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Affective Focus Increases the Concordance between Implicit and Explicit Attitudes

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Abstract

Two attitude dichotomies – implicit versus explicit and affect versus cognition – are presumed to be related. Following a manipulation of attitudinal focus (affective or cognitive), participants completed two implicit measures (Implicit Association Test and the Sorting Paired Features task) and three explicit attitude measures toward cats/dogs (Study 1) and gay/straight people (Study 2). Using confirmatory factor analysis, both studies showed that explicit attitudes were more related to implicit attitudes in an affective focus than in a cognitive focus. We suggest that, although explicit evaluations can be meaningfully parsed into affective and cognitive components, implicit evaluations are more related to affective than cognitive components of attitudes.

Keywords: affect, cognition, implicit attitudes, explicit attitudes, structural equation modeling

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Affective Focus Increases the Concordance between Implicit and Explicit Attitudes

Eighty years ago, L. L. Thurstone wrote, "It will be conceded at the outset that an attitude is a complex affair which cannot be wholly described by any single numerical index" (1928; p. 530). For years, measurement lagged behind Thurstone's appreciation of attitude complexity as assessments deliberately simplified attitudes into singular, summary evaluations. However, some applications have made useful distinctions – such as parsing affective and cognitive components of attitudes (e.g., Eagly & Chaiken, 1993). Further, over the past decade and a half, another parsing of that "complex affair" distinguishes between implicit and explicit components of attitudes. In this article, we investigate the relationship between these two approaches to parsing the attitude construct.

Implicit attitudes are those that can be elicited without an act of introspection whereas explicit attitudes, in contrast, are the products of evaluative introspection (Greenwald & Banaji, 1995; Nosek & Greenwald, 2009). Implicit and explicit attitudes are related, but distinct (Nosek & Smyth, 2007), and both are predictive of behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Explicit attitudes are commonly assessed with direct, self-report measures such as asking "Do you like fish?" whereas implicit measures usually use indirect means to infer evaluations. For example, evaluative priming compares the speed of evaluating a good or bad word immediately after a prime is presented. If the prime activates positivity, then the evaluation of good words should be relatively faster than the evaluation of bad words (e.g., compared to a neutral prime). It is important to note that the conception of "implicit" in both theory and measurement is heterogeneous. Implicit evaluations generally earn the term "implicit" if they lack one or more features of a typical self-report of one's evaluation: awareness of evaluating the target, intention to evaluate, control over the evaluation, and deliberation in making an evaluation (see Bargh, 1994; De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; and Nosek &

Greenwald, 2009 for further discussion). Because of the heterogeneous quality of the "implicit" construct, there is considerable interest and debate about which processes – e.g., awareness, control, intention – are relevant for characterizing the differences between implicit and explicit measurement, especially among the various measures that are considered to be implicit. This article is agnostic as to which particular evaluative processes distinguish implicit and explicit measures. Instead, we take the fact that they elicit distinct evaluations in some domains as our starting point, and investigate whether shifting mindsets to be focused on one's thoughts or feelings has implications for the strength of relation among these measures.

As research on implicit attitudes – and their distinction from explicit attitudes - has evolved, implicit evaluation has increasingly been described in affective terms (see Spence & Townsend, 2008 for a review). In fact, implicit attitudes have become nearly synonymous with the terms "automatic affective reactions" and "immediate affective reactions" (e.g., Friese & Hofmann, 2009; Gawronski & Bodenhausen, 2007; Hofmann, Friese, & Roefs, 2009; Huntsinger & Smith, 2009; LeBel & Campbell, 2009; Payne, Govorun, & Arbuckle, 2008; Quirin, Kazen, & Kuhl, 2009). However, while there is some extant support for this interpretation, the evidence is incomplete because the contrast to "affect" - usually conceived of as "cognition" - has been inconsistently or weakly operationalized. For the studies reported in this article, we operationalized affect and cognition using an approach that closely follows the form that they are most commonly conceptualized in the present literature wherein *affect* refers to *emotions and feelings* about the attitude object and *cognition* refers to *thoughts and beliefs* about the attitude object (Aikman & Crites, 2007; van den Berg, Manstead, van der Pligt, & Wigboldus, 2006; Crites, Fabrigar, & Petty, 1994; Fabrigar & Petty, 1999; Farley & Stasson, 2003; Giner-Sorolla, 2004; Haddock, Maio, Arnold, & Huskinson, 2008; Lavine, Thomsen, Zanna, & Borgida, 1998;

Petty, Wegener, & Fabrigar, 1997; See, Petty, & Fabrigar, 2008; Verplanken, Hofstee, & Janssen, 1998; Zanna & Rempel, 1988).

Some Evidence that Implicit Attitudes Have More in Common with Affect than Cognition

Some studies have investigated the link between implicit attitudes and affective components of attitudes. For example, Banse, Seise and Zerbes (2001) reported higher correlations between implicit and explicit measures when the explicit measures asked for affective as opposed to cognitive evaluations of gay people. However, this was *only* true when gay people comprised half of the sample; among straight people, implicit attitudes were not differentially related to affective versus cognitive self-reports.

Additionally, a study that evidenced a reduction in anti-black implicit bias following a course in diversity education (Rudman, 2004; Rudman, Ashmore & Gary, 2001) suggested that changes observed in implicit attitudes may have been primarily driven by shifts in affective variables such as increased friendships with, a reduction in fear of, and an increased liking for African-Americans. Rudman and colleagues also found that implicit attitudes toward smoking and body weight are related to early childhood experiences (and explicit attitudes to more recent experiences). They suggest that childhood is more affective in nature, while the present is more cognitive (Rudman, Phelan, & Heppen, 2007; but see Castelli, Carraro, Gawronski, & Gava, 2010).

