

## Affective and Cognitive Meta-Bases of Attitudes: Unique Effects on Information Interest and Persuasion

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The authors investigated the predictive utility of people's subjective assessments of whether their evaluations are affect- or cognition driven (i.e., meta-cognitive bases) as separate from whether people's attitudes are actually affect- or cognition based (i.e., structural bases). Study 1 demonstrated that meta-bases uniquely predict interest in affective versus cognitive information above and beyond structural bases and other related variables (i.e., need for cognition and need for affect). In Study 2, meta-bases were shown to account for unique variance in attitude change as a function of appeal type. Finally, Study 3 showed that as people became more deliberative in their judgments, meta-bases increased in predictive utility, and structural bases decreased in predictive utility. These findings support the existence of meta-bases of attitudes and demonstrate that meta-bases are distinguishable from structural bases in their predictive utility.

*Keywords:* attitudes, persuasion, meta-cognition

Every day, we are inundated with a variety of appeals asking us to do various things—to quit smoking, to buy a car, to vote for an issue, and so forth. Frequently, these messages are tailored in some way so that various types of audiences can appreciate them. One way to tailor messages is to appeal to the audience's emotions. Alternatively, messages can be constructed to focus on the audience's beliefs. The distinction between appealing to an audience's emotions versus reason dates back at least to Aristotle (1354/1954). According to contemporary research, structural properties of an attitude, such as whether it is based primarily on affect or cognition, can determine what type of message is more influential (e.g., Edwards, 1990; Fabrigar & Petty, 1999). In the present research, we examined whether *mere perceptions* of one's attitudinal basis can influence selective information interest and persuasion.

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This research was supported in part by Ohio State University's Distinguished University Fellowship. This research is based on Ya Hui Michelle See's doctoral dissertation; the dissertation committee was chaired by Richard E. Petty. Ya Hui Michelle See would like to thank Russell H. Fazio and Marilyn B. Brewer for serving on the dissertation committee. We also thank all of the members of the 2003–2007 Group for Attitudes and Persuasion at Ohio State University for providing feedback on the studies reported in this article.

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The distinction between structural properties of attitudes versus perceptions of those properties has been applied to various concepts in the attitudes domain (see Wegener, Downing, Krosnick, & Petty, 1995). Structural properties of attitudes are assessed with relatively objective measures (e.g., assessing knowledge by counting the number of pieces of information people can generate about an object), whereas subjective perceptions of some quality of an attitude are assessed by asking people for their own perspective (e.g., how much knowledge do people estimate they have about the attitude object; see Krosnick & Petty, 1995; Visser, Bizer, & Krosnick, 2006, for reviews). In much of the literature, it has been common to treat both types of measures as if they represent a single underlying construct. For instance, research exploring the role of knowledge in attitude-behavior consistency has relied on both subjective and objective measures of knowledge and interpreted the effects produced by these measures as being driven by the same underlying process (e.g., Davidson, Yantis, Norwood, & Montano, 1985).

Attitudinal ambivalence is another property for which researchers have often treated subjective and objective measures as tapping the same construct. In this case, self-reported ambivalence has typically been viewed as the criterion for establishing the validity of objective measures of ambivalence that assess conflicting positive and negative components (e.g., Priester & Petty, 1996; Thompson, Zanna, & Griffin, 1995). However, some attitude theorists have noted the possibility that subjective and objective measures can reflect distinct constructs rather than just alternative methods of assessing the same variable (e.g., Bassili, 1996; Krosnick & Petty, 1995). We refer to the subjective and objective indicators of attitudes as reflect-

ing *meta-cognitive* and *structural properties*, respectively. The former result from participants' perceptions of an attitudinal property, whereas the latter represent components in the cognitive architecture of an attitude.<sup>1</sup>

In the present research, we introduce a new meta-cognitive feature of attitudes that has previously been examined only in its structural form. That is, whereas prior research has examined whether attitudes are objectively based on affective or cognitive information, the present studies focus on the possible importance of people's subjective assessments of the bases of their attitudes (i.e., their meta-cognitive bases, or meta-bases for short). Affective and cognitive *structural* bases of attitudes have been assessed by examining the extent to which people's affective versus cognitive reactions to an attitude object predict overall evaluations of the object. In some research, assessments of the affective and cognitive components followed expectancy-value models of attitudes (e.g., Fishbein & Ajzen, 1975), in which each component reflected both the frequency with which a self-generated belief and emotion applied to the target object and the valence of those individual beliefs or emotions (e.g., Eagly, Mladinic, & Otto, 1994; Esses, Haddock, & Zanna, 1993). In other research, assessments of the components included only the valence of various beliefs and emotions that were provided for the participant (e.g., Chaiken, Pomerantz, & Giner-Sorolla, 1995; Fabrigar & Petty, 1999). In these assessments of structural bases, participants know that they are reporting their affective and cognitive reactions to an attitude object, but they do not necessarily know that their reliance on affect versus cognition in their attitudes is being examined. In the assessment of meta-bases in the present research, people were asked explicitly for their perceptions regarding the extent to which their attitudes are based on affect and on cognition, respectively.

### The Importance of Meta-Bases

Research on attitudes has established the importance of various types of meta-cognitive judgments (see Petty, Briñol, Tormala, & Wegener, 2007, for a review) such as subjective perceptions of knowledge (Davidson et al., 1985; Wilson, Kraft, & Dunn, 1989) and ambivalence (see, e.g., Tourangeau, Rasinski, Bradburn, & D'Andrade, 1989; Visser & Mirabile, 2004). Notably, in much of the research on meta-cognitive properties of attitudes, the structural counterparts of the subjective assessments were not measured within the same study. Thus, it is possible that these subjective perceptions were impactful only to the extent that they overlapped with structural properties.

Although it is rare for any one study to measure both meta- and structural features of attitudes, one study in which various meta-cognitive and structural properties were assessed concluded that structural properties are generally more impactful than meta-cognitive indicators (Bassili, 1996). However, we hypothesize that meta-cognitive perceptions of the affective versus cognitive bases of attitudes can contribute to attitudinal phenomena above and beyond the contribution of structural bases. First, prior work showing the importance of other types of subjective assessments, such as perceptions of knowledge and ambivalence, suggest that perceptions of one's attitudinal bases as relatively affective or cognitive might also impact attitudinal processes. Second, an examination of Basilli's (1996) data reveals that one of the meta-cognitive properties he assessed—attitude certainty—consistently

predicted attitude stability above and beyond structural indicators, thus suggesting that structural properties do not always matter more than meta-cognitive judgments. In order to compare meta-bases with structural bases of attitudes, in the present research, the two variables are always simultaneously assessed within the same study.

### The Importance of Structural Bases

Before discussing the potential influences of affective versus cognitive meta-bases, we first turn to past research on the affective versus cognitive structural bases of attitudes and review some key findings. Research in this domain began with a conceptual distinction between the affective and the cognitive bases of attitudes (e.g., Katz & Stotland, 1959; Rosenberg & Hovland, 1960; Zanna & Rempel, 1988).<sup>2</sup> *Affect* refers to the positive and/or negative emotions associated with the attitude object, such as excitement or sadness, whereas *cognition* refers to the positive and/or negative beliefs that people hold about the attitude object, such as usefulness or harmfulness. Although affect and cognition themselves can influence each other, the present research emphasizes *global attitudes* as driven relatively more by emotions than beliefs, or vice versa. An example of affectively based attitudes is negative evaluations toward cigarette smoking because one finds it disgusting, whereas cognitively based attitudes toward smoking could be based on its perceived harmfulness.

Much empirical work has established that affect and cognition exert separate influences on various attitudes (e.g., Breckler, 1984; Breckler & Wiggins, 1989). For instance, Crites, Fabrigar, and Petty (1994) found that attitudes toward snakes and math were driven primarily by emotions rather than by beliefs, whereas attitudes toward capital punishment were based more on beliefs than on emotions. Of most relevance for the present studies, additional research has shown that there are individual differences in the extent to which people tend to base their attitudes on affect versus cognition (e.g., Crites et al., 1994; Haddock & Zanna, 1994; Huskinson & Haddock, 2004). Knowing whether an attitude primarily has an affective or cognitive structural basis has important implications for attitude formation and change. With respect to persuasion, the dominant finding is for a matching effect. That is, people appear to be more influenced by persuasive messages that correspond to the structural basis of their attitudes. For instance, attitudes that were experimentally created to be affect based were

<sup>1</sup> The terms *meta-cognitive* and *structural*, in addition to overlapping with the subjective/objective distinction, also share some meaning with other distinctions used in the attitudes literature such as explicit/implicit. We prefer the former terms to avoid the multiple meanings sometimes implied by the others. For example, the subjective/objective distinction has previously been applied to the same construct measured in different ways (e.g., Davidson et al., 1995), whereas we focus on their independence. Similarly, the implicit/explicit distinction has sometimes referred to unconscious/conscious and automatic/controlled measures (see Fazio & Olson, 2003; Petty et al., in press), whereas we assume that both meta- and structural bases can be assessed with measures that are conscious and controlled.

<sup>2</sup> According to these theorists, attitudes are also posited to be based on behavioral factors. However, we do not discuss the behavioral base, as it is not relevant to the present research.

more susceptible to persuasion by an affective appeal than attitudes induced to be cognition based (e.g., Edwards, 1990; Fabrigar & Petty, 1999; see Millar & Millar, 1990, for an exception).

### Meta-Cognitive Constructs as Independent of Their Structural Counterparts

A key idea of the present research is that people's meta-bases regarding affect versus cognition will contribute to attitudinal phenomena above and beyond that contributed by structural bases. This idea assumes that people's meta-bases do not completely overlap with structural bases. Indeed, there are various reasons to expect that meta-bases would be somewhat independent of the structural bases of attitudes. First, past research on various properties of attitudes suggests that meta-cognitive measures are not redundant with their structural counterparts. For example, subjective reports of knowledge and measures of actual knowledge listed have usually been only weakly correlated ( $r$ s ranged from .14 to .29; e.g., Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Wood, Rhodes, & Biek, 1995) and have shown differential predictive utility (e.g., Holbrook, 2002). Similarly, meta-cognitive reports of ambivalence and structural measures have typically been found to be only moderately correlated (e.g.,  $r$ s ranged from .21 to .44; Priester & Petty, 1996; Thompson et al., 1995), and research suggests that subjective ambivalence is determined not only by conflict at the structural level but also by conflict with the attitudes of significant others (see Priester & Petty, 2001).

