CHAPTER 21

The Need for Cognition

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As conceptualized by Cacioppo and Petty (1982), the need for cognition (NC) refers to the tendency for people to vary in the extent to which they engage in and enjoy effortful cognitive activities. Some individuals have relatively little motivation for cognitively effortful tasks, whereas other individuals consistently engage in and enjoy cognitively challenging activities. Of course, people can fall at any point in the distribution. For people high in NC, thinking satisfies a desire and is enjoyable. For people low in NC, thinking can be a chore that is engaged in mostly when some incentive or reason is present.

Background and Measurement

Since its introduction, NC has been examined in a large number of studies. In a comprehensive review over a decade ago (Cacioppo, Petty, Feinstein, & Jarvis, 1996), well over 100 studies examining NC were described. Since then, over 100 additional publications have appeared. To date, over 1,000 publications have either cited the original article on NC (Cacioppo & Petty, 1982) or the short version of the scale (Cacioppo, Petty, & Kao, 1984). Given the small amount of space allocated here, we can only begin to outline some of the major themes in NC work, and we are not able to cover all of the interesting studies that have been conducted. Nevertheless, we aim to illustrate the major conceptual findings. Most important, the available evidence indicates that as NC increases, people are more likely to think about a wide variety of things, including their own thoughts. This enhanced thinking often produces more consequential (e.g., enduring) judgments and can sometimes provide protection from common judgmental biases. At other times, however, enhanced thinking can exacerbate a bias or even reverse it. We begin our review with a brief history of the NC concept and its measurement. Then we turn to the role of NC in current dual-process and system theories of judgment. We conclude with a summary of some of the key research areas in which the NC construct has proven useful.

The NC construct was originally conceptualized by Cohen and colleagues (Cohen, Stotland, & Wolfe, 1955) as reflecting a need to make sense of the world. Therefore, greater NC was associated with preference for structure and clarity in one's surroundings, making it appear closer to contemporary scales that measure need for structure (see Webster & Kruglanski, 1994) than to the current definition. Because Cohen's original NC measurement device was no longer available, Cacioppo and Petty (1982) devel-

oped a new scale to reflect their new conceptualization but retained the term *need for cognition* in acknowledgement of the pioneering efforts of Cohen and colleagues (1955).

Cacioppo and Petty (1982) proposed that NC is a stable individual difference in the tendency to engage in and enjoy cognitively effortful activities across a wide range of domains. NC was conceptualized as reflecting a stable intrinsic motivation that developed over time rather than a need in the traditional sense (i.e., a source of energy that motivates behavior). In this conceptualization, the emphasis is on cognitive processing rather than particular cognitive outcomes. The idea that NC taps into differences in motivation rather than ability is supported by research showing that NC is only moderately related to measures of cognitive ability (e.g., verbal intelligence) and continues to predict relevant outcomes after cognitive ability is controlled (see Cacioppo et al., 1996).

Although the NC scale was originally developed as a 34-item inventory (Cacioppo & Petty, 1982), the most commonly used version contains 18 statements that people rate on 5-point scales to reflect how characteristic the statement is of themselves (Cacioppo et al., 1984). Some examples of scale items are "I prefer complex to simple tasks" and "Thinking is not my idea of fun" (reverse scored). The scale has high internal consistency (reflecting one factor) and test–retest reliability. The scale also demonstrates good convergent and discriminant validity. For instance, the scale correlates highly with a recent scale designed to assess elaborated forms of thinking and judgment (Eigenberger, Critchely, & Sealander, 2006) but is uncorrelated with social desirability (Fletcher, Danilovics, Fernandez, Peterson, & Reeder, 1986; see Cacioppo et al., 1996; Petty & Jarvis, 1996). Sometimes fewer than 18 items have been used to assess NC with success (e.g., Verplanken, 1991), and a two-item version of the scale was developed for and used in the 2000 National Election Study (Bizer et al., 2002).

NC and Theories of Judgment

Cacioppo and Petty (1982) developed the NC construct at a time when dual-process theories of judgment were beginning to become popular in social psychology. In particular, the elaboration likelihood model (Petty & Cacioppo, 1981, 1986), the heuristic systematic model (Chaiken, 1987), and still other dual-process theories (see Chaiken & Trope, 1999) proposed that some judgments were thoughtfully based on a careful consideration of the information presented, whereas other judgments were based on a more cursory analysis. Within the context of the dual-process theories, NC was used as a way to determine the mechanism by which individuals' judgments would be formed or changed. Considerable research has suggested that individuals low in NC are, absent some incentive to the contrary, more likely to rely on simple cues in a persuasion situation (Haugtvedt, Petty, & Cacioppo, 1992) and on stereotypes alone in judging other people (Carter, Hall, Carney, & Rosip, 2006) than are those high in NC. Those high in NC are more likely to consider all of the pertinent information. Thus, as explained further later, if cues and stereotypes have any impact on individuals high in NC, it is more likely to be an indirect effect and to occur by a mechanism that requires some cognitive effort (e.g., Wegener, Clark, & Petty, 2006).

