. (2009). Persuasion: Insights from the self-validation hypothesis. *Advances in Experimental Social Psychology, 41*, 69-118.
- 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.
- Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken, & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 73-96). New York, NY: Guilford.
- De Houwer, J. (2001). A structural and process analysis of the Implicit Association Test. *Journal of Experimental Social Psychology, 37*, 443-451.
- Fazio, R. H. (2007). Attitudes as object-evaluation associations of varying strength. *Social Cognition, 25*, 603-637.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row Peterson.
- Festinger, L. (1964). *Conflict, decision, and dissonance*. Stanford, CA: Stanford University Press.
- Frey, D. (1986). Recent research on selective exposure to information. *Advances in Experimental Social Psychology, 19*, 41-80.
- Galdi, S., Arcuri, L., & Gawronski, B. (2008). Automatic mental associations predict future choices of undecided decision makers. *Science, 321*, 1100-1102.
- 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., & Bodenhausen, G. V. (in press). The associative-propositional evaluation model: Theory, evidence, and open questions. *Advances in Experimental Social Psychology*.
- Gawronski, B., & Galdi, S. (2011). Using implicit measures to read the minds of undecided voters. In M. Cadinu, S. Galdi, & A. Maass (Eds.), *Social perception, cognition, and language in honour of Arcuri* (pp. 203-216). Padova, Italy: CLEUP.
- Gawronski, B., Hofmann, W., & Wilbur, C. J. (2006). Are "implicit" attitudes unconscious? *Consciousness and Cognition, 15*, 485-499.
- Gawronski, B., & LeBel, E. P. (2008). Understanding patterns of attitude change: When implicit measures show change, but explicit measures do not. *Journal of Experimental Social Psychology, 44*, 1355-1361.
- Gawronski, B., Peters, K. R., Brochu, P. M., & Strack, F. (2008). Understanding the relations between different forms of racial prejudice: A cognitive consistency perspective. *Personality and Social Psychology Bulletin, 34*, 648-665.
- Gawronski, B., & Strack, F. (2004). On the propositional nature of cognitive consistency: Dissonance changes explicit, but not implicit attitudes. *Journal of Experimental Social Psychology, 40*, 535-542.
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *The handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 53-92). New York, NY: Guilford.
- Govan, C. L., & Williams, K. D. (2004). Changing the affective valence of the stimulus items influences the IAT by re-defining the category labels. *Journal of Experimental Social Psychology, 40*, 357-365.
- Greenwald, A. G., & Nosek, B. A. (2001). Health of the implicit association test at age 3. *Zeitschrift für 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*, 187-216.
- Greenwald, A. G., Smith, C. T., Sriram, N., Bar-Anan, Y., & Nosek, B. A. (2009). Race attitude measures predicted vote in the 2008 U.S. Presidential Election. *Analyses of Social Issues and Public Policy, 9*, 241-253.
- Hart, W., Albarracín, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling validated being correct: A meta-analysis of selective exposure to information. *Psychological Bulletin, 135*, 555-588.

- Hofmann, W., Gschwendner, T., Nosek, B. A., & Schmitt, M. (2005). What moderates explicit-implicit consistency? *European Review of Social Psychology, 16*, 335-390.
- Hofmann, W., & Wilson, T. D. (2010). Consciousness, introspection, and the adaptive unconscious. In B. Gawronski & B. K. Payne (Eds.), *Handbook of implicit social cognition: Measurement, theory, and applications* (pp. 197-215). New York, NY: Guilford.
- Jordan, C. H., Spencer, S. J., Zanna, M. P., Hoshino-Browne, E., & Correll, J. (2003). Secure and defensive high self-esteem. *Journal of Personality and Social Psychology, 85*, 969-978.
- Jordan, C. H., Whitfield, M., & Zeigler-Hill, V. (2007). Intuition and the correspondence between implicit and explicit self-esteem. *Journal of Personality and Social Psychology, 93*, 1067-1079.
- Karpinski, A., & Steinman, R. B. (2006). The Single Category Implicit Association Test as a measure of implicit social cognition. *Journal of Personality and Social Psychology, 91*, 16-32.
- Payne, B. K., Krosnick, J. A., Pasek, J., Lelkes, Y., Akhtar, O., & Tompson, T. (2010). Implicit and explicit prejudice in the 2008 American presidential election. *Journal of Experimental Social Psychology, 46*, 367-374.
- Peters, K. R., & Gawronski, B. (2011). Mutual influences between the implicit and explicit self-concepts: The role of memory activation and motivated reasoning. *Journal of Experimental Social Psychology, 47*, 436-442.
- Petty, R. E., Tormala, Z. L., Briñol, P., & Jarvis, W. B. G. (2006). Implicit ambivalence from attitude change: An exploration of the PAST model. *Journal of Personality and Social Psychology, 90*, 21-41.
- Petty, R. E., & Wegener, D. T. (1999). The elaboration likelihood model: Current status and controversies. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 41-72). New York, NY: Guilford.
- Ranganath, K. A., Smith, C. T., & Nosek, B. A. (2008). Distinguishing automatic and controlled components of attitudes from direct and indirect measurement methods. *Journal of Experimental Social Psychology, 44*, 386-396.
- Roccatò, M., & Zogmaister, C. (2010). Can we improve electoral forecasts using the IAT? A field research. *Political Psychology, 31*, 249-274.
- 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.
- Smith, C. T., & Nosek, B. A. (2011). Affective focus increases the concordance between implicit and explicit attitudes. *Social Psychology, 42*, 300-313.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review, 8*, 220-247.
- Whitfield, M., & Jordan, C. H. (2009). Mutual influences of explicit and implicit attitudes. *Journal of Experimental Social Psychology, 45*, 748-759.
- Wilson, T. D., & Bar-Anan, Y. (2008). The unseen mind. *Science, 321*, 1046-1047.