In yet other research, factor analyses revealed that meta-cognitive and structural measures do not represent the same underlying factor. For example, subjective perceptions of response time, extremity, and ambivalence did not consistently load on the same factor as their structural counterparts (i.e., actual response latency, objective extremity, and objective ambivalence; see Bassili, 1996). This should not be surprising given that people do not have direct access to their psychological processes, including why an attitude toward an object is positive or negative (Nisbett & Wilson, 1977).

Furthermore, past research suggests that when people think about their attitudinal bases, what comes to mind may not be representative of the actual structural content of attitudes. For instance, when participants were asked to examine why they liked or disliked an attitude object, they reported attitudes that were correlated with those reasons, but these attitudes did not predict behavior (Wilson, Dunn, Bybee, Hyman, & Rotondo, 1984). Wilson and colleagues (1984) proposed that this was due to participants' inability to identify the actual basis of their attitudes comprehensively—often underestimating the affect involved. Moreover, even if people identify a representative sample of the bases of attitudes, then they must be able to gauge the unique contributions of each basis to their global evaluation effectively. This is likely to be a difficult task, particularly in cases in which affect and cognition are evaluatively consistent. For instance, if one finds a drug both relaxing and useful, it might be hard to figure out how much of one's overall positive attitude stems from the feeling of relaxation induced and how much is due to the perceived utility of the drug for one's health, as both the affective and cognitive bases are consistent with the overall attitude.

Because identifying one's actual attitudinal basis is a difficult task, we expect people to be inaccurate in their perceptions of their attitudinal bases (i.e., meta-bases). Nonetheless, given past research dem-

onstrating the consequences of meta-cognitive judgments regarding other attitudinal properties such as knowledge and ambivalence, we argue that lay perceptions of one's attitudinal bases can still be consequential. That is, the mere subjective belief that one's attitudes are based primarily on affect or cognition, independent of the actual structural bases of attitudes, could have important implications for the manner in which people seek out information and use information to guide their behaviors and attitudes.

### The Present Research

The present research had several goals. The first was to provide evidence regarding the existence of affective versus cognitive meta-bases as distinct from structural bases. In the present studies, we conceptualized meta-bases as a general characteristic of individuals. That is, we explored individual differences in the extent to which people see themselves as relying on affect or cognition in their attitudes across various attitude objects. There are two reasons for our focus on individual differences in meta-bases rather than object-specific meta-bases. First, if meta-bases exist as an individual difference, then this would allow the broadest possible range of predictive ability. That is, if people perceive themselves to rely on affect or cognition in their attitudes across a wide array of attitude objects, then this would render the concept of meta-bases more useful than if perceptions varied dramatically from object to object. Moreover, in many respects, an individual-difference approach to meta-bases constitutes a stricter test of the utility of the meta-bases construct. If it can be shown that general individual differences in meta-bases can predict outcomes for specific attitude objects, then it readily follows that more specific levels of meta-bases assessments should be even more useful for predicting outcomes at the object-specific level.

The second reason that we focused on meta-bases at the level of individual differences is that although past research has shown that attitudes can vary in their object-specific structure (e.g., Crites et al., 1994), past research has also shown that structural bases can be conceptualized at the level of individual differences. Specifically, as noted earlier, it has already been established that individual differences in affective and cognitive structural bases exist (e.g., Haddock & Zanna, 1994; Huskinson & Haddock, 2004) and that these individual differences have important consequences. For example, in one study, participants whose attitudes toward various attitude objects correlated more highly with their cognition than their affect compared with others formed more positive attitudes toward an unknown beverage when they read about the attributes of the beverage than when they tasted the beverage (Huskinson & Haddock, 2004). The greater persuasive appeal of the cognitive over the affective information did not occur in participants whose attitudes correlated more highly with their affect than their cognition. In order to compare meta-bases with structural bases as assessed in prior work, we examined both structural and meta-bases as individual differences in the present studies.

In addition to conceptualizing meta-bases as an individual difference, we operationalized meta-bases as the difference between perceived reliance on affect versus cognition. We did so for both conceptual and methodological reasons. First, we argue that it is the perception of *relative* reliance on affect versus cognition rather than the perception of *absolute* reliance on affect versus cognition that matters in predicting the outcome variables of interest in the present

research—selective interest in and differential persuasion by affective versus cognitive information. For example, one might expect a person who perceives high reliance on affect to focus on affective rather than cognitive information if the individual also perceives little reliance on cognition. However, another person with the same perceived level of reliance on affect would actually pay more attention to cognitive rather than to affective information if he or she perceived an even higher reliance on cognition than affect. Stated simply, it is the relative perceived reliance on affect versus cognition rather than the absolute levels of either that should drive selective interest in and persuasion to affective versus cognitive messages.

The second reason for operationalizing meta-bases as a difference score is it results in a measure that is most conceptually comparable to the measure of structural bases used in past studies in which participants were selected because they were higher in their structural affective bases than their structural cognitive bases or were higher in their structural cognitive bases than their structural affective bases (e.g., Huskinson & Haddock, 2004).

Finally, from a statistical standpoint, conceptualizing meta-bases in the form of a difference score provides certain advantages. One advantage is that it leads to simpler statistical models with more degrees of freedom in their error terms because meta-bases are represented by a single predictor variable in the model rather than two separate variables. Such an advantage is most notable in contexts in which numerous interaction terms are being tested. Perhaps more important, because relative perceived reliance on affect versus cognition is a joint function of two components, a statistical test of an index that captures these two effects together is likely to be more powerful than separate tests of either of the two individual components comprising the overall index.<sup>3</sup>

In addition to establishing the existence of meta-bases as distinct from structural bases with respect to affect and cognition, the second objective of the present research was to establish that meta-bases are related to important attitudinal processes and that this relationship remains after taking into account the influence of structural bases and/or other relevant individual-difference variables. To accomplish this goal, we focused in Study 1 on demonstrating the utility of meta-bases in a context that seemed optimal for finding effects of meta-bases.

What attitudinal processes and outcomes might meta-bases be expected to predict? One straightforward possibility is that individuals who perceive reliance on affect more than on cognition in their attitudes would be more interested in and tend to seek out information that is explicitly affective when making decisions, whereas those who perceive themselves to rely more on cognition would be interested in and tend to seek out information that is explicitly cognitive. Stated differently, we expect meta-bases to predict behaviors that people engage in deliberately, such as selectively reading affective versus cognitive information at one's own pace. This is because past research on general meta-cognitive judgments suggests that such judgments impact behaviors especially when participants are responding thoughtfully. For example, people are more likely to rely on thought certainty in determining their attitudes (e.g., Petty, Briñol, & Tormala, 2002) and attitude certainty in determining their behavior (e.g., Rucker & Petty, 2004) when thinking is high rather than low (see Petty et al., 2007, for a review.)

An important prediction of the present research is that both meta- and structural bases can be important and independent predictors of attitude-relevant behavior. We have already noted

why these concepts are not necessarily redundant. Because they are not redundant, they might be expected to predict different behaviors as well as predict the same behavior independently. To understand this, some parallels can be drawn between the meta-structural distinction in attitude bases and the implicit–explicit distinction in global attitude measurement. *Explicit measures of attitudes* are assessments of people's subjective and conscious reports of their evaluations toward an object, whereas *implicit measures of attitudes* assess automatic reactions that presumably more directly reflect structural associations between objects and evaluations (see Petty, Fazio, & Briñol, in press; Wittenbrink & Schwarz, 2007, for reviews). Although very little prior research on attitude *properties* has examined simultaneously the independent contributions of meta-cognitive and structural assessments of those properties within the same study, research on *overall attitudes* has often included both explicit and implicit measures in the same study. One common finding is that explicit and implicit measures

<sup>3</sup> It is important to acknowledge that researchers have also noted several possible disadvantages of using difference scores (see, e.g., Peter, Churchill, & Brown, 1993). One issue is that discrepancy scores could be unreliable because they reflect the joint impact of error in both measures making up the difference score. However, this feature of discrepancy scores actually makes it more difficult to obtain evidence of the predictive utility of meta-bases, which was not a problem in the present research.

Another issue is that the relationship between a difference score and another variable of interest could be driven by only one component of the difference score, so that using the discrepancy score leads to misleading conclusions. That is, in the present research, one could argue that a relationship between our meta-bases discrepancy index and information interest was obtained when really, only affective meta-bases (or only cognitive bases) are related to information interest (or persuasion). As was demonstrated, when additional analyses were conducted using affective and cognitive meta-bases as separate predictors, there was little evidence to support this concern (see Footnotes 6, 9, and 10). In the present research, although both affective and cognitive meta-bases predicted the variable of interest (i.e., information interest or persuasion), results are *strongest* when the meta-bases discrepancy index is used.

Finally, a third potential objection is that the discrepancy score could hide fundamental differences between high-affect–high cognition individuals and low-affect–low cognition individuals because both groups would receive similar (low discrepancy) scores on a relative preference index. That is, the unidimensional approach we adopted results in situations in which two people could have identical discrepancy scores even though their relative standing on the affect and cognition meta-bases dimensions are quite different. To test our assumption that it is relative rather than absolute standing on the meta-bases measures that is critical to our effects, in each study, we conducted analyses examining whether the discrepancy index differentially predicted information interest among individuals who are relatively high in both perceptions of reliance on affect and on cognition versus individuals who are relatively low in both. This was accomplished by examining regression models in which a dummy variable representing the group that individuals belonged to (i.e., high in both affective and cognitive meta-bases or low in both affective and cognitive meta-bases as determined by median split on each variable) and their meta-bases discrepancy scores as well as the various interaction terms between the two variables and other variables were included as predictor variables. These analyses failed to produce interactions between our relative-standing group variable and other variables in the model. Thus, these analyses demonstrated that the discrepancy index behaved similarly whether people were relatively high in both their perceived reliance on affect and on cognition or relatively low in both.

predict different behaviors. For example, in one study, explicit measures of attitudes toward Blacks predicted self-paced ratings of a race-related incident, whereas implicit measures of prejudice predicted friendliness of spontaneous behavior toward the Black experimenter (Fazio, Jackson, Dunton, & Williams, 1995, Study 1; see also Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997).