Ranganath, Smith, and Nosek (2008) found that explicit attitudes toward gay people were more related to implicit attitudes when those self-reports were referred to as "gut reactions" and "initial responses" as opposed to "actual feelings" and when "given time to think fully about my feelings." Similarly, Gawronski and LeBel (2008) found that implicit and explicit attitudes were more related when participants focused on their feelings toward the attitude object versus their reasons for their preference or their knowledge about the attitude object. In another context,

Scarabis, Florack, and Gosejohann (2006) found that implicit measures related to consumer choices when participants made those choices while focusing on their feelings, but not while analyzing their reasons. These latter two papers built on evidence that, because people do not have easy introspective access to their mental processes (Nisbett & Wilson, 1977), focusing on reasons leads to less satisfaction with behavioral choices (Wilson, Lisle, Schooler, Hodges, Klaaren, & LaFluer, 1993). The presumption is that reasons-analysis leads people to confabulate factors that are actually irrelevant to the basis of their preferences. Reasons analysis is related to cognitive components of attitudes, but is more focused on the deliberative process of generating reasons than the cognitive components of attitudes themselves.

A final piece of evidence linking implicit with affective components of attitudes more than cognitive components of attitudes comes from a meta-analysis of the relationship between implicit and explicit evaluations (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Explicit measures were coded by whether they were relatively affective (e.g., thermometer ratings of warmth) or cognitive (e.g., trait ratings); affective attitudes were found to be more related to implicit attitudes than were cognitive attitudes across a variety of attitude topics.

While the existing literature is generally supportive of the hypothesis that implicit attitudes are more related to affective than cognitive components of attitude self-reports, most of the work has been correlational. The best experimental evidence to date used the reasons-analysis paradigm to disrupt the quality of self-report with thoughts that are irrelevant to the evaluation. It is possible that this manipulation shifted participants from an affective focus to a cognitive one. However, in the attitude literature about affective and cognitive components of attitudes, the latter are not necessarily weaker, less predictive of behavior, or less reflective of one's mental representations (e.g., Crites et al., 1994; Lavine et al., 1998). As such, the "reasons" condition in

the prior experimental research may not appropriately be thought of as capturing the cognitive components of evaluation.

Reasons analysis guides participants to think about the antecedent causes of their evaluation, rather than the evaluation itself. A cognitive focus, on the other hand, is supposed to keep participants attention on the evaluation itself rather than how they arrived at it. As such, reasons analysis manipulations may have just distracted participants away from the basis of their evaluation whether affective or cognitive, rather than provide a good "cognitive focus" comparison. Our approach was to focus directly on the relationship between *implicit-explicit* and *affect-cognition* dimensions, without trying to disrupt the quality of decision-making with deliberative reasoning or by operationalizing "cognition" in a way that may be less relevant for evaluation.

Overview of Studies

We tested the prediction that implicit attitudes are more related to affect than to cognition by manipulating attitudinal focus (affective focus vs. cognitive focus) between participants before assessing attitudes using multiple implicit and explicit measures with regard to cats and dogs (Study 1) and gay people and straight people (Study 2). The evidence from both studies suggests that an affective focus facilitates convergence of implicit and explicit attitude measures compared to a cognitive focus.

Study 1

In Study 1, we investigated the relationship between implicit and explicit attitudes following a manipulation of attitudinal focus. Crites and colleagues (1994) clarified how to distinguish between affective and cognitive attitudinal components and identified words that were primarily affective (referring to feelings and emotions) or cognitive (referring to thoughts and beliefs). We induced a feeling-focused or belief-focused mode of processing by using these

affective or cognitive words to manipulate attitudinal focus. Namely, participants read a short passage about attitudes toward pets and responded to multiple questions about their feelings (or thoughts) about cats and dogs. If implicit attitudes are primarily related to affect, then attitude reports focused on feelings and emotions may share more features with implicit attitudes than attitude reports focused on thoughts and beliefs that may correspond to slower, reflective, and more controllable processes.

Participants completed multiple implicit and explicit attitude measures in either an affective or cognitive focus condition. We tested our hypotheses in a confirmatory factor analysis framework with comparative model fitting (see John & Benet-Martinez, 2000 for a detailed treatment of the rationale behind the use of this statistical strategy and Nosek & Smyth, 2007; Ranganath et al., 2008 for related examples of a model comparison approach). This approach has some important advantages over a more familiar approach of comparing implicit-explicit zero-order correlations between "affect" and "cognitive" conditions: (1) model comparisons are more sensitive (powerful) to detecting differences, zero-order comparisons are underpowered tests (Cohen, 1988), (2) comparing structural models allows a comparison of the latent factors of multiple measures (the Implicit Association Test and Sorting Paired Features for implicit measures) rather than individual comparisons of single measures, and (3) structural models mitigate unreliability of measurement enhancing the sensitivity of the tests (Baron & Kenny, 1986; Jaccard & Wan, 1999; Wu & Zumbo, 2008). We conducted hypothesis-testing through comparative model fitting of different confirmatory models representing the relations among implicit and explicit measures in affective and cognitive experimental conditions. This tested whether the commonality between implicit and explicit evaluations was maximized in the affective-focus condition compared to the cognitive-focus condition.

Method

Participants

One hundred thirty-one undergraduate students completed the study in partial completion of a course requirement. The mean age of the sample was 18.8 years, and 76 (58%) of the participants were female.

Measures

Implicit Association Test (IAT). The IAT (Greenwald, McGhee, & Schwartz, 1998) measures associations between attitude objects (e.g., cats and dogs) and evaluative attributes (e.g., good and bad). Participants categorized pictures and words – presented in the center of a computer monitor into one of four categories using the "a" key to sort stimuli into the categories appearing on the left, and the ";" key for categories appearing on the right. Participants completed this task in seven blocks following the recommendations of Nosek, Greenwald, and Banaji (2005). In particular, participants first practiced categorizing pictures of cats and dogs for 20 trials (Block 1), then practiced categorizing good and bad words for 20 trials (Block 2). Following these two practice blocks, participants categorized cats and good words with one key response ("a") and dogs and bad words with another key response (";") for 56 trials (separated into blocks of 20 [Block 3] and 36 trials [Block 4] by a single trial instructing them to take a brief rest). Participants then practiced categorizing cats and dogs with the opposite keys from their first practice block for 40 trials (Block 5). Finally, they categorized dogs and good words with one key response ("a") and cats and bad words with the other key response (";") for 56 trials (again in two blocks of 20 [Block 6] and 36 trials [Block 7]). The difference in average response time sorting cats and good words together (and dogs and bad words together) compared to the reverse combination is taken as an indicator of association strengths between the animals and evaluative attributes. The order of these two categorization conditions was counterbalanced between

participants. If participants made a categorization error, a red "X" appeared below the stimulus and the trial continued until the participant made the correct response. Stimuli appeared immediately following a correct response with an intertrial delay of 150 ms.