Although the 1980s and 1990s were dominated by *dual-process* models of judgment, the most recent decade has brought forth various *dual-system* theories. One system has been referred to as emotional, impulsive, intuitive, implicit, or slow learning and is contrasted with the other system, which is labeled as cognitive, reflective, rational, explicit, or fast learning (Petty & Briñol, 2006). The dual-system theories share with the dual-process models the idea that judgments are sometimes deliberative and sometimes are not but also propose that high- and low-thought judgments depend on different mental systems that act independently and rely on distinct brain structures (e.g., Lieberman, 2000). As was the case with some dual-process models, some dual-system approaches have explicitly incorporated the NC construct. In particular, in his cognitive–experiential self-theory, Epstein (2003) uses a slightly modified NC scale to tap into the rational system, whereas the *Faith in Intuition* Scale (e.g., "I am a very intuitive person") is used to tap the experiential system (Epstein, Pacini, Denes-Raj, & Heier, 1996).

The rational system is assumed to be logical, verbal, and relatively affect free, whereas the experiential system is assumed to be intuitive, based on images, and highly dependent on affect. Because the NC scale is used to tap the rational system, one might expect that those high in NC would *not* rely on intuition, images, or affect. However, empirically, the NC and Faith in Intuition scales are uncorrelated, suggesting that individuals both high and low in NC make use of their intuitions, images, and emotions in forming their judgments. Indeed, the evidence suggests that individuals high and low in NC use their intuitions, images, and emotions in different ways.

Specifically, research indicates that affect, intuitions, and images, like any other mental content, can affect judgments in a variety of relatively thoughtful or nonthoughtful ways. When a person is not thinking much, the input (whether emotion, intuition, or image) is used in a rather direct way, having implications for judgment consistent with its valence (e.g., positive images lead to positive judgments). However, when thinking is higher, the impact on judgment is indirect because the input serves in some other capacity (e.g., biasing the thoughts that are generated). Thus it may be confusing to think of NC as assessing "rationality" (Epstein & Pacini, 1999) because one might expect purely rational outcomes from a rational system. However, individuals high in NC can be highly influenced by their intuitions, emotions, and images, but in thoughtful ways. This point is not always appreciated, as it is sometimes assumed that only people low in NC are influenced by these factors. For example, McMath and Prentice-Dunn (2005) suggested that individuals low in NC invariably respond more to images than to text. Rather, images can have an impact under both high and low thinking conditions, but by different mechanisms (e.g., see Miniard, Bhatla, Lord, Dickson, & Unnava, 1991). Thus it is preferable to refer to NC as tapping into the tendency to engage in extensive thinking. To the extent that this thinking is influenced (biased) by irrational intuitions, emotions, or images, the outcome of the thinking need not be rational.

In one study investigating the impact of intuitions on those who vary in NC, Jordan, Whitfield, and Zeigler-Hill (2007) examined the relationship between individuals' deliberative (explicit) versus intuitive (implicit) self-esteem. The key result was that individuals who were high in their faith in intuition showed a larger correlation between their implicit and explicit self-esteem scores than those low in this trait. However, faith in intuition moderated the correlation mostly for people high rather than low in NC.[1] This finding is consistent with other work on metacognition showing that confidence in mental content is more important for individuals high rather than low in NC. That is, just as individuals high in NC rely on their subjective experiences only to the extent that they have confidence in them, so too do they rely on any salient mental contents primarily when perceived validity is high (see Petty, Briñol, Tormala, & Wegener, 2007).

Over the past 25 years, NC has been examined in a wide variety of areas. For example, in the domain of survey research, it has been shown that individuals high in NC provide more thoughtful survey responses and are less likely to satisfice in their answers (Krosnick, 1991). People high in NC not only engage in more thinking, but they are also more aware of their thinking. Thus research shows that people high in NC are more likely to experience lucid dreaming (Blagrove & Hartnell, 2000; Patrick & Durndell, 2004), which is the awareness that one is dreaming. Although there are numerous studies relating NC to many phenomena, we have selected four broad domains to illustrate the utility of the NC construct: attitudes and persuasion, social cognition and decision making, interpersonal relations, and various more applied domains.

Attitudes and Persuasion

Reliance on Effortful Evaluation versus Low-Effort Processes

The psychology of persuasion focuses on which variables produce changes in individuals' beliefs and attitudes and the mechanisms by which they do so. Consistent with the idea that NC is associated with effortful thinking, people high in NC tend to form attitudes on the basis of an effortful analysis of the quality of the relevant information in a persuasive message (e.g., discriminating between strong and weak arguments—

Cacioppo, Petty, & Morris, 1983; discriminating between diagnostic and nondiagnostic information—Chang, 2007). In contrast, absent any incentive to the contrary, individuals low in NC tend to treat variables as simple cues. These include factors such as the attractiveness (e.g., Haugtvedt, Petty, & Cacioppo, 1992) or credibility (Priester & Petty, 1995) of the message source (see also Briñol, Petty, & Tormala, 2004; Kaufman, Stasson, & Hart, 1999), the appearance and frame (e.g., positive vs. negative, gains vs. losses) of the message (e.g., Chatterjee, Heath, Milberg, & France, 2000; Smith & Levin, 1996; Zhang & Buda, 1999), and their own emotional states (Briñol, Petty, & Barden, 2007; Petty, Schumann, Richman, & Strathman, 1993).