In addition, explicit and implicit measures of attitudes have also been established to predict the *same* behaviors independently. In one study, for instance, explicit and implicit measures of attitudes toward political conservatism predicted participants' request for information from either College Republicans or Democrats independently (Vargas, von Hippel, & Petty, 2004). Requesting information might be a behavior that involves both deliberative (e.g., thinking about potential differences between information from one source or the other before making a selection) and spontaneous (e.g., automatically relying on one's self-identity as a heuristic to form a preference) processes. Another example is in the domain of attitudes toward oneself, in which both implicit and explicit self-esteem have predicted a common outcome that plausibly had deliberative and spontaneous components (e.g., Spalding & Hardin, 1999).

In our first study, we examined the relationship between meta-bases and selective interest in information while controlling for the effects of structural bases. In addition, as described in more detail shortly, we also included individual-difference variables in Study 1 that might be related to interest in affect and cognition more generally (i.e., individual differences in need for affect and need for cognition). In Study 2, we examined the independent contributions of meta- and structural bases in a persuasion context, in which participants were not specifically encouraged or discouraged to be highly deliberative. To the extent that this persuasion context involved both deliberative and spontaneous elements, we expected both meta- and structural bases to predict differential persuasion as a function of the type of message. Finally, in Study 3, we manipulated the extent to which participants were deliberative in their responses to directly test the hypothesis that meta-bases matter more when responses are deliberative, whereas structural bases are more impactful when responses are spontaneous.

### Study 1

Because the goal of Study 1 was to demonstrate for the first time the utility of meta-bases in predicting selective information interest, we attempted to create an optimal context for meta-bases to have an impact by designing the study so that participants were motivated and able to respond thoughtfully. Selective information interest was operationalized as the amount of time an individual spends looking at the information with greater time assumed to indicate more interest (see, e.g., Pomerantz, Chaiken, & Tordesillas, 1995). To encourage participants to be deliberative in their selective attention to affective versus cognitive information (e.g., by carefully considering the nature of the information that one receives before reading the information), we explicitly told participants that the study examined how people make decisions. These instructions were designed to produce a context more likely to produce strong meta-bases effects than structural bases effects. However, to the extent that some spontaneous components (e.g., automatic attention to aspects of the information to which one is drawn) were still involved, structural bases might also determine information interest. Therefore, we also included a measure of

structural bases. More important, regardless of whether effects of structural bases emerged, we aimed to show for the first time that meta-bases would account for unique variance in information interest.

Another goal of Study 1 was to distinguish meta-bases from possibly similar constructs that have already been examined in the literature. One such construct is need for cognition (NC; Cacioppo & Petty, 1982), which is measured by asking people directly how much they enjoy cognitive challenges and how often they engage in mentally complex activities. Much research has shown that NC determines whether people's attitudes are based on effortful elaboration of issue-relevant arguments or peripheral cues that can be processed easily (see Cacioppo, Petty, Feinstein, & Jarvis, 1996, for a review). Another potentially relevant construct is need for affect (NA; Maio & Esses, 2001), which is measured by asking people directly about the extent to which they approach and avoid emotion-arousing events. NA influences people's willingness to view emotion-focused films (Maio & Esses, 2001) as well as people's actual reliance on affect in attitudes, a structural criterion (Huskinson & Haddock, 2004).

Despite apparent similarities between meta-bases and the constructs of NC and NA, we argue that meta-bases are not redundant with these variables. For example, individuals high in NC might believe that their attitudes are driven as much by extensive thinking about emotions as by thinking about attributes. That is, although people high in NC like to think, they might think as much about emotional factors as cognitive ones and thus could be equally interested in both types of information. Indeed, in prior research, manipulated emotion was found to have a greater biasing impact on thoughts for high- than for low-NC individuals (Petty, Schumann, Richman, & Strathman, 1993), suggesting that these individuals are not immune from emotional impact. As for a high-NA individual, he or she might seek out affect-arousing stimuli for the sake of experiencing emotions in general but not necessarily for the explicit purpose of forming evaluations. Furthermore, even if meta-bases stem in part from individual differences in NC and NA, these two well-established variables are not likely to be the sole determinants of meta-bases. For example, people might also develop their meta-bases from cultural expectations (e.g., it might be more accepted for women to rely on emotions than men). Our own views notwithstanding, to rule out redundancy between meta-bases and NC and NA, measures of the latter two variables were included in this study.

### Method

#### *Participants and Overview of Procedure*

Fifty-nine introductory psychology students at Ohio State University completed the study in return for partial course credit. Participants were told that they would be completing various studies in the session. As in Studies 2 and 3, all materials were presented using Medialab software (e.g., Jarvis, 2006). In Study 1, participants received instructions that they would be evaluating various messages, as the study's purpose was to examine how people make decisions. In this study, participants read an affective and a cognitive message against smoking. Participants were then told that the personality was assessed in a separate study, and they completed the need for cognition and need for affect scales. The

order in which the scales were presented was counterbalanced across participants. In what was described as a third study assessing attitudes, participants indicated their structural and meta-bases toward five different attitude objects, one object at a time. By collapsing across these attitude objects, a measure of structural and meta-bases as a general tendency (i.e., an individual difference that holds across objects) could be calculated. As in the remaining studies, participants were then debriefed and thanked for their participation.

### *Dependent Measure: Information Interest*

As part of the ostensible first study, participants were presented with an affective anti-smoking message as well as a cognitive version. Each message contained two paragraphs of information and an image. The affective message was about a smoker who lied to get money for his cigarettes and underwent a laryngectomy. This message was accompanied by an image that focused on the throat of a person who had undergone the surgical procedure. The cognitive message discussed the addictive feature of tobacco and consequences of smoking such as various cancers. This information was followed by a graph showing the smoking status of male and female adults (See the Appendix for the text in the messages).<sup>4</sup> To assess participants' selective interest in affective versus cognitive information, the proportion of time each participant spent reading the affective message was measured (i.e., the time spent reading the affective message relative to the total amount of time spent reading both the affective and cognitive messages). This measure thus controls for individual reading speed.

### *Predictor Variables*

*NC and NA.* After reading the messages, participants completed an ostensible personality survey in which they completed the NC scale (Cacioppo, Petty, & Kao, 1984) and the NA scale (Maio & Esses, 2001). Scores ranged from 25 to 87, and the median score was 63 for the NC scale ( $\alpha = .89$ ). For the NA scale, which was computed from the difference between the Motivation to Approach Emotions subscale ( $\alpha = .87$ ) and the Motivation to Avoid Emotions subscale ( $\alpha = .88$ ) following past research, scores ranged from  $-52$  to  $72$ , and the median score was  $16$ .

*Structural bases.* After completing the various scales above, participants were told that a separate study aimed to examine their opinions would be conducted. In order to assess participants' structural attitude bases, a measure adapted from one successfully used in prior research by Huskinson and Haddock (2004) was used. Computing the measure requires participants to complete affective, cognitive, and attitudinal items for several attitude objects (see Crites et al., 1994). The affective items asked participants to indicate the feelings that they had toward an attitude object. They reported the extent to which they had positive feelings toward the object on eight semantic differential scales (e.g., annoyed–happy). For cognition, participants were told to indicate the beliefs they had about the same attitude object using seven semantic differentials (e.g., useless–useful). Finally, they reported their overall attitudes, again using four semantic differentials (e.g., negative–positive). After reporting their affective, cognitive, and attitudinal responses as well as meta-bases (see the *Meta-bases* section) for one attitude object, participants then repeated the

procedure for another attitude object until they completed responses for five different attitude objects. The order in which participants reported their feelings and beliefs was counterbalanced across the five different objects for each participant.

The five attitude objects were abortion, birth control, capital punishment, exercising, and spiders. The order in which the attitude objects were presented was counterbalanced across participants. This group of five attitude objects was selected from a larger set that had been used in past research (e.g., Huskinson & Haddock, 2004), with the intention that the group of objects consisted of some objects that generally elicit affect-based attitudes (e.g., birth control) and others that elicit cognition-based attitudes (e.g., capital punishment; see Crites et al., 1994).

To create a structural bases index, two correlations were computed for each participant. One correlation reflected the relationship between the participant's affect and attitude for the five attitude objects. The other measured the relationship between the participant's cognition and attitude for these objects. These correlations were then converted to Fisher's  $z$  values. Finally, participants' cognition–attitude correlations were subtracted from their affect–attitude correlations such that the higher a participant's final score, the more the participant's attitude structure across the five diverse attitude objects is dominated by affect rather than by cognition (see Haddock & Zanna, 1994, for a similar method of assessment).

*Meta-bases.* After reporting their structural bases for each of the five attitude objects, participants indicated their meta-bases for the same object by responding to the following questions: (a) "To what extent do you think your attitudes toward (insert attitude object) are driven by your emotions?" and (b) "To what extent do you think your attitudes toward (insert attitude object) are driven by your beliefs?" To compute an index for participants' meta-bases, participants' responses to the belief questions across the five attitude objects were averaged. The same was done for their responses to the emotion questions. Finally, standardized values for each participant's averaged responses to the belief questions were subtracted from standardized values for the participant's averaged responses to emotion questions. Therefore, larger positive scores indicated more affective meta-bases, and larger negative scores indicated more cognitive meta-bases.

