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Cognitive-Affective Processing System

Definition

While the distinction between emotions and reason dates back to Aristotle (1954), contemporary social psychologists have continued to rely on this distinction, especially in the domain of attitudes and persuasion. That is, people's affect (e.g., feeling happy) and cognition (e.g., belief about usefulness) have been conceptualized as separate components or bases of overall attitudes, which refers to the global evaluations of issues, objects, persons, or groups on a valence dimension ranging from negative to positive (e.g., Katz & Stotland, 1959; Rosenberg & Hovland, 1960; Zanna & Rempel, 1988). In addition, much empirical evidence has demonstrated that affect (i.e., emotions) and cognition (i.e., beliefs) contribute to unique variances in attitudes (e.g., Abelson, Kinder, Peters, & Fiske, 1982; Breckler, 1984; Crites, Fabrigar, & Petty, 1994; Trafimow & Sheeran, 1998). Importantly, there are no assumptions about the mental effort that is *required* to process emotions or beliefs. That is, affective processing can occur with little or much mental effort. The same is true for cognitive processing.

Introduction

The tendencies for processing affect and processing cognition have been operationalized and measured in various ways, including as stable individual differences (e.g., Crites et al., 1994; Huskinson & Haddock, 2004). These individual differences can reflect the motivation to process affect or cognition (i.e., affective-cognitive meta-bases; See et al., 2008), and the ability to process affect or cognition (i.e., affective-cognitive structural bases; See et al., 2008). As discussed below, these individual differences have implications for various consequences such as attention, memory, and persuasion. In addition, there are other related individual differences such as the motivation to engage in mental challenges (i.e., Need for Cognition; Cacioppo et al.,

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1996), and the motivation to seek out arousing emotions (i.e., Need for Affect; Maio & Esses, 2001). The similarities and distinctions among all these individual differences will also be discussed, as well as future directions to enhance our understanding of how they are unique in their impact.

Measurement of Affect and Cognition

In some research, individuals generate the emotions and beliefs they have toward a particular attitude object, and then, report their perceptions of the frequency with which each self-generated emotion and belief apply to the target object as well as the degree of positivity or negativity they associate with each emotion and belief (e.g., Eagly, Mladinic, & Otto, 1994; Esses, Haddock, & Zanna, 1993). In other research, positive and negative emotions and beliefs (e.g., sad-happy; useless-useful), which have been demonstrated to be applicable across a variety of attitude objects, are provided to individuals, who then select ratings on standardized scales (e.g., Chaiken, Pomerantz, & Giner-Sorolla, 1995; Crites et al., 1994). Regardless of the measurement approach, the distinction between affect and cognition as bases of attitudes has proven useful in identifying attitude objects that are dominated by cognition (e.g., welfare assistance, Eagly et al., 1994; capital punishment, Crites et al., 1994) or affect (e.g., math, Crites et al., 1994; a rival university; See, Valenti, Ho, & Tan, 2013). The same affective-cognitive distinction can also be made for individuals (Crites et al., 1994; Huskinson & Haddock, 2004).

Ability versus Motivation

Besides the affect-cognition distinction, recent work has demonstrated that for each domain, a further distinction — between ability and motivation — can shed light on how people process emotions and beliefs (See, Petty, & Fabrigar, 2008; See, Petty, & Fabrigar, 2013). In this case, processing ability is conceptualized as efficiency, skill, or capacity, or any combination of

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the three. For instance, efficiency can be reflected by speed of processing such that in the absence of any time constraints, greater efficiency means faster speed; skill can be reflected by the ability to process complex rather than simple emotions or beliefs, and capacity can be reflected by the number of emotions or beliefs that one can process within a given time period. Importantly, ability and motivation do not correspond perfectly with each other. That is, an individual who has high ability to process emotions may have little or high motivation to do so. The same is true for an individual who has low ability to process emotions. Similarly, an individual who has high ability to process beliefs may have little or high motivation to do so. Put differently, an individual who is highly motivated to process emotions (or beliefs) may have low or high ability to do so.