However, individuals low in NC can be motivated to scrutinize the available information carefully and eschew reliance on cues if situational circumstances are motivating—such as when the message is of high personal relevance (Axsom, Yates, & Chaiken, 1987), when there is some uncertainty regarding the communication (Priester & Petty, 1995; Priester, Dholakia, & Fleming, 2004; Smith & Petty, 1996; Ziegler, Diehl, & Ruther, 2002), when the medium through which they receive the information is entertaining or engaging (e.g., when it uses comic strips; Bakker, 1999; Stephan & Brockner, 2007), when the message matches some aspect of the recipient's self-concept (e.g., Brannon & McCabe, 2002; Evans & Petty, 2003), and when the message includes emotional contents (Vidrine, Simmons, & Brandon, 2007; see also Haddock, Maio, Arnold, & Huskinson, 2008). When strong arguments are presented, increasing thinking enhances persuasion, but when weak arguments are presented, increasing thinking diminishes persuasion. It is important to note that the normally extensive thinking of individuals high in NC can be undermined when a message is framed as being for people who do not like to think (Wheeler, Petty, & Bizer, 2005) or when the thinking is demanded rather than spontaneous (Lassiter, Apple, & Slaw, 1996; Leone & Ensley, 1986).

Because individuals high (vs. low) in NC typically engage in more thinking, they also tend to have stronger attitudes (e.g., more accessible in memory, resistant to change, and having more impact on subsequent behavior (e.g., Haugtvedt & Petty, 1992; Ruiter, Verplanken, De Cremer, & Kok, 2004; see Petty, Haugtvedt, & Smith. 1995). If individuals high in NC are told that they based their attitudes on simple cues rather than on a careful assessment of the message arguments, they feel ambivalent about their attitudes, which can undermine attitude strength (Tormala & DeSensi, 2008). Also, because individuals high (vs. low) in NC engage in more thinking, they tend to form stronger automatic associations among attitude objects (Briñol, Petty, & McCasslin, 2009), and to generalize their changes to other related beliefs (e.g., Murphy, Holleran, Long, & Zeruth, 2005).

Metacognition

Individuals high in NC not only tend to generate more thoughts than those low in NC, but they are also more likely to think about their thoughts (i.e., engage in metacognition; Petty et al., 2007). For example, following thought generation, individuals high in NC are more likely to evaluate their thoughts for validity, a process called *self-validation* (Petty, Briñol, & Tormala, 2002). The more valid thoughts are seen to be, the more likely they are to be used in forming judgments. Many variables have been shown to affect thought confidence and subsequent thought reliance for individuals high but not low in NC, including whether people were nodding rather than shaking their heads during thought generation (Briñol & Petty, 2003) or experiencing ease rather than difficulty in thought generation (Tormala, Falces, Briñol, & Petty, 2007; Tormala, Petty, & Briñol, 2002). Thought confidence has also been increased for individuals high (vs. low) in NC if following thought generation they learned that the message source was of high versus low credibility (Briñol, Petty, & Tormala, 2004), were made to feel powerful rather than powerless (Briñol, Petty, Valle, Rucker, & Becerra, 2007), or were led to believe that their thoughts were shared by similar others (Petty et al., 2002). Enhanced thought confidence can increase persuasion when thoughts are favorable toward the proposal but decrease it when thoughts are mostly unfavorable.

Not only do individuals high in NC think about the thoughts that they have generated

to a message, but they also think about the process by which they either changed their attitudes or resisted change. First, people high in NC are typically aware of the greater thought they put into their judgments and as a result tend to have more confidence in their opinions than individuals low in NC (Barden & Petty, 2008). Furthermore, when people high in NC change their attitudes, they become more confident of their new opinions if they believe that they have considered both sides of the issue rather than just one side (Rucker & Petty, 2004; Rucker, Petty, & Briñol, 2008). On the other hand, if people have resisted persuasion, they can become more confident in their original attitude if they are impressed with their resistance (Petty, Tormala, & Rucker, 2004), such as when they think they have resisted strong arguments rather than weak ones (Tormala & Petty, 2004).

Finally, as a result of their enhanced thinking and concern about validity, individuals high (vs. low) in NC are more likely to correct their judgments for any perceived judgmental biases that might be operating (e.g., DeSteno, Petty, Rucker, Wegener, & Braverman, 2004; for a review, see Wegener & Petty, 1997). For example, DeSteno, Petty, Wegener, and Rucker (2000) found that when an irrelevant source of emotion was made salient, people high in NC adjusted their judgments in a direction opposite to the perceived biasing impact of the emotion (see also Briñol, Rucker, Tormala & Petty, 2004).