## *Results*

### *Relationships Among the Predictors*

Despite being measured in close temporal proximity to each other, participants' meta-bases did not correlate with their struc-

<sup>4</sup> To ensure that the affective message had more affective qualities than cognitive qualities and that the opposite was true for the cognitive message, we conducted a pilot test in which participants indicated the extent to which each message elicited affect (e.g., "To what extent does the message appeal to your feelings?") and cognition (e.g., "To what extent does the message appeal to your reasoning?"). To compare the messages in their relative affective–cognitive qualities, we computed a relative emotions-arousing index by subtracting the average of the cognitive responses from the average of the emotional responses. Results showed that the extent to which the message elicited emotions rather than thoughts was greater for the affective version ( $M = 1.15$ ,  $SD = 0.35$ ) than the cognitive version ( $M = -0.41$ ,  $SD = 0.28$ ),  $F(1, 61) = 12.29$ ,  $p = .001$ .

tural bases,  $r(56) = .11, p = .41$ , thus suggesting the meta-bases are independent of structural bases. In addition, meta-bases were not related to NA,  $r(57) = -.05, p = .72$ , and were marginally related to NC,  $r(57) = -.22, p = .10$ . Table 1 contains all correlations among the predictor variables.

*Information Interest*

First, we examined whether meta-bases predicted participants' total reading time for both the affective and cognitive information. Results indicated that meta-bases did not predict total reading time  $\beta = .02, t(57) = 0.18, p = .89$  (all  $\beta$ s reported in the present research are standardized coefficients). In the next regression analysis, meta-bases were included as the only predictor of the proportion of time participants spent on the affective message. Results showed that the more affective one's meta-bases, the greater the extent to which people spent more time reading the affective information relative to the cognitive information ( $\beta = .29, t(57) = 2.26, p = .03, R^2 = .08$ ). Then, we conducted separate regression analyses with structural bases, NA and NC as predictors, respectively. None of these variables predicted proportion of reading time (all  $ps > .30$ ).<sup>5</sup>

We conducted a final regression analysis with all the predictors entered. This analysis revealed that only meta-bases predicted the proportion of time spent reading the affective message ( $\beta = .37, t(52) = 2.75, p = .01$ ).<sup>6</sup> In other words, meta-bases' ability to predict reading time remained significant even after controlling for all the other predictors. In summary, meta-bases did not predict participants' overall interest in reading the information as reflected in total reading time. Rather, meta-bases predicted the extent to which participants were selective in the amount of time they spent on the preferred information.

*Discussion*

The results from Study 1 showed that meta-bases predicted selective information interest that was manifest as actual behavior—proportion of time spent reading affective versus cognitive information. Notably, meta-bases were not related to NA and were only marginally related to NC, thus suggesting that people's perceptions of their attitudinal bases are not redundant with their intrinsic interest in cognitive challenges or with their motivation for emotionally arousing events. In addition, even though participants completed the NA and NC scales immediately after the reading time assessment, neither NA nor NC predicted participants' information interest as reflected in relative reading time.

Table 1  
*Correlations Among Structural Bases, Meta-Bases, Need for Affect, and Need for Cognition in Study 1*

Variable	1	2	3	4
1. Structural bases	—	.02	-.03	-.08
2. Meta-bases		—	.05	-.22
3. Need for affect			—	.42**
4. Need for cognition				—

\*\*  $p < .01$ .

Meta-bases were also not correlated with structural bases. Furthermore, meta-bases but not structural bases mattered in the prediction of reading time. The null findings for structural bases are unlikely due to a lack of sensitivity of the measure, however, as the structural bases measure has proved useful in prior research (Huskinson & Haddock, 2004) and is very similar to the meta-bases index (e.g., in referring to the same attitude objects) that proved successful. Rather, it is likely that participants were (as we intended) being deliberative in the amount of time they allocated to reading the two messages. Still, to rule out the alternative explanation that the structural bases measure we have used is less sensitive than the meta-bases measure, we wanted to compare meta-bases and structural bases in their influence on a phenomenon that previous research has clearly established to be impacted by structural bases. In particular, past research has shown that attitude change is influenced by the interaction between structural bases and the nature of a persuasive message (e.g., Fabrigar & Petty, 1999; Huskinson & Haddock, 2004). Thus, we designed Study 2 to assess the separate influences of meta-bases and structural bases on attitude change as a function of whether the persuasive communication contains affective or cognitive information.

On the basis of past research, we expected structural bases to have an impact in predicting susceptibility to affective versus

<sup>5</sup> In additional analyses, we created a discrepancy index from NA and NC to reflect a preference for emotionally arousing events over cognitive challenges, as such an index would be more equivalent to our relative meta-bases measure. This relative need for affect index was created by subtracting participants' standardized NC scores from their standardized NA scores. As the only predictor in the model, relative NA did not predict the proportion of time spent reading the affective message ( $\beta = -.11, t(57) = -0.83, p = .41$ ).

<sup>6</sup> Because the relationships between the separate affective and cognitive meta-bases,  $r(57) = .57, p = .01$ , and structural bases,  $r(57) = .04, p = .76$ , were either moderate or zero, we also ran analyses using affective and cognitive meta-bases as separate predictors rather than using the index created from the discrepancy between the two variables. Results revealed that when only affective and cognitive meta-bases were entered as the predictors, cognitive meta-bases predicted a lower proportion of time spent reading the affective message ( $\beta = -.32, t(56) = -2.06, p = .04$ ), but affective meta-bases did not predict the proportion of time spent reading the affective message. However, the impact of affective meta-bases was in the expected direction ( $\beta = .22, t(56) = 1.41, p = .16, R^2 = .07$ ). Furthermore, a test of the difference in the absolute magnitude of the coefficients revealed that the cognitive meta-bases effect was not significantly stronger than the affective meta-bases effect,  $F(1, 56) = 1.27, p > .25$ . Notably, affective meta-bases served as a significant predictor in Study 3 and a marginal predictor in Study 2 (see Footnotes 9 and 10).

When separate affective and cognitive meta- and structural bases, as well as NC and NA, were entered simultaneously in another regression, cognitive meta-bases still predicted a lower proportion of time spent reading the affective message ( $\beta = -.35, t(52) = -2.18, p = .03$ ). As in the earlier regression, affective meta-bases did not predict the proportion of time spent reading the affective information, although the trend was in the expected direction ( $\beta = .25, t(52) = 1.54, p = .13$ ). There was also a marginally significant tendency for NC to predict a greater proportion of time spent reading the affective information ( $\beta = .28, t(52) = 1.85, p = .07$ ). This might have been due to participants' perception that the affective information was more challenging to process than the cognitive information. Affective structural bases, cognitive structural bases, and NA did not predict relative reading time (all  $ps > .20$ ).

cognitive persuasive messages in the absence of constraints on one's thinking. The question was whether meta-bases would also predict attitude change and would do so above and beyond structural bases. As discussed earlier, research on attitudes has demonstrated that explicit measures can *uniquely* predict the same behavior that is already predicted by implicit measures. As we proposed, meta-bases could be especially impactful when the behavior comprises deliberative processes. To the extent that processing a message also involves high-elaboration processes (e.g., thoughtful consideration of the nature and strength of information), we expect meta-bases to predict attitude change as a function of the appeal type, and to do so beyond the impact of structural bases.

## Study 2

The primary goal of Study 2 was to examine the utility of meta-bases in a new domain—persuasion—and to compare the unique contributions of meta-bases and structural bases in predicting attitude change to affective versus cognitive persuasive messages. By doing so, we could confirm the efficacy of the structural bases measure as well as demonstrate that the effects of meta-bases extend beyond relative information interest (as assessed with reading time) to persuasion. First, participants' meta- and structural bases were measured as in Study 1. Participants were then presented with either an affective or a cognitive message in favor of blood donation before reporting their attitudes toward this topic. Because NC and NA were uncorrelated with structural bases and did not account for any of the effects of meta-bases in Study 1, we did not include NC or NA in Study 2.

## Method

### Participants

One hundred forty-eight introductory psychology students at Ohio State University participated in the study in return for partial course credit.

### Procedure

Participants were told that they would be completing various studies in order to fulfill the credit requirement. The first study was presented as a survey in which students' opinions toward various attitude objects were assessed. During this phase, both the structural and meta-bases of participants' attitudes were assessed. The second study was said to be about students' opinions toward social issues that were presumed to be randomly selected. During this phase of the study, participants first read a distractor message and then read the target message regarding blood donation. After participants completed the dependent measures, they were debriefed and thanked for their participation.

### Independent Variables

**Structural bases.** Participants' structural bases were assessed and computed in the same way as in Study 1, except that four rather than five attitude objects were used. The four attitude objects were birth control, capital punishment, George W. Bush, and spiders.

**Meta-bases.** Participants' meta-bases were assessed and aggregated in the same way as in Study 1. That is, participants indicated the extent to which their attitudes were driven by affect and by cognition for each of the four attitude objects.

**Message type.** After reading a distractor message (concerning capital punishment), participants read either an affective message or a cognitive message in favor of blood donation. The affective message focused on positive emotions such as the good feelings associated with blood donation. For instance, the message described the joy and excitement an individual might experience when donating blood. The cognitive message was designed to elicit positive thoughts about donating blood. For example, the message discussed the various ways in which donated blood can be used (see the Appendix for the text of the messages).<sup>7</sup>

### Dependent Measure: Attitude Change

Before reading the message, participants reported their attitudes toward blood donation using semantic differential scales with the following anchors: *negative–positive*, *undesirable–desirable*, *negative–good*, and *dislike–like*. Then, after reading the blood donation message, participants reported their attitudes toward blood donation again using the same items. An index of attitude change was created by subtracting the average of participants' postmessage attitudinal responses from the average of their premessage responses.<sup>8</sup>

## Results

As in Study 1, participants' meta-bases did not correlate with their structural bases,  $r(143) = -.03$ ,  $p = .71$ . Participants' meta-bases and structural bases were centered (see Aiken & West, 1991), and the type of message was contrast coded ( $-1 =$  cognitive vs.  $1 =$  affective) before all main effects and then the two-way Structural Bases  $\times$  Message Type and Meta-Bases  $\times$  Message Type interactions were entered as predictors (see Cohen & Cohen, 1983). Results showed the overall model accounted for a significant amount of variance ( $R^2 = .08$ ). As expected, neither message type nor structural bases predicted attitude change ( $\beta = .02$ ),  $t(141) = 0.18$ ,  $p = .86$  ( $\beta = -.10$ ),  $t(141) = -1.21$ ,  $p = .23$ , respectively. There was a marginally significant tendency such that meta-bases were related to attitude change ( $\beta = -.15$ ),  $t(141) = -1.73$ ,  $p = .09$ . That is, participants with cognitive meta-bases tended to show more attitude change than those with affective meta-bases.