Individual Differences in Affective-Cognitive Processing

As mentioned before, the affect-cognition distinction has been relied on to identify and categorize attitude objects. However, this distinction has also been useful for categorizing individuals (Crites et al., 1994; Huskinson & Haddock, 2004). That is, some individuals tend to be more cognitive in their attitudes across a variety of objects whereas others tend to be more affective in their attitudes across the same objects. Importantly, such individual differences predicted their receptivity to persuasion four months later (Huskinson & Haddock, 2004). That is, cognitive individuals were more persuaded by an appeal that targeted their beliefs about a new beverage than an appeal that targeted their emotions. At the same time, affective individuals were more persuaded by information that targeted their emotions than by information that targeted their beliefs. In other words, there was a matching effect on persuasion such that the appeal that is tailored to individual differences in affective-cognitive processing was more effective. These matching effects have also been replicated for the topic of blood donation,

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where messages were tailored to affective-cognitive individual differences (See et al., 2008). These matching effects are consistent with prior matching effects where affective-cognitive processing was situationally induced rather than examined as an individual difference (e.g., Fabrigar & Petty, 1999).

In the research described above (Huskinson & Haddock, 2004; See et al., 2008), whether an individual is considered as (relatively) affective or cognitive depends on the extent to which affect or cognition is more closely linked to their overall attitudes. That is, for each individual, the relationship (or discrepancy) between their emotions and attitudes is compared against that between their beliefs and attitudes such that stronger links between emotions and attitudes, relative to links between beliefs and attitudes, would suggest the individual has more affective attitudes. Notably, while participants are aware of reporting their emotions (e.g., sad-happy), beliefs (e.g., useless-useful), and attitudes (e.g., unfavorable-favorable) for various objects, they are not aware of what the final index, which assesses the links between these, is. Recent work suggests that such an index captures individuals' *ability* for affective-cognitive processing, and is distinguishable from individuals' *motivation* for affective-cognitive processing. For instance, the index of affective-cognitive structural bases, where higher scores meant more affective structural bases, predicted faster processing speed. That is, high affective processing ability individuals spent less time on reading emotions-focused information than high cognitive processing ability individuals (and vice-versa; See et al., 2013). Importantly, this pattern occurred in a condition where processing ability would be especially impactful, that is, when individuals were prevented from allocating their mental resources strategically. This was because individual pieces of affective and cognitive information appeared in a random fashion so participants had no way of knowing whether incoming information was affective or cognitive. Thus, the amount of time

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individuals spent on reading each piece of affective or cognitive information was more likely due to their efficiency at processing each type of information rather than any strategy or intention. Besides reading speed, another relevant outcome is the reliance on the affective-cognitive qualities of an attitude object in decision-making. That is, individual differences in cognitive-affective structural bases predicted the reliance on others' ratings of the affective and cognitive qualities of attitude objects such as movies and educational video clips, such that more affective structural bases predicted greater affective reliance (See et al., 2008). Again, this pattern occurred when participants were more likely to be influenced by their available processing capabilities than any strategy for processing, that is, when they were relatively spontaneous in forming their own preferences. To summarize, because affective-cognitive structural bases capture individual differences in ability for affective-cognitive processing, they are predictive of consequences such as persuasion, reading speed, and decision-making, in conditions where processing ability are likely to influence outcomes.

On the other hand, individuals' *motivation* for affective-cognitive processing can be assessed by an affective-cognitive meta-bases index. For each individual, two sets of responses are obtained. One set consists of subjective perceptions of the degree to which attitudes are driven by emotions, repeated across a variety of attitude objects: "To what extent do you think your attitudes toward _____ are driven by your emotions?" Another set consists of subjective perceptions of the degree to which attitudes are driven by beliefs, repeated across the same attitude objects: "To what extent are your attitudes toward _____ are driven by your beliefs?" Responses to the questions about beliefs are then subtracted from responses to the questions about emotions such that higher scores mean more affective meta-bases. In support of the assumption that the affective-cognitive meta-bases index captures individual differences in the