The IAT was scored following the *D* scoring algorithm (Greenwald, Nosek, & Banaji, 2003) with trial responses less than 400 ms deleted. Mean latencies were calculated for each block of the task, and two *D*-subscores were calculated by dividing the difference between the mean latencies for Block 3 from those of Block 6 (and likewise for Block 4 and Block 7) by the mean standard deviation of the trials in those blocks. Therefore, the first *D*-score is constructed using the first 20 trials (i.e., Blocks 3 and 6) and the second *D*-score uses the remaining 36 trials (i.e., Blocks 4 and 7). These two *D*-scores served as the two IAT indicators for the confirmatory factor analyses. IAT scores were coded such that higher values indicated a stronger implicit preference for dogs relative to cats.[1]

Sorting Paired Features Task (SPF). The SPF (Bar-Anan, Nosek, & Vianello, 2009) assesses the strength of associations between attitude objects (cats and dogs) and evaluative terms (good and bad) by having participants rapidly categorize word and picture *pairs* into one of four conjoint category responses (i.e., cats + good, cats + bad, dogs + good, dogs + bad) presented in the four corners of the screen.

Each trial of the SPF consisted of the presentation of a pair of stimuli – either a good or bad adjective directly below either a dog or cat picture – in the center of the computer screen. Pairs were categorized into the appropriate category (e.g. dogs + good) using the "q" key to sort pairs into the category appearing in the upper-left corner, the "c" key for the lower-left corner, the "p" key for the upper-right corner, and the "m" key for the lower right corner. Each pair of stimuli appeared immediately following a correct response with an intertrial delay of 150 ms.

Participants responded to three blocks of 80 trials each, using the same stimuli from the IAT. Half of the participants performed an SPF with the two categories for cats on the left side and the two categories for dogs on the right side, and half of the participants completed an SPF with the dog and cat categories reversed.

The scoring algorithm for the SPF was adapted from the algorithm used with the IAT (Greenwald et al., 2003). First, trials in which the participant responded in less than 400 ms were deleted. A mean latency was then calculated for trials in each of the four category pairings (e.g. cats with good). Separate *D*-scores were calculated for attitudes toward cats and dogs by taking the difference between mean latencies in a given block for categorizing attitude objects when paired with good items versus when paired with bad items and dividing by the standard deviation of the latencies for those trials. Positive scores indicated positive implicit attitudes toward the animal. To create a relative attitude that conceptually paralleled the IAT, we calculated the difference between the cats *D*-score and the dogs *D*-score, resulting in three manifest indicators, one from each block of 80 trials, with positive scores indicating a preference for dogs relative to cats.

Explicit Ratings. Participants reported their attitudes toward cats and dogs using a set of 8-point semantic differentials anchored by the following word pairs: bad/good, negative/positive, and unfavorable/favorable. All three semantic differentials were used to report attitudes toward both cats and dogs, for a total of six explicit ratings. Three manifest variables were created by calculating difference scores with positive numbers indicating a preference for dogs relative to cats.

Procedure

Attitudinal focus was manipulated by first presenting a paragraph relevant to either feelings and emotions or thoughts and beliefs about pets. In addition, participants rated their level

of agreement with 14 affect (or cognition) relevant statements. Some items asked them to rate

their level of agreement with a statement, whereas other items were sentence stems which

participants completed using a Likert-type scale anchored by word pairs (e.g., "Dogs make

me…" anchored by "sad" and "happy" in the affective focus condition, or, agree-disagree ratings

of "For the most part, I believe that dogs are a mindless animal" in the cognitive focus condition).

See Appendix for full text of paragraphs and sentences.

After this manipulation, participants completed the two implicit attitude measures.

Participants were then exposed to the attitudinal focus manipulation again before completing

explicit attitude measures. During the second manipulation, each of the 14 questions was changed

so that if a participant responded to some aspect of their feelings (or beliefs) about cats the first

time, the question asked them about dogs the second time. The order of implicit and explicit

procedures was counterbalanced between participants; the two implicit procedures were always

presented together and their order was counterbalanced between participants.

Analysis Strategy

Hypotheses were tested using model comparisons of confirmatory factor analyses

(Jöreskog, 1969). This technique has emerged as a powerful method for hypothesis testing that

can represent and compare alternative structure of relations between multiple observed indicators

of various constructs (John & Benet-Martinez, 2000; see similar applications in Nosek & Smyth,

2007; Ranganath et al., 2008). For example, one of the advantages of structural equation

modeling is that shared method variance (e.g., of the implicit measures) is statistically removed

from the relationship between the latent constructs, thereby clarifying extant relationships (e.g.,

Baron & Kenny, 1986; Jaccard & Wan, 1999; Wu & Zumbo, 2008). In confirmatory factor

analysis, the experimenter uses theory to make decisions about relationships between manifest

variables (measured during the study), and underlying latent variables (hypothesized, but not

measured). The theorized data structure is then compared to the observed data structure, and the resulting chi-square estimate provides information about the goodness-of-fit of theory to data. We tested a series of multiple-group models that allowed imposition of distinct factor structures for our affective and cognitive focus groups. With multiple-group modeling, groups can have distinct theorized factor structures and the chi-square estimate tests the overall fit across groups. This is critical for testing our hypothesis that implicit and explicit measures will cohere more strongly in the affect condition compared to the cognition condition.

The assessment of each model's fit was based on the chi-square estimate and the root-mean-square error of approximation index (RMSEA, or ε_a). ε_a is a comparative assessment of the value of parsimony against the tendency for overall fit to improve in more complex representations. In other words, ε_a is an indicator of the balance between model fit and model complexity. The rule-of-thumb for model fitting is that an ε_a of <.05 is a "close" fit, .05-.08 is a "fair" fit, .08-.10 is a "mediocre" fit, and >.10 is a "poor" fit (MacCallum, Browne, & Sugawara, 1996).