Of more relevance, replicating prior research, structural bases interacted with message type to influence attitudes ( $\beta = .17$ ),

<sup>7</sup> The pro-blood donation messages were pilot tested in the same way as in Study 1 (see Footnote 4). Analyses on the relative affect–cognition qualities of the messages showed that the extent to which the message elicited emotions rather than thoughts was greater for the affective message ( $M = 0.73$ ,  $SD = 1.20$ ) than for the cognitive message ( $M = -0.40$ ,  $SD = 1.58$ ),  $F(1, 61) = 10.18$ ,  $p < .01$ .

<sup>8</sup> A regression analysis, with premessage attitudes as a covariate and postmessage attitudes as a dependent variable, was also conducted. Results were virtually identical to the change score analysis. To match the conceptualization of the dependent measure (i.e., persuasion), the change score analysis is reported in the text.



$t(139) = 2.08, p = .04$ . That is, the type of message was differentially effective as a function of individuals' structural bases. The top panel in Figure 1 shows a relative persuasion matching effect such that individuals with primarily affective structural bases tended to be more influenced by the affective than the cognitive message. However, as structural bases became more cognitive, the

advantage of the affective message disappeared, and, in fact, the cognitive message tended to be more impactful.

Crucial to the present goal is the Meta-Base  $\times$  Message Type interaction ( $\beta = .16$ ),  $t(139) = 1.98, p = .05$ , which remained significant even when controlling for the Structural Base  $\times$  Message Type interaction. That is, the nature of the message differen-

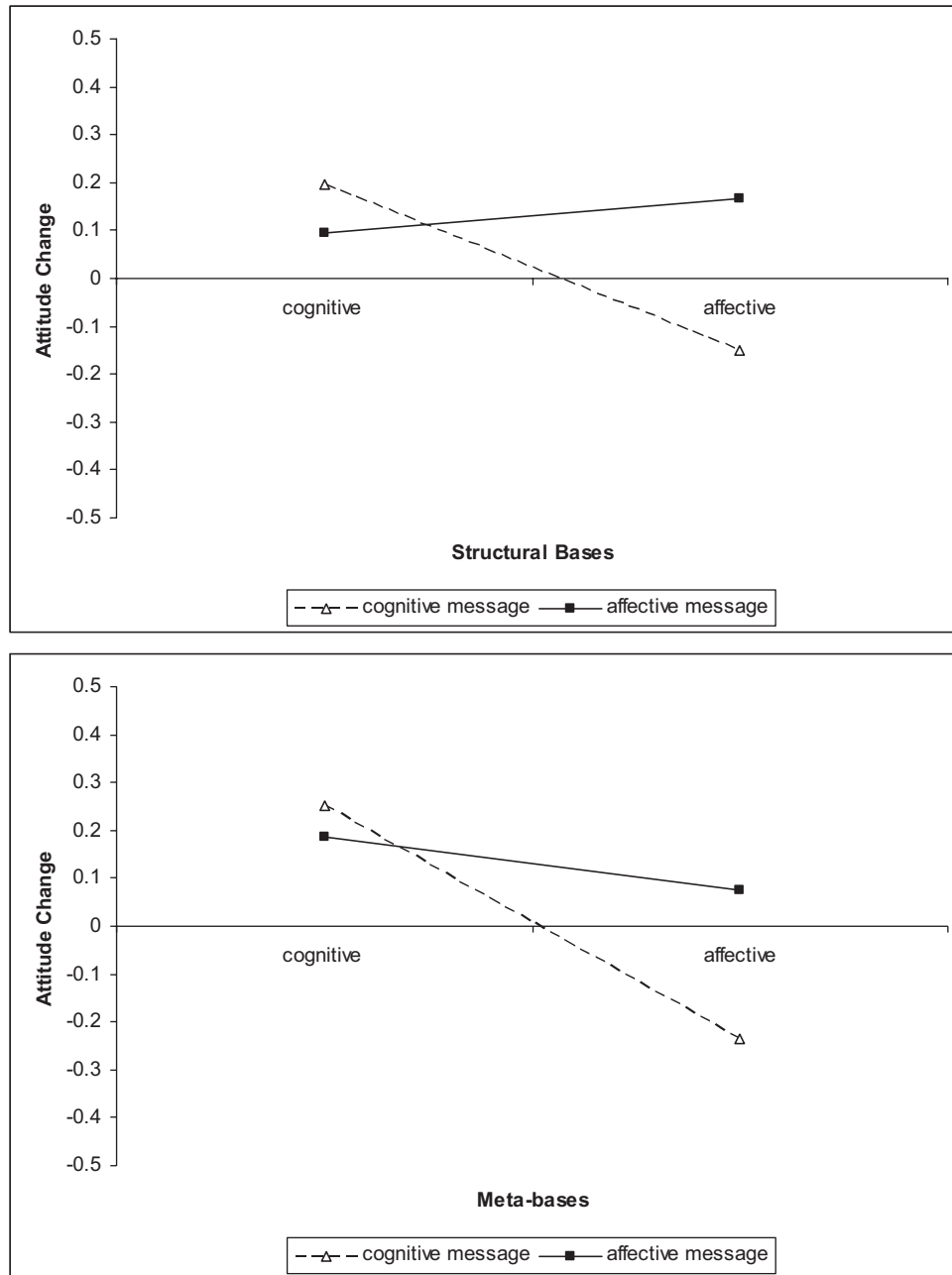


Figure 1. The top panel illustrates the impact of structural bases on attitude change as a function of message type. The cognitive structural base group consists of individuals who are at one standard deviation below mean structural bases. The affective structural base group consists of individuals who are at one standard deviation above mean structural bases. The bottom panel illustrates the impact of meta-bases on attitude change as a function of message type. The cognitive meta-base group consists of individuals who are at one standard deviation below mean meta-bases. The affective meta-base group consists of individuals who are at one standard deviation above mean meta-bases.

tially influenced attitudes as a function of individuals' meta-bases. As shown in the bottom panel of Figure 1, there again was a relative persuasion matching effect such that affective meta-base individuals tended to be more persuaded by the affective than the cognitive appeal. The advantage of the affective message was removed for individuals with cognitive meta-bases. Instead, the cognitive message tended to be more effective for these individuals.<sup>9</sup>

### Discussion

Results from Study 2 suggest that both meta-bases and structural bases interacted with message type to produce a matching effect on persuasion. That is, the attitude pattern produced a relative matching effect such that individuals with relatively affective meta- and structural bases were more persuaded by the affective than the cognitive message, but as meta- and structural bases became more cognitive, the advantage of the affective message was gone, and the cognitive message became slightly, though not significantly, more persuasive. The findings that (a) meta-bases and structural bases accounted for separate amounts of variance and that (b) the two did not correlate with each other provide additional support for the hypothesis that it is important to consider meta-bases *in addition to* structural bases when examining attitude change to affective versus cognitive communications. In fact, the interaction between meta-bases and message type was equivalent in effect size to the interaction between structural bases and message type. This suggests that meta-bases play at least an equally important role as structural bases in accounting for affective-cognitive matching effects.

These findings imply that given a message, people's structural bases might guide their inclination to actually rely on emotions or beliefs in attitudes such that they are more persuaded by the message that matches their structural bases. At the same time, a matching effect occurs for people's meta-bases independent of their structural bases. As we proposed, meta-bases and structural bases could be impactful under conditions that promote deliberative and spontaneous responses, respectively. Because Study 2 was designed not to prevent or facilitate a high level of effort in message processing, deliberative and spontaneous elements such as considering the merits of the information and automatically attending to the information could both be involved. Hence, it is not surprising that both meta-bases and structural bases played a role in this study.

These findings are in obvious contrast to Study 1, in which only meta-bases had a significant impact. However, in Study 1, ample time to read information was provided, and perhaps more importantly, participants were specifically told of our interest in examining how they made decisions. Thus, the differences in Studies 1 and 2 are plausibly a result of our attempt to create a highly thoughtful context in Study 1 and to neither encourage nor discourage thoughtfulness in Study 2.

Although our speculation regarding the moderating role of level of thoughtful responding provides a reasonable explanation for the differences between Studies 1 and 2, it would be better to provide some direct evidence. It is possible that other differences in the studies, such as the fact that Study 1 focused on information interest, whereas Study 2 examined persuasion, could be responsible for the different results. Critically, if our interpretation is

correct, then a manipulation of thoughtfulness should moderate the extent of impact of meta- and structural bases. That is, as the extent of deliberative responding is increased, the impact of meta-bases should increase, but the impact of structural bases should decrease.

### Study 3

The main goal in Study 3 was to examine the hypothesized moderator of when meta- versus structural bases would be influential—deliberativeness, and to do so with another dependent measure to extend the generalizability of the impact of meta-bases. As noted earlier, previous research suggests that general metacognitive judgments are more likely to be influential when participants are relatively thoughtful (see Petty et al., 2007). In the domain of attitudinal bases, it is possible that when people are deliberating carefully about the information they encounter, they consider not only the contents of the information but also whether they typically base their attitudes more on affect or on cognition. Therefore, we expect meta-bases to be more impactful in guiding people's reactions to the information they encounter when they are responding deliberately.

<sup>9</sup> An alternative view of these interactions is that for the cognitive message, those with cognitive bases (meta- and structural) were more persuaded than those with affective bases, but for the affective message, basis made little difference. The fact that matching appeared to work better for one attitudinal basis than another (i.e., there is not a full crossover interaction) is a fairly common finding in research on affective-cognitive matching (see, e.g., Fabrigar & Petty, 1999; Huskinson & Haddock, 2004), and various factors can contribute to this. In the present study, cognitive meta-base individuals tended to change their attitudes more than affective meta-base individuals. One possibility is that the messages were different in their affective-cognitive qualities in relative but not absolute terms. That is, the affective and cognitive messages were actually equivalent in their cognitive qualities, although significantly different in their affective qualities. Thus, the affective message was still somewhat persuasive to the cognitive meta-base individuals, even if less so, compared with the cognitive message. Therefore, a full crossover interaction would presumably have been obtained on the cell means if the affective message had fewer cognitive qualities than the cognitive message on an absolute level. When all main effect variance is removed from the cell means, of course, the interaction variance alone forms a crossover pattern (Petty, Fabrigar, Wegener, & Priester, 1996; Rosenthal & Rosnow, 1985).