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motivation for processing emotions or beliefs, the index has been found to positively predict reading time, such that affective meta-bases individuals spend more time on reading information that elicit emotions than cognitive meta-bases individuals, whereas cognitive meta-bases individuals spent more time on reading on reading information that generates beliefs. Of importance, this pattern is especially likely to occur when individuals are encouraged to be strategic or act according to their intention, such as when the incoming information is preceded by an affective frame or a cognitive frame (See et al., 2013). Other outcomes that have been influenced by affective-cognitive meta-bases include judgments regarding the degree to which a particular type of information is meaningful and worth remembering (Keer, van den Putte, Neijens, & de Wit, 2013), and differences in receptivity to emotions-focused versus beliefs-focused appeals (See et al., 2008). Affective-cognitive meta-bases have also been found to predict reliance on others' perceptions of an object's emotionally provoking versus thought stimulating qualities to form new preferences but only when individuals had been asked to be deliberative, which meant they were likely to be intentional or strategic in their information processing (See et al., 2008). Consistent with the notion that affective-cognitive meta-bases capture processing motivation or goals, in further research, the more an individual was understood in their affective-cognitive meta-bases by their romantic partner, the greater their relationship satisfaction (Tan, See, & Agnew, 2015). Taken together, because affective-cognitive meta-bases capture individual differences in the motivation for affective-cognitive processing, they are predictive of consequences such as persuasion, reading speed, and decision-making, in conditions where individuals can act on their intentions or strategies. Furthermore, being understood in one's affective-cognitive processing motivation is beneficial for relationship satisfaction.

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Other Affective-Cognitive Individual Differences

Beyond individual differences in affective-cognitive processing ability (captured by structural bases) and processing motivation (captured by meta-bases), other individual differences also play a role in the processing of emotions and beliefs. Perhaps the most established individual difference is Need for Cognition (NC), which refers to the tendency to engage in and enjoy mentally effortful tasks across a variety of domains (Cacioppo & Petty, 1982). Examples of items in the NC scale are “I prefer my life to be filled with puzzles that I must solve,” and “Thinking is not my idea of fun (reverse-coded). As expected, NC correlates positively with other scales that measure the tendency to make complex attributions, and the tendency to seek out relevant information for decision-making and problem-solving. NC has also been found to predict a variety of behaviors such as the tendency to be persuaded by the merits of arguments versus by a peripheral cue such as attractiveness of a source (Haugtvedt, Petty, & Cacioppo, 1992) or audience response (Axsom, Yates, & Chaiken, 1987), and the tendency to process information that is expected to be complex versus simple (See, Petty, & Evans, 2009; see Cacioppo, Petty, Feinstein, & Jarvis, 1996, and Petty, Brinol, Loersch, & McCaslin, 2009).

Another frequently examined individual difference is Need for Affect (NA), which refers to the tendency to approach and avoid emotion-arousing events (Maio & Esses, 2001). Examples of items in the NA scale are “Emotions help people to get along in life,” and “I do not know how to handle my emotions, so I avoid them (reverse-coded)”. As expected, NA correlates positively with other scales that measure the tendency to experience intense emotions (Larsen & Diener, 1987), thus suggesting that individuals are usually able to act on their motivation to approach emotion-arousing events, and the tendency to seek sensations. In addition, NA predicts behavior such as the willingness to view emotional films (Maio & Esses, 2001).

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Interestingly, both NA and NC have also been shown to matter in the processing of affective and cognitive information. For instance, individual differences in NC predicted receptivity to different appeals such that high NC individuals were more positive after an appeal that targeted beliefs about a new beverage rather than an appeal that involved tasting a new beverage (Haddock, Maio, Arnold, & Huskinson, 2008). In contrast, high NA individuals were more positive after the affective appeal than the cognitive appeal. Furthermore, higher NC meant better recognition memory for the cognitive appeal whereas higher NA meant better memory for the affective appeal.

NC and NA also matter for processing information about individuals (Aquino, Haddock, Maio, Wolf, & Alparone, 2016). That is, higher NA predicted greater liking for warm targets and less liking for cold targets, whereas higher NC predicted greater liking for competent targets and less liking for incompetent targets. In other words, NA predicted the relationship between the warmth dimension of a target and overall evaluations toward the target whereas NC predicted the competence dimension of a target and overall evaluations toward the target. In addition, these patterns were replicated when stereotypical groups (e.g., older adults, Asians) instead of individuals were evaluated (Wolf, von Hecker, & Maio, 2017).

Given the above findings, one might wonder how similar or different NC and NA are from affective-cognitive structural bases and meta-bases. For instance, since both high NC individuals and individuals with cognitive meta-bases are more receptive to appeals that target beliefs, is a high NC individual necessarily an individual with cognitive meta-bases or vice-versa? As mentioned earlier, cognitive meta-bases differ from cognitive structural bases in that they reflect processing motivation instead of processing ability for beliefs. However, cognitive meta-bases seem similar to NC in that both constructs focus on motivation for processing.