Multiple Roles for Variables Depending on NC

We have noted that the same variables can have an impact on the judgments of individuals high and low in NC, but the mechanism of impact is often different. For example, variables that operate as simple cues for individuals low in NC can influence attitudes for those with high NC, but by different mechanisms, such as biasing thoughts or validating thoughts. To illustrate, in one study (Petty et al., 1993), participants viewed a commercial for a pen embedded in a television program that invoked either a happy or a neutral affective state. Participants both high and low in NC developed more favorable attitudes toward the pen when they were happy. However, emotion worked differently for those high and low in NC. For individuals high in NC, emotion biased the thoughts that were generated (i.e., a happy state led to more favorable thoughts being produced that mediated attitude change). For individuals low in NC, a happy state produced more favorable attitudes without affecting thoughts (i.e., happiness served as a simple cue). In a similar vein, Priluck and Till (2004) found that a deliberative aspect of conditioning—contingency awareness—mediated the classical conditioning effect for individuals high (but not low) in NC.

Other Attitudinal Effects

In other research, NC has been related to a number of well-established attitudinal phenomena, such as the *mere thought effect* (Smith, Haugtvedt, & Petty, 1994) and *primacy* and *recency* effects (e.g., Petty, Tormala, Hawkins, & Wegener, 2001; see Briñol & Petty, 2005, for a review). Recent research has shown that individuals high (vs. low) in NC are more susceptible to the *sleeper effect*. In this paradigm, individuals both high and low in NC initially discount a strong persuasive message due to its association with a negative cue (e.g., low credibility source), but persons high in NC become more influenced over time. The reason is thought to be that individuals high but not low in NC had engaged in more processing of the strong message arguments, so the attitudes from this emerged once the negative cue was forgotten (Priester, Wegener, Petty, & Fabrigar, 1999).

Social Cognition and Decision Making

At the most basic level, NC affects the amount of thought that goes into a decision. Thus those high in NC tend to think more about available options prior to making a decision (Levin, Huneke, & Jasper, 2000) and are more likely to search for additional information before coming to a judgmental conclusion (Yang & Lee, 1998). Perhaps surprisingly, both high and low levels of NC have been related to various biases in judg-

ment. Across a variety of studies, those low in NC tend to show greater amounts of bias when this bias is created by a reliance on mental shortcuts. Alternatively, when the bias is created through effortful thought, individuals high in NC tend to be more strongly affected. When a bias can come about through either route, individuals both low and high in NC can show the effect, but it will be produced by different mechanisms. We highlight various research findings that illustrate NC's role in producing judgmental bias.

False Memories

One domain in which high thought leads to more bias is in the creation of false memories. In a common paradigm, participants are first asked to memorize lists of related words (e.g., *table, sit, legs*). After this task, recognition memory is tested by having participants go through a larger list that contains both studied and nonstudied items. The critical items in this task are nonstudied words that are semantically related to those contained in the studied list (e.g., *chair*). Individuals high in NC are more likely to show false memory for these lures (Graham, 2007). Because individuals high in NC elaborate each list item and have stronger interconnections in memory, they are more likely to think about and access the semantically related (but nonpresented) items and therefore show greater false memory for them.

Halo Effects

One bias presumed to be on the opposite end of the thinking continuum from false memories is the halo effect, a phenomenon in which people rate attractive or likeable others as superior on a variety of other trait dimensions (e.g., intelligence; Feingold, 1992). Perlini and Hansen (2001) argued that because this effect can occur when people rely on their stereotypes of attractive others alone to judge a novel target (rather than individuating this person), those low in NC would be more susceptible to this bias. However, individuals high in NC also showed a smaller halo effect. Although not explicitly studied, it is possible that instead of their relying on target attractiveness as a simple cue, the thoughts of participants high in NC were biased in a favorable direction by the target's attractiveness (as was the case for happiness see Petty et al., 1993).

Anchoring

One well-studied judgmental bias is the anchoring effect—the tendency for an activated irrelevant number to influence numeric estimates (Tversky & Kahneman, 1974). In one study, Epley and Gilovich (2006) asked students questions that elicited self-generated anchors, such as "When was George Washington elected president?" (eliciting an anchor of 1776). The responses to these questions provided by individuals low in NC were more influenced by the starting anchors. Because individuals high in NC engage in greater levels of thought, they tend to entertain a greater range of possible values and subsequently provided estimates further from the initial anchor value. Importantly, although this specific process renders individuals low in NC more susceptible to a starting anchor, other anchoring mechanisms tend to emerge more strongly when one thinks extensively about the judgment and when one's thoughts are biased by the anchor (e.g., see Mussweiler & Strack, 2001, on selective accessibility). When this is the case, those high in NC can show equal or greater judgmental bias from the anchor (Blankenship, Wegener, Petty, Detweiler-Bedell, & Macy, 2008).