Furthermore, as in Study 1, we assessed the relationships between the separate components of the meta-bases and structural bases difference scores. Affective and cognitive meta-bases were correlated,  $r(146) = .39$ ,  $p < .01$ . In addition, affective and cognitive structural bases were correlated,  $r(146) = .33$ ,  $p < .01$ . Because these relationships were moderate, we also conducted regression analyses using affective and cognitive meta-bases and structural bases as separate predictors. In addition, interaction terms involving the separate meta-bases and message type as well as the separate structural bases and message type were included in the second step. Results showed that there was a tendency for the separate meta-bases to interact with message type in predicting persuasion ( $R^2 = .03$ ). Affective meta-bases interacted with message type to predict attitude change ( $\beta = .11$ ),  $t(135) = 1.71$ ,  $p = .09$ . The same was true for cognitive meta-bases in the opposite direction ( $\beta = -.11$ ),  $t(135) = -1.66$ ,  $p = .10$ . As was the case in Study 1, a test of the magnitude of the critical effects for the two meta-bases scores indicated they were of comparable magnitude,  $F(4, 138) = 0.00$ ,  $p > .25$ . As for structural bases, the multicollinearity involving affective structural bases and cognitive structural bases rendered regression analyses with those separate terms problematic.

However, prior research has conceptualized structural bases as tapping into existing associations among people's affect, cognition, and overall evaluation toward various attitude objects (e.g., Crites et al., 1994; Giner-Sorolla, 2004). That is, just as an attitude reflects the association between an object and its stored evaluation in memory (Fazio, 1995), structural bases represent the associations among an evaluation, its affective components, and its cognitive components in memory. When cognitive components are more strongly linked than emotional components to the object and its evaluation, the attitude is viewed as having a cognitive structural base. However, when emotions are more strongly associated with the object and its evaluation in memory, the attitude is considered to be affectively based.

Evidence for the notion that structural bases are linked to the target object in memory is provided by research on differences in accessibility of affective versus cognitive components as a function of whether the attitude is affect- or cognition based. In one study, Giner-Sorolla (2004) showed that relative to cognition-based objects, affect-based objects elicited quicker response times to associated emotional adjectives than cognitive adjectives. That is, when the target object was affect based in structure, participants were faster in completing the affective stem "A (insert target object) makes me feel \_\_\_" than the cognitive stem "A (insert target object) is something \_\_\_." Therefore, similar to automatically activated attitudes, which have been posited to be especially influential for spontaneous behaviors (e.g., Fazio et al., 1995), we expected that structural bases would also be more impactful when people are responding quickly and spontaneously rather than deliberately.

To test the hypothesis that deliberativeness moderates the impact of meta-bases versus structural bases, we randomly assigned participants to receive instructions stressing the importance of being deliberative in their decision making (similar to Study 1) or not. A secondary goal of Study 3 was to assess selective information interest using a different operationalization than used in Study 1. Therefore, we examined the extent to which participants' preferences for information exposure were influenced by an object's ostensible affect-cognition qualities.

### Method

#### Participants and Overview of Procedure

Eighty-six introductory psychology students at the Ohio State University participated in the study in return for partial course credit. All participants were told that they would engage in two different studies and that the first study was a pilot test for future experiments. In this study, their task was to rate various materials that were going to be used in later research. They were then given additional instructions or not depending on whether they were in the deliberative ranking or spontaneous ranking condition. Next, each participant received information about movie and psychology clips that they were to rank according to how interested they were in watching them. Finally, in what was described as a separate study, participants reported their structural bases and meta-bases toward various attitude objects.

#### Independent Variable: Deliberativeness in Ranking

Participants were randomly assigned to respond either deliberately or spontaneously to the ranking tasks. In the deliberative

ranking condition, participants were told the following: "Please note that in this study, it will be very important for you to think about the information as it is presented to you. The materials that you will be rating are crucial to our research." Participants in the spontaneous ranking condition did not receive any additional instructions that stressed the importance of the task or otherwise made salient that their responses would be evaluated.

#### Dependent Measure: Relative Use of Affect in Preferences

After initial instructions, participants were presented with an information grid about six movies. This information grid contained ratings of the movies on four dimensions that were said to come from last quarter's students. The four dimensions were the following: the extent to which the movie stimulates thinking, how well the movie elicits emotions, how impressive the special effects are, and how good the acting is in general. This procedure was adapted from a ranking task developed by Wegener and Petty (1994). In the information grid, the ratings were distributed such that three of the movies were high in their affective qualities and low in their cognitive qualities, whereas the opposite was true for the remaining three movies. In addition, to ensure that the movies were similar in their overall quality, low and high ratings of special effects and acting were evenly distributed across the affective movies and the cognitive movies. This means the more highly an individual ranks an affective movie relative to a cognitive movie, the more the individual is relying on the movie's affect-cognition qualities rather than on other dimensions to determine his or her preference.

After ranking the movies, participants were presented with similar information about video clips that were described as supplementary course materials for the introductory psychology course. The psychology clips were ostensibly rated by last quarter's students on the extent to which they were thought provoking, were emotionally provoking, had good audiovisual quality, and were of appropriate length. The distribution of the ratings for the psychology clips on the various dimensions was parallel to that for the movies. Ratings for the movie clips and psychology clips are presented in Tables 2 and 3, respectively.

As a measure of the extent to which a participant relied on an object's affect-cognition quality in determining preference for that object, we first reverse coded the ranks for the movie and psychology clips such that greater values reflected more preference. In addition, we subtracted participants' average reverse-coded ranks for the cognitive clips from their average reverse-coded ranks for the affective clips. Therefore, overall greater values mean greater

Table 2  
*Information Grid Presented to Participants About Movie Ratings in Study 3*

Movie	Stimulates thinking?	Special effects?	Arouses feelings?	Acting?
A	2.1	1.9	4.5	4.5
B	4.5	4.1	2.4	2.0
C	1.9	2.3	4.7	4.1
D	4.4	3.4	1.9	3.3
E	4.6	1.8	2.2	4.4
F	2.0	3.9	4.4	1.7

Table 3  
*Information Grid Presented to Participants About Psychology  
 Clip Ratings in Study 3*

Video clip	Stimulates thinking?	Provokes feelings?	Appropriate length?	Audiovisual quality?
1	4.8	9.0	8.2	4.0
2	9.2	5.1	8.8	4.5
3	4.4	9.2	4.6	8.0
4	9.4	3.8	4.5	8.2
5	9.0	4.2	8.3	4.1
6	4.0	8.1	4.1	8.8

relative reliance on affect versus cognition in determining preference for the object.

In addition to participants' rankings, we also measured the amount of time each participant spent on ranking every movie clip and psychology clip. We then computed the average time each participant took to rank a movie clip or psychology clip in order to assess whether the deliberativeness manipulation was effective.

### Predictor Variables

*Structural bases.* Participants' structural bases were assessed in the same way as in the prior studies. These were aggregated across five attitude objects to form a structural bases index. The five attitude objects were abortion, birth control, exercising, spiders, and snakes.

*Meta-bases.* Participants' meta-bases were also assessed in the same way as in the earlier studies using the same five attitude objects that comprised the structural bases measure.

## Results and Discussion

### Deliberativeness Manipulation Check

Results showed that 4 participants were more than three standard deviations above the mean in their response times. These 4 participants were excluded from further analyses. As expected, participants in the deliberative ranking condition ( $M = 15.50$  s,  $SD = 11.98$  s) took a longer time on average to rank each clip than those in the spontaneous ranking condition ( $M = 10.50$  s,  $SD = 3.93$  s),  $t(80) = -2.59$ ,  $p = .01$ .

### Relationship Between Meta-Bases and Structural Bases

As in both prior studies, participants' meta-bases did not correlate with their structural bases,  $r(75) = .18$ ,  $p = .14$ .

### Relative Use of Affect in Preferences

We entered participants' centered meta-bases, centered structural bases, deliberativeness (contrast coded;  $-1 =$  spontaneous vs.  $1 =$  deliberative), as well as all interaction terms as predictors in a series of regression analyses. As in Study 2, we entered main effects in the first step, two way interactions in the second step, and so forth. Only the anticipated Structural Bases  $\times$  Deliberativeness and Meta-Bases  $\times$  Deliberativeness interactions attained statistical significance ( $\beta = -.30$ ),  $t(70) = -2.68$ ,  $p = .01$  and

( $\beta = .25$ ),  $t(70) = 2.27$ ,  $p = .03$ , respectively (all other  $ps > .24$ ; overall model  $R^2 = .16$ ).

To decompose the interactions, we assessed the separate influences of structural bases and meta-bases when participants were responding spontaneously versus deliberately. Among participants who were spontaneous in their ranking, structural bases predicted selective information interest such that more affective structural bases were associated with greater use of a clip's affective quality in determining preferences ( $\beta = .36$ ),  $t(33) = 2.19$ ,  $p = .04$ . Meta-bases did not predict selective information interest among participants who were responding spontaneously ( $\beta = -.09$ ),  $t(33) = -0.56$ ,  $p = .58$ . The opposite was true among participants who were deliberative; that is, meta-bases predicted greater use of a clip's affect-cognition quality to determine preference ( $\beta = .42$ ),  $t(38) = 2.79$ ,  $p = .01$ , but structural bases did not ( $\beta = -.23$ ),  $t(38) = -1.53$ ,  $p = .13$ .<sup>10</sup> Overall, the present findings provide support for the hypothesis that meta-bases are more important in predicting information use when an individual is responding more deliberately, whereas structural bases are more influential when the individual is responding spontaneously.