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Despite this overall similarity, it is important to note that the nature of the motivation differs for NC and cognitive meta-bases. That is, even if an individual who is interested in mental challenges (high NC) might be especially motivated to generate new beliefs, reinforce existing ones, or pay attention to others' beliefs, that should be the case to the extent that such mental activities for their beliefs would involve a high amount of mental effort and complexity. That is, if much mental effort is expected to be involved for processing emotions, such as those elicited by a persuasive appeal, then high NC individuals should be especially motivated to process emotions instead. Indeed, in prior research, high NC individuals were found to be as much influenced, or sometimes, more influenced, by emotions, compared to low NC individuals (Desteno, Petty, Rucker, Wegener, & Braverman, 2004; Petty, Schumann, Richman, & Strathman, 1993; Wegener, Petty, & Klein, 1994). For example, high NC individuals but not low NC individuals were more persuaded when the emotional state that they were in before an appeal (e.g., sadness about a natural disaster) matched the emotional content of the appeal (using tax increase to minimize the sad plight of infants and elderly), because high NC individuals were more likely to use emotions as informational sources in their environment to form expectations about the likelihood of events in the appeal, and to pay attention to the emotional consequences described in the appeal (Desteno et al., 2004). Therefore, one implication is that high NC individuals were more likely to process the competence-related information about a target person (Aquino et al., 2016), perhaps because such information was viewed as relatively complex whereas warmth-related information, relatively simple. Another implication is that because both competence-related and warmth-related information are typically related to beliefs about a target person (e.g., perceptions that a target person is warm are inevitably related to the belief that the person is incompetent; see Fiske, Cuddy, & Glick, 2007), impressions that involve greater

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independence between warmth and competence judgments (e.g., a target person who is high in both warmth and competence) should then be predicted by affective-cognitive meta-bases. Importantly, taken together, the extant literature suggests that while high NC individuals might sometimes be more likely to process cognitive information, but other times be more likely to process affective information, compared to low NC individuals, when each pattern occurs might depend on the extent to which cognitive or affective information is viewed as a mental challenge. At the same time, an individual with cognitive meta-bases should be more likely to process cognitive information more than others with affective meta-bases, especially when the cognitive information is not invariably intertwined with emotional information.

Consider also NA and affective meta-bases. Is a high NA individual necessarily an individual with affective meta-bases, or vice-versa? After all, both high NA individuals and individuals with affective meta-bases have been shown to be more susceptible to appeals that target emotions. Despite this overall similarity, it is important to note that the end goal might be different for both constructs. That is, a high NA individual is more likely to seek out and experience affect-arousing stimuli than a low NA individual but for the sake of experiencing emotions in general, and not for the purpose of forming preferences (even if the emotions end up influencing preferences). However, an individual with affective meta-bases is more likely to rely on emotions in their preferences than an individual with cognitive meta-bases, and should be motivated to process all kinds of emotions, regardless of their intensity, in order to form preferences. Relatedly, a high NA individual might stop processing affective information once they have experienced as much intensity as they desire, but an affective meta-bases individual might continue to do so even after the peak of their emotions and only stop when they believe they have processed emotions enough to form a preference. Furthermore, although an interest in

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experiencing arousing affect might encourage an individual to be motivated to rely on emotions in their evaluations, there are likely other antecedents for affective meta-bases. For instance, individuals with affective meta-bases might have developed their interest to rely on emotions in their evaluations because of time perspective (e.g., limited time motivates people to place more importance on emotionally meaningful goals; Fung & Carstensen, 2003; see Carstensen, Isaacowitz, & Charles, 1999). As another example, individuals with affective meta-bases might be more motivated to rely on emotions because emotions can help them resolve self-control dilemmas (Giner-Sorolla, 2001) or attitudinal ambivalence (Rocklage & Fazio, 2015).

Conclusion

Individual differences in affective-cognitive processing can differ along a number of dimensions, including the motivation to process emotions versus beliefs (i.e., affective-cognitive meta-bases) and the ability to process emotions versus beliefs (i.e., affective-cognitive structural bases). Other related individual differences include the motivation to engage in mental challenges (NC), and the motivation to seek out and experience arousing emotions (NA). These individual differences influence a wide variety of outcomes that include people's attention to, memory for, and receptivity for persuasion.

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