Priming

Another area in which bias can be exacerbated by extensive thinking is priming. In a series of studies (Petty, DeMarree, Briñol, Horcajo, & Strathman, 2008), NC affected the degree to which participants subtly primed with openness (or resistance) judged an ambiguous individual in a prime-consistent manner. Because primes often affect judgments by biasing one's interpretation of a target (Higgins, Rholes, & Jones, 1977), those who think more about the target have more opportunities for the prime to have an effect. Furthermore, because those high in NC are also more likely to think about the validity of their thoughts, these individuals are less likely to show priming effects when

a construct is primed in a blatant manner because they are more likely to correct for any perceived biasing impact of the prime. If individuals high in NC overcorrect for a perceived assimilative bias, they can show a reverse effect of the prime (i.e., contrast; see also Martin, Seta, & Crelia, 1990).

Stereotyping

As a final example of how the same variable can create bias in those high or low in NC via different mechanisms, consider a study on stereotyping (Crawford & Skowronski, 1998) in which participants were presented with a hypothetical criminal assault case in which the defendant was described as either Hispanic or Caucasian. In addition to the crime details, participants also read about three kinds of behaviors that this individual had performed prior to the crime—behaviors consistent with the criminal stereotype (negative and incriminating), inconsistent (positive and exculpating), and neutral.

Although individuals both low and high in NC were biased by the defendant's ethnicity, the nature of this bias was quite different. Those low in NC simply relied on the Hispanic stereotype to form their guilt judgments. In contrast, those high in NC elaborated carefully on the crime details they received and were able to avoid an overall guilt bias. However, individuals high in NC showed a bias in memory for the behaviors performed by the defendant such that they recalled a greater percentage of the guilt-implying behaviors when the defendant was Hispanic. Although this was not examined, this memory bias could lead to a guilt bias on a delayed assessment (see also Wegener et al., 2006).

Interpersonal Relations

Although most work on NC has examined its operation with respect to intrapersonal cognition, some studies have shown that people who vary in NC also behave differently in interpersonal contexts. For example, research suggests that those high in NC typically take a more involved role in dyads and other small-group settings, such as entering into discussions earlier (Henningsen & Henningsen, 2004) and speaking longer than those low in NC (Shestowsky & Horowitz, 2004).

In some cases, interacting with an individual high in NC can be beneficial for all those involved. For instance, Schei, Rognes, and Mykland (2006) found that better joint outcomes were obtained for buyer–seller dyads in which the seller was high in NC, and Smith, Kerr, Markus, and Stasson (2001) showed that in collective settings, those high (versus low) in NC were less likely to engage in social loafing. In other cases, though, individuals high in NC can have a negative impact on interpersonal interactions. For example, Henningsen and Henningsen (2004) showed that in a group setting, those high in NC are more likely to promote the discussion of information that is already known by other group members, thereby limiting the productivity of group discussions. Shestowsky and Horowitz (2004) provided evidence that, despite the fact that individuals high in NC were seen as more active and persuasive, they were *less* responsive to differences in the quality of arguments presented by a confederate than those low in NC, perhaps because they were distracted by focusing on presenting their own ideas. In addition, Briñol and colleagues (2005) showed that although people high in NC were able to generate more convincing arguments in a group setting than those low in NC (see also Shestowsky, Wegener, & Fabrigar, 1998), they were also less efficient in reaching group consensus as the size of the group increased. Briñol and colleagues reasoned that group discussions can become deadlocked due to fierce counterarguing among individuals high in NC who hold different opinions. However, when individuals high in NC receive training in interpersonal skills, they can adapt their behavior in a way that enhances group performance (Briñol et al., 2007).

Applied Areas: Law and Health

NC has been of interest to researchers in a number of applied areas. Some, such as survey research, advertising, and the media, were mentioned in earlier sections of this chapter. Two other domains in which NC has had an impact are in law and health. These are noted next.

Research in psychology and law has shown that differences in the amount and depth of thinking between individuals high and low in NC can influence legal judgments. For example, one study (Sargent, 2004) showed that the greater attributional complexity of individuals high (vs. low) in NC led them to endorse less punitive judgments. Another study (Leippe, Eisenstadt, Rauch, & Seib, 2004) provided evidence for a curvilinear relationship between NC and jurors' likelihood of convicting a defendant in a particular case, such that those either very low or high in NC were least likely to convict. The authors speculated that individuals low in NC failed to appreciate the merits of the case and that individuals very high in NC saw even minor flaws as weaknesses. A third study suggested that individuals high in NC are more likely to correct for perceived biasing agents in a trial (Sommers & Kassin, 2001; see Wegener, Kerr, Fleming, & Petty, 2000, for a review).