The model comparison series (see Figure 1 for a representation of the four models) begins with a baseline model in which all manifest variables (five implicit and three explicit) were indicated by a single latent factor. This is a one-attitude model against which we compare the other models. This first model represents the hypothesis that an implicit-explicit distinction is not necessary in order to understand the relation among the various attitude measures. In the second model, a single constraint is relaxed so that two separate latent factors (one implicit and one explicit) are estimated in the affect condition, whereas a single factor is again estimated in the cognition condition. In other words, the correlation between implicit and explicit attitudes is set to 1 (i.e., perfectly positively correlated) in the cognition condition, whereas it is freely estimated

in the affect condition. A significance test compares the comparative fit of these two representations. With this design, that significance test is the conceptual parallel to a comparison of correlations with the attendant advantages of representing all of the relations simultaneously in a single structural model. If the second model provides a significant improvement in fit over the baseline model (which holds the correlation between implicit and explicit attitudes to be 1 in both the affect and cognition condition), then we would conclude that implicit and explicit attitude measures in the affect condition are better represented by a dual implicit and explicit attitude model than a single attitude model. The third model does the opposite in comparison to the first model. The single factor is retained in the affect condition, and two factors (implicit and explicit) are estimated in the cognition condition. Similarly to Model 2, if this shows a significant improvement in fit over Model 1, then we would conclude that implicit and explicit measures in the cognitive condition are better represented as assessing distinct but related attitudes than as a single attitude factor. The fourth and final model estimates a separate implicit and explicit attitude factor for both affective and cognitive conditions; the correlation is freely estimated in both the affective and the cognitive condition. Conceptually speaking, the sequence of model comparisons is similar to a moderation analysis testing whether the relationship between implicit and explicit latent variables is moderated by the experimental condition (Reinecke, 2002; Rigdon, Schumacker, & Wothke, 1998).

When comparing nested models, the inference test of differences in relative model fit is to place a 95% confidence interval (CI) around the ϵ_a of the change in chi-square ($\epsilon_a\Delta$). If this CI encompasses .05, then the models are considered to be close to one another meaning that any improved fit due to adding model complexity is not worth the loss of parsimony.

Results and Discussion

Descriptive Statistics

Indicators of implicit and explicit attitudes showed that participants reported more positivity for dogs ($M = 20.42$, $SD = 3.39$) than cats ($M = 14.56$, $SD = 5.7$, $t(129) = 10.43$, $p < .0001$, $d = 1.25$) and implicitly preferred dogs relative to cats using the IAT ($M = 0.07$, $SD = 0.36$, $t(129) = 2.10$, $p = .04$, $d = 0.19$). Using the SPF, participants had a non-significant tendency to more easily associate dogs with good words relative to bad words ($M = 0.04$, $SD = 0.26$, $t(124) = 1.77$, $p = .08$, $d = 0.15$), and were equally able to associate cats with good and bad words ($M = -0.02$, $SD = 0.25$, $t(125) = -0.70$, $p = .48$, $d = -0.08$). No differences in means or variances of animal preferences were hypothesized or found between conditions on any of the explicit or implicit measures (all ts < 1.1). In other words, an affective or cognitive focus did not change average liking for dogs or cats.

Comparative Model Fitting

Here we summarize the absolute fits of the four structural models, and then report the inferential tests of comparative model fits to test the primary hypotheses. See Table 1 for model fit statistics for both studies. Model 1 estimated a single latent attitude in both affective and cognitive conditions and was a "poor" fit to the data ($\chi^2(40) = 96.5$, $\varepsilon_a = .11$). This replicates prior research findings that indicate implicit and explicit attitude measures do not conform well to a single-attitude structure (Cunningham, Preacher, & Banaji, 2001; Greenwald & Farnham, 2000; Nosek & Smyth, 2007; Ranganath et al., 2008). Model 2 (single attitude in the cognition condition and distinct implicit and explicit attitudes in the affect condition) was a "mediocre" fit to the data ($\chi^2(39) = 79.3$, $\varepsilon_a = .09$). Model 3 (single attitude in the affect condition, and distinct implicit and explicit attitudes in the cognition condition) was a "fair" fit to the data ($\chi^2(39) = $

65.1, $\varepsilon_a = .07$). Finally, Model 4, which estimated distinct, but related, implicit and explicit attitudes in both conditions was a "close" fit to the data ($\chi^2(38) = 48$, $\varepsilon_a = .05$).

Affect vs. Cognition. To answer whether attitudinal focus influences the concordance between implicit and explicit attitudes we used inference tests to compare fit improvements from Model 1 (single attitude model) to Model 2 (single cognitive attitude, distinct affective attitudes) versus Model 3 (single affective attitude, distinct cognitive attitudes). Both showed a significant improvement in fit over Model 1; Model 1 versus 2 ($\Delta\chi^2(1) = 17.2$, 95% CI $\epsilon_a\Delta = .19$-$.54$), Model 1 versus 3 ($\Delta\chi^2(1) = 31.4$, 95% CI $\epsilon_a\Delta = .32$-$.67$) indicating that, in both affective and cognitive focus conditions, implicit and explicit attitudes are more appropriately considered distinct but related constructs.

Model 2 and Model 3 are not nested and have the same number of degrees of freedom, so it is not possible to test formally whether one model makes a significantly larger improvement in fit. Instead, a comparison of their improvements over the baseline single-attitude model shows that Model 3, which fit a single attitude for the affective condition and two distinct attitudes for the cognition condition is a much better improvement in fit ($\Delta\chi^2 = 31.4$) than Model 2, which fit two attitude factors for the affective condition and a single attitude for the cognition condition ($\Delta\chi^2 = 17.2$).

Model 4, which fit a dual implicit-explicit attitude model for both affect and cognition conditions was a better overall fit than both Model 3 ($\Delta\chi^2(1) = 17.1$, 95% CI $\epsilon_a\Delta = .19$-$.54$) and Model 2 ($\Delta\chi^2(1) = 31.3$, 95% CI $\epsilon_a\Delta = .32$-$.67$). This suggests that implicit and explicit attitudes are still best conceived as related but distinct, even with an affective focus. However, this does not challenge the primary conclusion that explicit attitudes are more related to implicit attitudes when one has an affective focus than when one has a cognitive focus.