## General Discussion

The major goal of the present research was to introduce the construct of affective versus cognitive meta-bases of attitudes as distinct from affective versus cognitive structural bases. The latter concept has achieved considerable prior attention in the literature on attitudes and persuasion, but the former is new. The present research provided empirical evidence to support such a distinction. Study 1 showed that meta-bases predicted selective information interest as manifest in actual behavior—proportion of time spent reading affective versus cognitive information. In comparison, structural bases, NA and NC did not predict such information interest. In Study 2, meta-bases interacted with the type of message to influence persuasion, and these effects were independent of the effects of structural bases, which also influenced persuasion. Finally, Study 3 showed that meta-bases exert their influence especially when people are responding deliberately, but structural bases are more impactful when people are spontaneous in their responses.

<sup>10</sup> As before, the relationships between the separate components of the meta-bases and structural bases difference scores were moderate,  $r(80) = -.40$ ,  $p < .01$ , and,  $r(75) = .25$ ,  $p = .03$ , respectively. Therefore, we also ran analyses using affective and cognitive meta-bases as separate predictors rather than using the index created from the discrepancy between the two variables. In addition, interaction terms involving the separate meta-bases and deliberativeness as well as the separate structural bases and deliberativeness were included in the second step. Results showed that the interactions did account for a significant amount of variance, combined ( $R^2 = .19$ ). Both affective structural bases and meta-bases interacted with deliberativeness to influence the relative use of affect in attitudes ( $\beta = -.25$ ),  $t(68) = -2.19$ ,  $p = .03$ , and ( $\beta = .43$ ),  $t(68) = 3.14$ ,  $p < .01$ . Neither the cognitive structural bases nor cognitive meta-bases interacted with deliberativeness to influence the relative use of affect in attitudes ( $ps > .15$ ). As might be expected given this pattern of results, this study was the only case in which the meta-bases effects tended to be nonsymmetrical, with the Affective Meta-Basis  $\times$  Deliberativeness interaction being marginally stronger than the Cognitive Meta-Basis  $\times$  Deliberativeness interaction,  $F(2, 68) = 3.10$ ,  $p = .06$ .

### *Assessing Meta-Bases*

In order to compare meta-bases with structural bases that were assessed as an individual difference, we examined meta-bases as a function of individuals, too. The present research indicates that there is sufficient uniformity across attitude objects within individuals such that an individual-difference index of meta-bases predicts responses to various attitude objects (i.e., smoking, blood donation, and movies). In fact, it is worth noting that a meta-bases measure computed from the aggregate of responses to a relatively small number of objects (e.g., abortion, birth control, capital punishment, exercising, and spiders in Study 1) had predictive utility for participants' responses to a completely different object (e.g., smoking in Study 1).

However, it is also likely fruitful to consider meta-bases at the object-specific level, as structural bases have proved useful at this level as well (e.g., Fabrigar & Petty, 1999). For instance, people presumably can perceive affective bases for some objects (e.g., one's relationship partner) but cognitive bases for others (e.g., job applicants). In this regard, one potentially interesting type of object to examine is social groups. In prior research, participants' attitudes toward men, women, and Democrats were predicted by their cognitions but not their emotions regarding these groups (Eagly et al., 1994). In other research, Canadian participants' judgments of Native Indians and French Canadians were predicted more by their emotions toward the group than by their cognitions about the group, but for Pakistanis and homosexuals, it was the opposite (Esses et al., 1993). The present research suggests that in addition to the structural bases of prejudice toward specific social groups, it might be useful to consider the meta-bases of prejudice toward groups because matching the affect-cognition nature of a message about a prejudiced group to the meta-bases of that prejudice could be more effective in reducing prejudice than mismatching the two. For example, future research can assess whether Blacks are perceived to be a social group that elicits affectively based or cognitively based prejudice and whether prejudice can be reduced by presenting a message that matches the meta-basis of attitudes toward Blacks. We predict that this should be an effective strategy, at least when people are being deliberative.

### *Deliberativeness as a Moderator*

In addition to demonstrating meta-bases as unrelated to structural bases, the present research showed the importance of meta-bases in predicting information interest and persuasion. One question that we addressed is under what conditions meta-bases versus structural bases will predict attitudinal phenomena. In Study 1, the behavior of interest—reading-preferred information at one's own pace—was likely performed with some deliberation because participants were told explicitly that we were examining how people make decisions. In Study 2, we argued that attitude change was likely to have comprised both deliberative and spontaneous elements such as carefully considering the nature and merits of the matched message and experiencing the ease of processing matched information, respectively.

Of most importance, we tested this speculation empirically in Study 3 by manipulating the extent of deliberation. This study provided evidence that as the extent of deliberation increases, meta-bases become more impactful, but structural bases become

less impactful. Stated differently, when people are relatively thoughtful in their responses, meta-bases are more impactful in determining choices than structural bases, but when people are responding more spontaneously, structural bases are more influential. The hypothesis that meta-bases matter more when people are deliberative is consistent with prior research on other types of metacognitive judgments, such as using the perceived validity of one's thoughts to form attitudes (e.g., Petty et al., 2002). In addition, the hypothesis that structural bases are more impactful in attitudes and related phenomena when people respond spontaneously is consistent with the conceptualization of automatically activated attitudes, which have been proposed to be especially influential for spontaneous behaviors (e.g., Dovidio et al., 1997; Fazio et al., 1995).

In Study 3, we tested the deliberativeness-as-moderator hypothesis by varying the likelihood of deliberativeness to examine the differential impact of meta- versus structural bases on the *same* outcome (i.e., use of an object's explicit affect-cognition qualities to determine overall preference). One potential future direction is to examine the differential influence of meta-bases versus structural bases on *different* behaviors that tend to be deliberative or spontaneous. For instance, one could examine whether certain deliberative behaviors, such as biased processing of information (e.g., Petty et al., 1993), are more impacted by meta-bases than structural bases, whereas certain spontaneous behaviors, such as automatic attention (e.g., Roskos-Ewoldsen & Fazio, 1992) or experienced ease, are more influenced by structural bases than meta-bases. Findings from such research could shed light on the specific mechanisms by which meta-bases and structural bases influence outcomes such as attitude change.

### *Underlying Mechanisms for the Impact of Meta-Bases and Structural Bases*

In addition to there being differences between meta-bases and structural bases in when they are more impactful, there are likely differences between the two constructs in how they would be impactful. The distinction between the underlying mechanisms of meta-bases and structural bases in attitude change is most likely observable when people are not constrained to be low or high in their deliberativeness. For example, when the tendency to elaborate is unconstrained, meta-bases might influence people to increase their overall processing of the matched appeal such that the merits of the matched appeal are recognized to a greater extent than those of the mismatched appeal. More important, it is possible that meta-bases are influencing the amount of scrutiny given to the appeal by impacting the motivation to process and distinguish between affective and cognitive information rather than the ability to do so (cf. Petty & Cacioppo, 1986; Petty & Wegener, 1998). In particular, information matched to meta-bases might seem more personally relevant (and thus more interesting and worthy to process) than mismatched information (Petty, Wheeler, & Bizer, 2000).

In fact, past research on other metacognitive judgments suggests that such judgments impact motivation-dependent behavior rather than ability-dependent behavior. For instance, consider research on the social judgeability model (e.g., Yzerbyt, Schadron, Leyens, & Rocher, 1994). Yzerbyt and colleagues (1994) found that relative to control participants, individuals who believed they had uncon-

sciously received individuating information were more likely to rely on stereotypes in their judgments, even though they actually did not receive any such information. Because participants were randomly assigned to the meta-information or control condition, knowledge of stereotypes should be evenly distributed across both groups. Thus, it is unlikely that participants in the meta-information condition made more stereotypical judgments because they had more knowledge of stereotypes. Rather, they were more willing to use stereotypes because the perception that they had received individuating information encouraged them to believe their judgments were legitimate. Meta-bases might similarly affect motivation rather than ability to seek out, process, and use information.

What about structural bases? Given that structural bases represent existing associations among affect, cognition, and attitudes in one's memory (e.g., Giner-Sorolla, 2004), it is likely that such associations influence one's ability to process affective or cognition information efficiently. For example, an individual with an affective structural basis might be able to automatically attend to and/or to retrieve more affective information than cognitive information even when given equal opportunity to process both types of information. In summary, when people are not constrained in their elaboration, meta-bases might influence persuasion via the motivation for processing (e.g., by encouraging the perception that the matched information is more personally relevant), whereas structural bases might influence attitude change via the ability to quickly comprehend, evaluate, and remember the matched information relative to the mismatched information.

### *Origins of Meta-Bases*

Besides differing in their mechanisms, meta-bases and structural bases might also differ in their origins. As demonstrated in prior research on the structural bases of attitudes, people can base their attitudes on affect or on cognition as a function of what knowledge they actually possess about the object. For example, in one study, participants who read information designed to elicit emotions toward a fictitious animal (a lemphur) formed more affectively based attitudes, whereas participants who read information about the characteristics of the animal, such as its intelligence and usefulness, developed more cognitively based attitudes (Fabrigar & Petty, 1999). In addition, some researchers have argued that even when given both affective and cognitive information, the information that is presented first is the information upon which an attitude is structurally based (e.g., Edwards, 1990). What about perceptions of attitudinal bases? If meta-bases are not derived from structural bases, from where do they come?

First, it is possible that meta-bases develop from perceptions regarding one's interest in affective and cognitive information in general. That is, people who think they like to process affective information might perceive that they like to use such information to make decisions in addition to processing such information for its own sake. Similarly, people who perceive themselves to enjoy processing cognitive information in general might also think that they rely on cognitive information in forming their attitudes. Second, although the present research focuses on the conceptualization of meta-bases as perceptions regarding affective versus cognitive bases for one's attitudes, it is possible that this conceptualization could be broadened to include perceptions about affective

and cognitive bases for one's behavior. In fact, perceived attitudinal bases might develop from perceptions of behavioral bases, and vice versa. Third, meta-bases might stem from differences in people's perceptions of their ability to process affective or cognitive information. For instance, people who perceive that they tend to know a lot about emotions might also perceive that they tend to use affect to guide their attitudes, whereas people who think they tend to be well informed about the characteristics of various issues and objects might also think that they tend to rely on cognition in their attitudes. Furthermore, such perceptions about knowledgeability with regard to affect and cognition need not correspond to actual knowledgeability. Rather, perceptions of affective or cognitive knowledgeability might be influenced by general lay theories such as gender stereotypes. Indeed, prior research that distinguishes perceived performance from actual performance has demonstrated that women tend to view themselves as having low ability in science relative to men (Ehrlinger & Dunning, 2003). Such perceptions, in turn, reduce their interest in participating in a science competition. Applied to meta-bases, women who view themselves as well informed about emotions might also perceive themselves to rely on affect more than on cognition in attitudes.