Recent studies have also shown that NC can lead to a greater understanding of health-related phenomena. For instance, just as beliefs are better predictors of attitudes for individuals high rather than low in NC, Hittner (2004) found that participants' cognitive expectations about the positive and negative outcomes of drinking alcohol were more strongly associated with actual drinking behavior as NC increased. Similarly, Ruiter and colleagues (2004) showed that although participants both high and low in NC reported more fear arousal after reading a high- (vs. low-) threat message about breast cancer, the high-threat appeal favorably influenced relevant attitudes and behaviors only for those high in NC. In contrast, threat was associated with negative attitudes toward breast self-examination and was unrelated to behavior for those low in NC. Importantly, NC is also relevant to crafting persuasive health appeals. In one study (Williams-Piehota, Scheider, Pizarro, Mowad, & Salovey, 2003), women high in NC were significantly more likely to obtain a mammography within 6 months when given a complex versus a simple message, and in another study (Bakker, 1999) presenting information about AIDS in a simple cartoon format rather than a text format proved more effective for individuals low in NC, whereas the reverse was true for those high in NC.

Summary and Conclusions

Based on the reviewed findings, it is clear that need for cognition (NC), the tendency to engage in and enjoy thinking, is an individual difference that is relevant across many different areas of inquiry, ranging from attitudes and persuasion, judgment and decision making, interpersonal and group interactions, and important applied settings. A number of general conclusions emerge from this chapter. First, and most important, individuals high in NC tend to think more than those low in NC about all kinds of information, including their own thoughts (metacognition). Second, however, it is noteworthy that individuals low in NC are capable of and can be motivated to exert extensive thinking, and individuals high in NC can decide not to think under certain circumstances, such as when the message does not seem challenging. Third, these differences in the extent of thinking between individuals high and low in NC can result in different outcomes in response to the same treatment. For example, if people experience happiness (versus sadness) after receiving a weak persuasive message, the happiness would induce more persuasion for individuals low in NC by serving as a simple positive cue, but would lead to less persuasion for individuals high in NC by instilling more confidence in their negative thoughts. Fourth, even when individuals high and low in NC show the same outcome, the underlying processes (e.g., cue effect vs. biased processing) and further consequences can differ (e.g., weaker attitudes for individuals low than high in NC). Fifth, although the mechanisms usually differ, individuals high and low in NC can both be susceptible to various biases, regardless of the nature and the source of the biasing factor (e.g., an anchor, a stereotype, or an emotional state). Sixth, individual differences in NC are relevant to understanding not only how people process information (e.g., as targets of influence) but also how they behave (e.g., as persuasive agents). Seventh, different levels of NC can be associated with both positive or negative, accurate or inaccurate, and rational or irrational outcomes, depending on the circumstances involved. For example, high levels of NC can be beneficial in some domains (e.g., buyer–seller dyads) but can also yield

negative outcomes in other situations (e.g., reaching consensus in large-group discussions). Finally, we have seen how NC relates not only to some classic topics in psychology (e.g., the sleeper effect, halo effects, priming, group influence) but also to more recent phenomena (e.g., dual-system models, metacognition). Although our review of the literature has been illustrative rather than exhaustive, it provides a reasonably coherent picture of the proclivities of those who vary in NC and the utility of this construct in a wide variety of basic and applied domains.

Note

1. The moderational impact of NC was not shown in a second study that used a substantially smaller sample and a truncated NC scale.

References

Ahlering, R. F., & Parker, L. D. (1989). Need for cognition as a moderator of the primacy effect. *Journal of Research in Personality, 23*, 313–317.

Axsom, D., Yates, S. M., & Chaiken, S. (1987). Audience response as a heuristic cue in persuasion. *Journal of Personality and Social Psychology, 53*, 30–40.

Bakker, A. B. (1999). Persuasive communication about AIDS prevention: Need for cognition determinates the impact of message format. *AIDS Education and Prevention, 11*, 150–162.

Barden, J., & Petty, R. E. (2008). The mere perception of elaboration creates attitude certainty: Exploring the thoughtfulness heuristic. *Journal of Personality and Social Psychology, 95*, 489–509.

Bizer, G. Y., Krosnick, J. A., Holbrook, A. L., Petty, R. E., Rucker, D. D., & Wheeler, S. C. (2002, September). *The impact of personality on political beliefs and behavior: Need for cognition and need to evaluate.* Paper presented at the meeting of the American Political Science Association, Boston.

Blagrove, M., & Hartnell, S. J. (2000). Lucid dreaming: Associations with internal locus of control, need for cognition and creativity. *Personality and Individual Differences, 28*, 41–47.

Blankenship, K. L., Wegener, D. T., Petty, R. E., Detweiler-Bedell, B., & Macy, C. L. (2008). Elaboration and consequences of anchored estimates: An attitudinal perspective on numerical anchoring. *Journal of Experimental Social Psychology, 44*, 1465–1476.

Brannon, L. A., & McCabe, A. E. (2002). Schema-derived persuasion and perception of AIDS risk. *Health Marketing Quarterly, 20*, 31–48.