While comparatively underpowered compared to the formal model comparisons, it is possible to assess the extent to which implicit and explicit attitudes are related by looking at the correlation between the implicit and explicit constructs in Model 4. In the cognition condition, implicit and explicit latent constructs covaried at .51, $p < .0001$, whereas in the affect condition these constructs covaried at .72, $p < .0001$; these two correlations are marginally distinct from one another ($z = 1.92$, $p = .055$) within the context of that single model. This observation reaffirms the inferential test of these relations from the comparative model fitting.

In sum, these data affirm that a dual-attitude structure is the best way to characterize the relationship between implicit and explicit attitudes regardless of attitudinal focus, but focusing on one's feelings increases the concordance between implicit and explicit attitude measures more than does focusing on one's thoughts.

Study 2

The results of Study 1 support the prediction that cognitive versus affective focus influences the relationship between implicit and explicit attitude measures. Implicit and explicit attitudes cohered to a single attitude factor better in an affective focus condition than in a cognitive focus condition. However, estimating separate implicit and explicit attitudes fit better than estimating a single attitude in either the affective or the cognitive conditions. This suggests that the correlation between implicit and explicit evaluations departs significantly from perfect correspondence, even when participants are focusing on their feelings and emotions. In Study 2, we sought to strengthen the conclusion by assessing attitudes in a different attitude domain – gay people and straight people. We hypothesized that attitudes toward gay people may be especially likely to include conflicting affective and cognitive inputs, because of cognitive beliefs about fairness and equality and relatively negative affect toward gay people (e.g., Moreno & Bodenhausen, 2001). This difference between affective and cognitive reactions may provide for

stronger shifts in implicit-explicit convergence based on our affective-cognitive focus manipulation compared to attitudes toward dogs and cats.

Method

Participants

Ninety-nine undergraduate students completed the study in partial completion of a course requirement. Fifty-two (53%) were female, and the mean age of the sample was 18.7 years.

Measures

Implicit Association Test. The procedure for the presentation and scoring of the IAT was identical to Study 1. Attitude object stimuli were words relevant to gay and straight people (Nosek et al., 2007). Positive scores indicate a relative preference for straight people over gay people.

Sorting Paired Features. The stimuli sets used for the SPF were identical to those used for the IAT. The procedure was the same as in Study 1 except that two blocks of 80 trials were administered (rather than three blocks as in Study 1). Two manifest variables were created (one from each block of 80 trials) by calculating relative scores such that positive numbers indicate a preference for straight people relative to gay people.

Explicit Ratings. Participants rated their attitudes toward both gay people and straight people using semantic differentials: bad/good, negative/positive, and unfavorable/favorable. Three manifest variables were created by subtracting attitudes toward gay people from attitudes toward straight people for the semantic differentials such that positive scores indicate a preference for straight people.

Attitudinal Focus Manipulation. To induce attitudinal focus, participants read a paragraph highlighting feelings and emotions (or thoughts and beliefs) about gay and straight people. And,

as in Study 1, participants evaluated 14 statements about gay and straight people with either an affective or cognitive focus (see Appendix for full text of paragraphs and sentences).

Procedure

Participants read an opening paragraph about either affective or cognitive attitudes toward gay and straight people and responded to 14 items regarding their affective or cognitive reactions toward gay people and straight people before completing a set of explicit attitude measures. The manipulation was then reinstated after the report of explicit attitudes when participants responded again to the 14 statements before completing a set of implicit attitude measures. The procedure and counterbalancing rules were the same as in Study 1.

<div align="center">Results and Discussion</div>

Descriptive Statistics

Across conditions, participants self-reported more positivity for straight people ($M =$ 19.45, $SD = 3.37$) than gay people ($M = 16.43$, $SD = 4.85$, $t(95) = 5.62$, $p < .0001$, $d = 0.72$). They also showed an implicit preference for straight people relative to gay people on the IAT ($M = 0.29$, $SD = 0.29$, $t(95) = 9.59$, $p < .0001$, $d = 0.98$). On the SPF, participants more easily associated straight people with good words relative to bad words ($M = 0.21$, $SD = 0.21$, $t(95) = 7.76$, $p < .0001$, $d = 1.00$), and were equally able to associate gay people with good and bad words ($M = -0.03$, $SD = 0.25$, $t(95) = -1.34$, $p = .18$, $d = -0.12$). No main effects or variance differences were found on any of the explicit or implicit measures based on experimental condition (all ts < 0.99).

Comparative model fitting

As in Study 1, we first summarize the overall fits of the four structural models, and then report the hypothesis testing with the relevant model fit comparisons. Model 1 estimated a single attitude in both conditions and showed a "mediocre" fit to the data ($\chi^2(28) = 46.8$, $\varepsilon_a = .09$)[2].

Model 2 (single attitude in the cognition condition and two distinct attitudes in the affect condition) also had a "mediocre" fit (χ^2 (27) = 41.4, ε_a = .08), whereas Model 3 (single attitude in the affect condition, and separate attitudes in the cognition condition) was a "fair" fit to the data (χ^2(27) = 36.1, ε_a = .06). Finally, Model 4, which estimated separate, but related, implicit and explicit attitudes in both conditions was a "close" fit to the data (χ^2(26) = 30.7, ε_a = .04).

Affect vs. Cognition. To assess whether implicit and explicit attitudes are more related when one is focusing on affect (versus cognition) the relevant model comparison is whether there was a meaningful difference in improvement in fit when moving from estimating a single attitude in both conditions (Model 1) to estimating separate implicit and explicit attitudes in either the affect condition (Model 2) or the cognition condition (Model 3). Replicating Study 1, estimating distinct attitude factors resulted in a significant improvement over the baseline, single-attitude model when participants were focusing on cognition (Model 3; ($\Delta\chi^2$(1) = 10.7, 95% CI $\epsilon_a\Delta$ = .13-.53)). However, estimating separate attitudes in the affective focus condition (Model 2) did not result in a significant improvement over the single attitude model ($\Delta\chi^2$(1) = 5.4, 95% CI $\epsilon_a\Delta$ = .03-.43). Furthermore, although estimating separate attitudes in both conditions (Model 4) was an improvement over estimating separate attitudes in the affect condition and one attitude in the cognition condition (Model 2: $\Delta\chi^2$(1) = 10.7, 95% CI $\epsilon_a\Delta$ = .13-.53), it was not a significant improvement over Model 3 ($\Delta\chi^2$(1) = 5.4, 95% CI $\epsilon_a\Delta$ = .03-.43) that fit a single attitude in the affect condition and two separate attitudes in the cognition condition.