### *Are Meta-Bases Ever Related to Structural Bases?*

The lack of a relationship between meta- and structural bases in all three studies is consistent with research on introspection showing that people do not necessarily have accurate access to why they like or dislike something (Nisbett & Wilson, 1977).<sup>11</sup> One might ask whether people's meta-bases would ever correspond to structural bases. To the extent that the lack of relationship between meta- and structural bases is driven by factors such as incomplete access to reasons for attitudes and difficulty in distinguishing between unique contributions of affect versus cognition, these same factors could be modified to produce correspondence between meta- and structural bases. For example, people should be able to comprehensively access their attitudinal bases when the subjectively accessible bases are a representative sample. In other words, it might be easier for people to accurately detect a greater use of affect if the greater amount of affective information that occurred to them spontaneously was experienced as easier to retrieve than cognitive information.

Whether affective or cognitive information is subjectively accessible might depend on whether people view the attitude object in question as a consummatory or instrumental object. Millar and Tesser (1986) argued consummatory behaviors are those that people perform for their own sake (e.g., playing with puzzles), whereas instrumental behaviors are those that people perform to attain a separate goal (e.g., playing with puzzles as a way to practice for an upcoming test). In their research, Millar and Tesser found that when participants viewed playing with puzzles as a consummatory behavior, those who tried to access affective bases for their attitudes reported attitudes that were more predictive of

<sup>11</sup> In all studies, when affective and cognitive meta- and structural bases were examined separately, no correlation was found between affective meta-bases and affective structural bases or between cognitive meta-bases and cognitive structural bases (all other  $ps > .10$ ).

their behavior than others who tried to access cognitive bases. In contrast, when participants viewed playing with puzzles as an instrumental behavior, it was the group that tried to access cognitive bases that reported attitudes that were more predictive of behaviors. Perhaps participants experienced more ease in retrieving a representative sample of affective bases when they viewed puzzles as consummatory but more ease in retrieving a representative sample of cognitive bases when they viewed puzzles as instrumental.

In addition to identifying a representative set of reasons, people also need to accurately distinguish between the unique contributions of affect and cognition in their attitudes so that their meta-bases correspond with their structural bases. People might be more likely to recognize the unique contributions of affect and cognition in their judgments when the affective and cognitive components are evaluatively inconsistent. When the components of an attitude are evaluatively consistent and close to one another in extremity, it will be especially difficult for people to infer a dominant base for their attitudes. However, the task would be easier if the components differ in valence. For example, given a positive attitude toward a drug, people should find it relatively easy to infer an affective base for their attitude if the drug produces desirable emotions but is associated with negative beliefs.

#### *Implications of the Meta-Structural Distinction for Other Attitudinal Bases*

The meta-structural distinction might be useful for understanding bases of attitudes beyond affect and cognition. For example, according to past research, attitudes can be based on various functions such as to make sense of the world, fit in with others, and uphold values (see Katz, 1960; Smith, Bruner, & White, 1956). In addition, previous research has shown that the functional basis of an attitude interacts with message type to influence attitudes such that a message type that matches an attitude's function tends to produce more persuasion than a message type that does not match an attitude's function—at least if the arguments presented are strong (DeBono & Harnish, 1988; Petty & Wegener, 1998). For instance, Snyder and DeBono (1985) showed that high self-monitors, whose attitudes are based on the perceived motivation to fit in with others, were more persuaded by advertisements that were image oriented than advertisements focused on the quality of the product. The opposite was true for low self-monitors. Given that self-monitoring was always assessed directly, self-monitoring probably taps into metacognitive judgments of social concerns or values as bases for one's preferences. In other words, high and low self-monitors might be said to differ in their image or value metacognitive bases. However, it is unclear whether attitudes among high self-monitors are also structurally based on social concerns. For example, a high self-monitor might also have attitudes that are associated with social concerns in memory. Given that the present research demonstrated the equal and independent contributions of meta- and structural bases with respect to affect and cognition, it could be useful to assess structural functional bases in high and low self-monitors. Differences in structural image- or value bases between high and low self-monitors might explain additional variance in persuasion beyond the variance already accounted for by meta-bases. Moreover, the structural bases might be especially impactful when people are changing

their attitudes spontaneously. The meta-structural distinction could also be extended to matching effects for other types of bases of attitudes such as one's regulatory goal (e.g., Aaker & Lee, 2001), one's group membership (see Fleming & Petty, 2000, for a review), or one's self-schema (e.g., Wheeler, Petty, & Bizer, 2005).

#### *Conclusions*

The present research provides evidence for the utility of a meta-structural distinction in the affective versus cognitive bases of attitudes. Because past research focused exclusively on structural bases, the present studies emphasized the importance of meta-bases by showing the impact of meta-bases on information-seeking behaviors that are unaffected by structural bases and by showing the influence of meta-bases in addition to that of structural bases on attitude change. We believe that the meta-structural distinction could prove to be fruitful with respect to other attitudinal properties. Much past research on attitudes has focused on structural properties or on metacognitive judgments. Even in research in which both structural properties and metacognitive judgments were examined, the two were usually viewed as representing a single underlying construct. Although we have only discussed the application of such a distinction to attitudinal bases, the distinction might also prove useful for understanding additional attitudinal properties such as knowledge and ambivalence.

Given the utility of meta-bases established in the present studies, various future directions are possible. First, future research can examine the different underlying mechanisms through which meta- and structural bases impact information seeking and attitude change. At the same time, a clearer picture of meta-bases would emerge from examining the origins of meta-bases and their relationship to structural bases. Such issues are interesting to consider because we now know that the mere perception that one bases one's attitudes primarily on affect or on cognition influences whether one is more interested in or persuaded by information that appeals to affect versus cognition.

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## Appendix

## Affective and Cognitive Messages

## Study 1

*Affective Message*

John tried his first cigarette at the age of 14. Smoking was a means for him to fit in with his new friends at school. It did not take long for John to realize that he was addicted to cigarettes. His addiction turned him into a sneak, a liar, and a thief. He stole money from his younger brother to buy cigarettes because he could not afford to buy the quantity he had to smoke. Even after he became a father to two children, the lying did not stop. He borrowed money from his brother and lied that the money was for an X-Box for his son's birthday. He lied to his doctor, insisting that he smoked "only less than a pack a day." He was absolutely ashamed but could not stop. He was compelled to such action, all because of his nicotine addiction.

In 1999, John was diagnosed with cancer in the larynx. The doctor suggested a laryngectomy, which meant that John could not talk again. When John first got home after the operation, his children ran away from him when they saw the hole in his throat. He opened his mouth to call them, but no voice came out. Soon later, he suffered from withdrawal symptoms from having stopped smoking. He experienced increased anger and hostility and had problems with basic cognitive functions such as language comprehension. Worse still, his older son, Jimmy, was diagnosed with bronchitis, a disease common in people exposed to secondhand smoke. Guilt overcame John, but it was too late. When smoking doesn't kill, it destroys.

*Cognitive Message*

Forty years have passed since the first Surgeon General's report on smoking and health. Yet smoking remains the leading preventable cause of death in this country. Tobacco continues to cost our society too many lives and too many dollars. The new Surgeon General's report illustrates the harmful impact of smoking on many organs in the body. The report's statistics and conclusions highlight the necessity of remaining vigilant in our smoking prevention efforts. For example, smoking causes 87% of lung cancer, and most cancers of the larynx, oral cavity, esophagus, and bladder. In addition, secondhand smoke is responsible for an estimated 3,000 lung cancer deaths among nonsmokers each year. This is no surprise considering that tobacco smoke contains thousands of chemical agents, including over 60 substances that are known to cause cancer.

Cigarette smoking has been the most popular method of taking nicotine since the beginning of the 20th century. Nicotine is highly

addictive. Nicotine provides an almost immediate "kick" because it causes a discharge of epinephrine from the adrenal cortex. This "kick" then leads the abuser to seek more nicotine. Addiction to nicotine results in withdrawal symptoms when a person tries to stop smoking. For example, during periods of abstinence and/or craving, smokers have shown impairment across a wide range of psychomotor and cognitive functions, such as language comprehension. Such are the harmful effects of smoking.

## Study 2

*Affective Message*

Kelly is bursting with excitement. She knows that there is always a need for blood donation, and she is glad to be able to contribute. The red cells in her blood will be useful for the treatment of all sorts of anemia and for sickle cell disease—imagine that! The platelets in her blood can be used for patients undergoing chemotherapy—she is going to help save lives! Kelly is filled with joy as she thinks about how she will help save others such as Jake. Kelly has read about poor Jake, who was diagnosed with leukemia at the age of 6. Jake had to undergo chemotherapy, which took a huge strain on his young life. In fact, Jake narrowly escaped death from a bone marrow infection that occurred as a side effect of chemotherapy. Every year, about 110,960 chemotherapy patients are in need of your blood. Be a happy blood donor today!

*Cognitive Message*

Did you know that every day, new medical treatments are being developed and more operations are being carried out? Not surprisingly, blood donations are always needed. About 2.5 million blood donations, to be exact. The donated blood can be used in several ways. Blood as a whole is rarely used, except in cases of severe blood loss. Usually, blood is separated into its individual components to be used. Red blood cells are widely used to replace lost blood during surgery, or in the treatment of anemia and sickle cell disease. Platelets are used to help patients undergoing chemotherapy or suffering from leukemia. These are but a few examples of how the donated blood can be used. Every year, about 110,960 chemotherapy patients are in need of your blood. Be a helpful blood donor today!

Received October 13, 2006

Revision received November 19, 2007

Accepted November 21, 2007 ■