Briñol, P., Becerra, A., Díaz, D., Horcajo, J., Valle, C., & Gallardo, I. (2005). El efecto de la necesidad de cognición sobre la influencia interpersonal [The impact of need for cognition on interpersonal influence]. *Psicothema, 17*, 666–671.

Briñol, P., Horcajo, J., Díaz, D., Valle, C., Becerra, A., & De Miguel, J. (2007). El efecto de la formación sobre la influencia interpersonal [The effect of training on interpersonal influence]. *Psicothema, 19*, 401–405.

Briñol, P., & Petty, R. E (2003). Overt head movements and persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 84*, 1123–1139.

Briñol, P., & Petty, R. E. (2005). Individual differences in persuasion. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes and attitude change* (pp. 575–616). Hillsdale, NJ: Erlbaum.

Briñol, P., Petty, R. E., & Barden, J. (2007). Happiness versus sadness as determinants of thought confidence in persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 93*, 711–727.

Briñol, P., Petty, R. E., & McCaslin, M. J. (2009). Changing attitudes on implicit versus explicit measures: What is the difference? In R. E. Petty, R. H. Fazio, & P. Briñol (Eds.), *Attitudes: Insights from the new implicit measures* (pp. 285–326). New York: Psychology Press.

Briñol, P., Petty, R. E., & Tormala, Z. L. (2004). The self-validation of cognitive responses to advertisements. *Journal of Consumer Research, 30*, 559–573.

Briñol, P., Petty, R. E., Valle, C., Rucker, D. D., & Becerra, A. (2007). The effects of message recipients' power before and after persuasion: A self-validation analysis. *Journal of Personality and Social Psychology, 93*, 1040–1053.

Briñol, P., Rucker, D., Tormala, Z. L., & Petty, R. E. (2004). Individual differences in resistance to persuasion: The role of beliefs and meta-beliefs. In E. S. Knowles & J. A. Linn (Eds.), *Resistance and persuasion* (pp. 83–104). Mahwah, NJ: Erlbaum.

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116–131.

Cacioppo, J. T., Petty, R. E., Feinstein, J. A., & Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition. *Psychological Bulletin, 119*, 197–253.

Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of "need for cognition." *Journal of Personality Assessment, 48*, 306–307.

Cacioppo, J. T., Petty, R. E., & Morris, K. (1983). Effects of need for cognition on message evaluation, argument recall, and persuasion. *Journal of Personality and Social Psychology, 45*, 805–818.

Carter, J. D., Hall, J. A., Carney, D. R., & Rosip, J. C. (2006). Individual differences in the acceptance of stereotyping. *Journal of Research in Personality, 40*, 1103–1118.

Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario symposium* (Vol. 5, pp. 3–39). Hillsdale, NJ: Erlbaum.

Chaiken, S., & Trope, Y. (Eds.). (1999). *Dual-process theories in social psychology.* New York: Guilford Press.

Chang, C. (2007). Diagnostic advertising content and individual differences. *Journal of Advertising, 36*, 75–84.

Chatterjee, S., Heath, T. B., Milberg, S. J., & France, K. R. (2000). The differential processing of price in gains and losses: The effects of frame and need for cognition. *Journal of Behavioral Decision Making, 13*, 61–75.

Cohen, A. R., Stotland, E., & Wolfe, D. M. (1955). An experimental investigation of need for cognition. *Journal of Abnormal and Social Psychology, 51*, 291–294.

Crawford, M. T., & Skowronski, J. (1998). When motivated thought leads to heightened bias: High need for cognition can enhance the impact of stereotypes on memory. *Personality and Social Psychology Bulletin, 24*, 1075–1088.

DeSteno, D., Petty, R. E., Rucker, D. D., Wegener, D. T., & Braverman, J. (2004). Discrete emotions and persuasion: The role of emotion-induced expectancies. *Journal of Personality and Social Psychology, 86*, 43–56.

DeSteno, D., Petty, R. E., Wegener, D. T., & Rucker, D. D. (2000). Beyond valence in the perception of likelihood: The role of emotion specificity. *Journal of Personality and Social Psychology, 78*(3), 397–416.

Eigenberger, M. E., Critchely, C., & Sealander, K. A. (2006). Individual differences in epistemic style: A dual-process perspective. *Journal of Research in Personality, 41*, 3–24.

Epley, N., & Gilovich, T. (2006). The anchoring-and-adjustment heuristic: Why the adjustments are insufficient. *Psychological Science, 17*(4), 311–318.

Epstein, S. (2003). Cognitive–experiential self-theory of personality. In T. Millon & M. J. Lerner (Eds.), *Handbook of psychology: Vol. 5. Personality and social psychology* (pp. 159–184). Hoboken, NJ: Wiley.

Epstein, S., & Pacini, R. (1999). Some basic issues regarding the dual-process theories from the perspective of cognitive–experiential self-theory. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 462–482). New York: Guilford Press.

Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive–experiential and analytical–rational thinking styles. *Journal of Personality and Social Psychology, 71*, 390–405.