As before, we can examine the difference in implicit-explicit correlations in Study 4 as a more familiar (but weaker) means of comparing conditions compared to the formal model comparisons. Implicit and explicit attitudes were more strongly related in the affect condition (r = .48, p = .015) than they were in the cognition condition (r = .17, p =.37), though this difference

was not significant ($z = 1.70$, $p = .089$) despite the fact that the formal model comparisons did find significant differences. This is illustrative of the underpowered correlation comparison tests compared against the more modern methods of representing and testing structural relations.

Taken together, this suggests that when people focused on the cognitive components of their attitudes, their self-reported attitudes were different enough from their implicit attitudes that they were distinct constructs. However, when people focused on the affective components of their attitudes, their self-reported attitudes were similar enough to their implicit attitudes that the added structural complexity of a two-factor solution was not necessary[3]. Thus, compared to a cognitive focus, inducing an affective focus increases the concordance between implicit and explicit attitude measures.

General Discussion

In two studies we found that implicit and explicit attitudes were more related when focusing on feelings and emotions (i.e., affect) than on thoughts and beliefs (i.e., cognition). Study 1 found that implicit and explicit attitudes toward cats and dogs formed a single factor more effectively (though not completely) when participants focused on affective portions of attitudes as opposed to cognitive portions of those attitudes. The pattern of results in Study 2 supported the hypothesis more clearly. In fact, implicit and explicit attitudes toward gay and straight people were similar enough to fit onto a single factor when those attitudes were expressed while participants were focusing on their feelings and emotions. Reasoned thoughts and beliefs, while attitudinally important, were not as related to implicit attitudes as were feelings and emotions.

In both studies, we found that implicit and explicit attitudes were less similar when one focused on one's reasoned thoughts and beliefs and were more similar when one focused on one's feelings and emotions. Therefore, the oft-stated assertion that affect is more related than

cognition to implicit attitudes was supported consistently. Attitudes generated following a cognitive focus still necessitated a two-factor solution, but additional work is needed to understand if focusing on affect increases the concordance between implicit and explicit attitudes for all attitude domains, or if it is limited in scope. It is unlikely that the domains we selected (pet and sexual orientation attitudes) are the only two domains for which this holds. However, it is possible that an affective focus might only increase the concordance for attitude objects that are particularly affective in nature, or for which affective and cognitive responses tend to be in conflict. For example, Giner-Sorolla (2004) found that the accessibility advantage of affect over cognition (Verplanken et al., 1998) held true only for attitude objects that were affectively based. Additionally, when given conflicting affective and cognitive information, participants focusing on affect formed explicit evaluations in line with the valence of the affective information whereas those focusing on cognition formed explicit evaluations in line with the valence of the cognitive information (van den Berg et al., 2006). Though we did not measure it directly, attitudes toward pets and sexual orientation may be particularly affectively based. Selecting attitudes that are more cognitively based may show no difference in implicit-explicit convergence based on the focus condition, or might even show greater convergence when in a cognitive focus. If so, this would suggest a different interpretation of the present data. Rather than implicit attitudes being determined more by affective reactions than by cognitions, it could be that implicit evaluations derive from whatever is most elaborated or accessible, whether affective or cognitive (Nosek, 2005).

In addition, there is evidence that people differ in the extent to which they base their explicit attitudes on affect or cognition (Haddock & Zanna, 1994; Huskinson & Haddock, 2004; See et al., 2008). With the present interpretation, we would anticipate that people who base their explicit evaluations more on affect would tend to show stronger implicit-explicit relations than

people who base their explicit evaluations more on cognition. With the just articulated alternative interpretation, the strength of implicit-explicit correspondence would depend on matching the person's evaluative style with the focus manipulation. Clarifying which of these holds will have significant implications for understanding the relationship between affect-cognition and implicit-explicit construct designations.

Also, future work could clarify whether a manipulation of attitudinal focus is more influential on shifting explicit attitudes, or whether both implicit and explicit attitudes converge concurrently. Although from our perspective, it is likely that explicit attitudes are more amenable to the influence of the manipulation, we cannot rule out the possibility that both implicit and explicit attitudes shifted because the manipulation was presented before both the implicit and explicit attitude measures. Presenting the manipulation following implicit measurement will isolate whether having an affective focus caused implicit and explicit attitudes to simultaneously become more related to one another or whether it caused participants to report explicit attitudes using attitudinal inputs that are more related to implicit attitudes.

Implications for Attitude Taxonomies

This work has implications for current attitude taxonomies – in particular the distinctions between affective and cognitive attitudes and distinctions between implicit and explicit attitudes. For one, we observed additional evidence that implicit and explicit attitudes are best considered to be distinct, but related constructs (Nosek & Smyth, 2007). At the same time, these results provide evidence for some convergence between alternate taxonomies of implicit versus explicit attitudes, and affective versus cognitive components of attitudes.

The observed pattern of results is experimental evidence that implicit-explicit and affect-cognition may be partially redundant dual-process characterizations of evaluation. We say *partially* redundant, because it is obviously not the case that implicit equals affect and explicit

equals cognition. Rather, reasoned thoughts and beliefs, while attitudinally important, were not as related to implicit attitudes as were feelings and emotions suggesting that cognitions are less useful as indicators of implicit attitudes.

These results highlight a perplexing issue in psychological science – how do the associations in memory give rise to affective (or cognitive) experiences? While the studies certainly do not provide traction on resolving this question, they are – at least – consistent with an interpretation that activation of associations provides an affective experience and if people are focused on that experience then their attitude reports will be more reflective of those associations. However, the cognitive components of attitudes may be a distraction rather than a contributor to the effects of automatically activated associations on evaluative reports. Said another way, focusing on reasons and beliefs may be a secondary process that moves people away from using their activated associations as a basis for judgment. This certainly is not the only possible interpretation of the present data. It is likely that many areas of research inquiry will contribute to clarifying this important question.

It is useful to point out that the terms "affect," "cognition," "implicit," and "explicit" are theoretically defined rather than fixed and unchanging. The evolving definitions respond to the accumulating construct validation evidence. In this case, we provide further evidence for a relationship between two taxonomic distinctions between attitudes – affective versus cognitive, and implicit versus explicit. Given this relationship, whether both distinctions are useful and necessary for theories about attitudes will require additional theoretical refinement and empirical investigation.

Conclusion

In two studies, we found that explicit attitudes were more related to implicit attitudes when participants focused on feelings and emotions compared to thoughts and beliefs. Focusing

on our emotions may blur the dividing line between implicit and explicit attitudes and elicit

attitude reports that are more related to our activated evaluative associations.

Footnotes

[1] The selection of targets and attributes is, of course, critical to interpreting any effects that are elicited (e.g., Bluemke & Friese, 2006; Steffens & Plewe, 2001; for a review of this and other procedural issues pertaining to the use of IATs se also Lane, Banaji, Nosek, & Greenwald, 2007; Nosek, Greenwald, & Banaji, 2005; Nosek et al., 2007).

[2] The error variance on the second indicator of the IAT was estimated to be negative. Because this leads to an inadmissible solution, we followed the recommendation of Rindskopf (1984) in setting the error variance to 1.00 and estimating the pathway to the error variable.

[3] We caution that the fact that the single factor solution is sufficient for the affect condition should not be taken to suggest that implicit and explicit attitudes are the same in that condition. Such a conclusion would require accepting the null hypothesis. Given the overall strength of relations, such a conclusion is not likely to persist with a much larger sample.

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Appendix

Manipulation of Affect and Cognition for Study 1 and Study 2

Study 1: Attitudinal Focus Manipulation – Affect

Opening Paragraph

Many people feel that pets are an important part of their emotional lives. People with pets tend to show very strong emotional attachments to their pets, often treating them as though they are a member of the family. Pets can comfort us and make us laugh when we are upset, and they can be a good outlet for our feelings. Some people even talk to their pets about their problems, and report that their pets really understand how they feel. Whether it's true or not, we often feel that our pets seem to be able to sense our emotions. Many people feel "warm and fuzzy" when they think about their pets. Of course, sometimes our pets do things to make us feel angry or upset, such as ruining furniture, or upsetting a friend that comes over to our home. For people who are lonely or depressed, pets can create a feeling of warmth and understanding that is important for their emotional well-being. Overall, pets play a central role in the emotional lives of their owners, and most people report very strong feelings of affection towards their animals.

Attitudinal Sentences

Cats are an animal that is very emotionless/emotional.
Cats make their owners feel rejected/comforted.
A dog would make a good gift for someone who was feeling depressed.
I would most want to spend time with a dog when I was feeling sad/happy.
If I were feeling down, having a dog around would make me feel worse/better.
I feel that dogs can sense people's emotions.
Dogs often feel lonely.
Cats are probably a lot happier when other cats are around.
The emotional make-up of most dogs is especially cold/warm.
Whenever I'm around a cat, I feel very sad/happy.
Playing with a cat usually makes me feel bored/excited.
Cats are an animal that I really hate/love.
Cats make me feel tense/calm.
Dogs make me sad/happy.

Study 1: Attitudinal Focus Manipulation – Cognition

Opening Paragraph

Many people believe that pets serve an important function in their lives. For example, parents may come to the conclusion that helping raise a pet instills a sense of responsibility in their children. Children who take care of pets can also learn valuable lessons about the necessity of food and water to living things. Also, pets are often useful in protecting a home or business from intruders. Pets can also serve other purposes, such as allowing people with disabilities to live a more functional life. Of course, pets can be a financial burden, because they need to be provided for, and often their medical expenses can be significant. Many people believe that training an animal to carry out a task is an intellectually satisfying task that can help to give people a sense of control over their surroundings. Overall, pets can play a central role in the lives of their owners, and many people report the belief that living with pets is an important aspect of their day-to-day functioning.

Attitudinal Sentences

Cats are a financial drain, and a smart person would not own one.
For the most part, I believe that dogs are a mindless animal.
Domesticated cats have evolved to be more intelligent than their untamed ancestors.
Dogs have the cognitive capacity necessary to reason and solve simple problems.
Providing for a cat takes a lot of thought.
Dogs performing services for handicapped people is useful to society.
I believe that cats are capable of thinking.
The fact that a dog can be trained shows that they are thinking beings.
Having a cat in the house is very useful.
Helping to raise a dog makes children more responsible.
I think that people who own cats are likely to be academically successful.
I believe that owning a dog can be a positive influence on one's mental health.
I believe that cats are very useful animals.
I think that watching a dog is an especially thought-provoking activity.

Study 2: Attitudinal Focus Manipulation – Affect

Opening Paragraph

Some people feel that gay people choose that lifestyle. Others feel that it's something that you're born with. In any case, the experience of telling others that you are gay (often referred to as "coming out") is undoubtedly an emotionally trying one. A lot of people feel differently about gay people than they do about straight people. Some people report more feelings of disgust or anger, whereas others feel more compassion and love. You don't have to be gay to feel compassion toward gay people, nor do you have to be straight to feel anger toward them. People also have particular feelings about the lives that gay people can live. For example, some people feel that gay people are just as good as straight people at creating a warm, and caring home environment, but others feel that the emotional lives of gay people are too difficult to make for a nurturing home. Most likely, whatever a person's overall feelings about gay people, it's the case that individual people have a variety of different feelings and emotions toward gay people, just as they have a variety of different feelings and emotions toward straight people. This study is an opportunity for you to explore the variety of YOUR feelings and emotions toward both gay people and straight people.

Attitudinal Sentences

I feel that gay people should be free to express their love.
Straight people probably have an emotionally stressful life.
Gay people are warm and caring individuals.
My emotional reaction to straight people is typically one of disgust.
I sometimes feel negative emotions when I'm talking to someone who I feel is gay.
I feel that straight people are probably more emotional than gay people.
Gay people probably feel more at ease when other gay people are around.
I feel straight people are accepted warmly by society.
People should feel free to express whatever emotions they want about gay people.
Straight people do not experience real love.
Gay people can contribute to an emotionally enriching environment.
My life would be more exciting if I had a gay neighbor.
Someone would be happy if one of their roommates announced that they were straight.
I feel that most straight people are far from being accepted.

Study 2: Attitudinal Focus Manipulation – Cognition

Opening Paragraph

Some people believe that gay people choose that lifestyle. Others think that it's something you're born with. In any case, the decision to tell others that you're gay (often referred to as "coming out") is undoubtedly an intellectually taxing one. A lot of people think different thoughts about gay people than they do about straight people. Some people report more thoughts of unhealthiness or even harmfulness, whereas others think of gay people as being valuable and wholesome. You don't have to be gay to think positive thoughts about gay people, nor do you have to be straight to think negative thoughts about them. People also have particular beliefs about the lives that gay people live. For example, some people believe that gay people are just as good as straight people at overseeing a stimulating and mentally challenging work environment, but others think that the mental lives of gay people are too difficult to allow them to create a positive workplace. Most likely, whatever a person's overall beliefs about gay people, it's the case that individual people have a variety of different thoughts and beliefs about gay people, just as they have a variety of different thoughts and beliefs about straight people. This study is an opportunity for you to explore the variety of YOUR thoughts and beliefs toward both gay people and straight people.

Attitudinal Sentences

I believe that gay people should be free to state their opinions.
Straight people probably have an intellectually difficult life.
Gay people are wise and valuable individuals.
My intellectual reaction to straight people is typically one of condemnation.
I sometimes think negative thoughts when I'm talking to someone who I believe is gay.
I think that straight people are probably more intelligent than gay people.
Gay people probably think more clearly when other gay people are around.
I think straight people are more valuable than gay people to the functioning of society.
People should be free to think whatever thoughts they want about gay people.
Straight people do not think wholesome thoughts.
Gay people can contribute to an intellectually enriching environment.
My life would be more wholesome if I had a gay neighbor.
It would be perfectly reasonable for someone to tell their roommate if they were straight.
I believe that most straight people are far from being perfect.

*Table 1*. Goodness of Fit and Model Comparison Information for Structural Models

Study 1

Model	$\chi2$	df	$\Delta\chi^2$/df	ε_a	95% CI ε_a of Δ
Model 1: Single Affective, Single Cognitive	94.9	40		.10	
Model 2: Two Affective, Single Cognitive	78.6	39	16.3/1	.09	.18-.53
Model 3: Single Affective, Two Cognitive	63.5	39	31.4/1	.07	.32-.67
Model 4: Two Affective, Two Cognitive	47.2	38	16.3/1	.04	.18-.53

Study 2

Model	$\chi2$	df	$\Delta\chi^2$/df	ε_a	95% CI ε_a of Δ
Model 1: Single Affective, Single Cognitive	46.8	28		.09	
Model 2: Two Affective, Single Cognitive	41.4	27	5.4/1	.08	.03-.43
Model 3: Single Affective, Two Cognitive	36.1	27	10.7/1	.06	.13-.53
Model 4: Two Affective, Two Cognitive	30.7	26	5.4/1	.04	.03-.43

Note. ε_a = root mean-square error of approximation (RMSEA) for each model. 95% CI ε_a of Δ = confidence interval around RMSEA of the change in fit between models. If the CI contains .05, then model fits are not considered to be significantly different. For Models 2 and 3, $\Delta\chi^2$/df = change in chi-square per degrees of freedom relative to Model 1. Model 4, however, is compared to Model 3, which is the better fitting of the mixed single-factor/dual-factor models.

Figure 1. Representation of models within the structural model comparison series. Squares represent measured variables, circles represent latent factors. Affect condition is on top of each individual model, cognition condition is on bottom. IAT1 and IAT2 are indicators of the IAT; SPF1 and SPF2 are indicators of the SPF; Pos = positivity; Fav = favorability; Good = goodness.
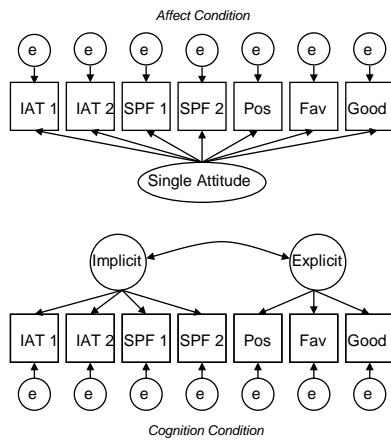
Model 1: Single attitude in both conditions

Affect Condition

Cognition Condition
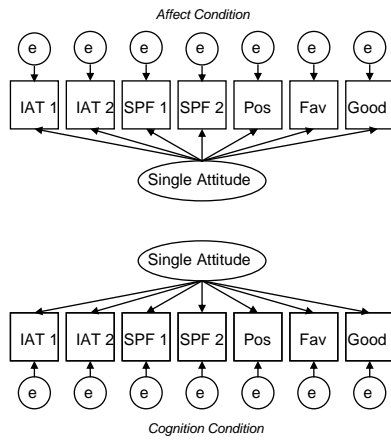
Model 2: Separate attitudes in affect condition, single attitude in cognition condition

Affect Condition

Cognition Condition
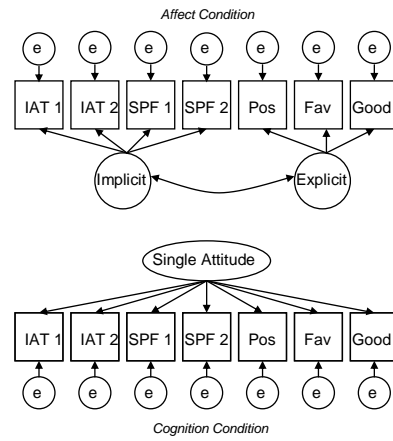
Model 3: Single attitude in affect condition, separate attitudes in cognition condition

Affect Condition

Cognition Condition

Model 4: Separate attitudes in both conditions

Affect Condition

Cognition Condition