Evans, L., & Petty, R. E. (2003). Self-guide framing and persuasion: Responsibly increasing message processing to ideal levels. *Personality and Social Psychology Bulletin, 29*, 313–324.

Feingold, A. (1992). Good-looking people are not what we think. *Psychological Bulletin, 111*(2), 304–341.

Fletcher, F. J. O., Danilovics, P., Fernandez, G., Peterson, D., & Reeder, G. D. (1986). Attributional complexity: An individual difference measure. *Journal of Personality and Social Psychology, 51*, 875–884.

Graham, L. M. (2007). Need for cognition and false memory in the Deese–Roediger–McDermott paradigm. *Personality and Individual Differences, 42*(3), 409–418.

Haddock, G., Maio, G., Arnold, K., & Huskinson, T. (2008). Should persuasion be affective or cognitive: The moderating effects of need for affect and need for cognition. *Personality and Social Psychology Bulletin, 34*, 769–778.

Haugtvedt, C. P., & Petty, R. E. (1992). Personality and persuasion: Need for cognition moderates the persistence and resistance of attitude changes. *Journal of Personality and Social Psychology, 63*, 308–319.

Haugtvedt, C. P., Petty, R. E., & Cacioppo, J. T. (1992). Need for cognition and advertising: Understanding the role of personality variables in consumer behavior. *Journal of Consumer Psychology, 1*, 239–260.

Henningsen, D. D., & Henningsen, M. L. M. (2004). The effect of individual difference variables on information sharing in decision-making groups. *Human Communication Research, 30*, 540–555.

Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology, 13*(2), 141–154.

Hittner, J. B. (2004). Alcohol use among American college students in relation to need for cognition and expectations of alcohol's effects on cognition. *Current Psychology: Developmental, Learning, Personality, Social, 23*, 173–187.

Jordan, C. H., Whitfield, M., & Zeigler-Hill, V. (2007). Intuition and the correspondence between implicit and explicit self-esteem. *Journal of Personality and Social Psychology, 93*, 1067–1079.

Kaufman, D. Q., Stasson, M. F., & Hart, J. W. (1999). Are the tabloids always wrong or is that just what we think? Need for cognition and perceptions of articles in print media. *Journal of Applied Social Psychology, 29*, 1984–1997.

Krosnick, J. A. (1991). Response strategies for coping with the cognitive demands of attitude measures in surveys. *Applied Cognitive Psychology, 5*, 213–236.

Lassiter, G. D., Apple, K. J., & Slaw, R. D. (1996). Need for cognition and thought-induced attitude polarization: Another look. *Journal of Social Behavior and Personality, 11*, 647–665.

Leippe, M. R., Eisenstadt, D., Rauch, S. M., & Seib, H. M. (2004). Timing of eyewitness expert testimony, jurors' need for cognition, and case strength as determinants of trial verdicts. *Journal of Applied Psychology, 89*, 524–541.

Leone, C., & Ensley, E. (1986). Self-generated attitude change: A person by situation analysis of attitude polarization and attenuation. *Journal of Research in Personality, 20*, 434–446.

Levin, I. P., Huneke, M. E., & Jasper, J. D. (2000). Information processing at successive stages of decision making: Need for cognition and inclusion–exclusion effects. *Organizational Behavior and Human Decision Processes, 82*, 171–193.

Lieberman, M. D. (2000). Intuition: A social cognitive neuroscience approach. *Psychological Bulletin, 126*, 109–137.

Martin, L. L., Seta, J. J., & Crelia, R. A. (1990). Assimilation and contrast as a function of people's willingness and ability to expend effort in forming an impression. *Journal of Personality and Social Psychology, 59*(1), 27–37.

McMath, B. F., & Prentice-Dunn, S. (2005). Protection motivation theory and skin cancer risk: The role of individual differences in responses to persuasive appeals. *Journal of Applied Social Psychology, 35*, 621–643.

Miniard, P., Bhatla, S., Lord, K. R., Dickson, P. R.,

& Unnava, H. R. (1991). Picture-based persuasion processes and the moderating role of involvement. *Journal of Consumer Research, 18*, 92–107.

Murphy, P. K., Holleran, T. A., Long, J. F., & Zeruth, J. A. (2005). Examining the complex roles of motivation and text medium in the persuasion process. *Contemporary Educational Psychology, 30*, 418–438.

Mussweiler, T., & Strack, F. (2001). The semantics of anchoring. *Organizational Behavior and Human Decision Processes, 86*(2), 234–255.

Patrick, A., & Durndell, A. (2004). Lucid dreaming and personality: A replication. *Dreaming, 14*, 234–239.

Perlini, A. H., & Hansen, S. D. (2001). Moderating effects of need for cognition on attractiveness stereotyping. *Social Behavior and Personality, 29*, 313–321.

Petty, R. E., & Briñol, P. (2006). Understanding social judgment: Multiple systems and processes. *Psychological Inquiry, 17*, 217–223.

Petty, R. E., Briñol, P., & Tormala, Z. L. (2002). Thought confidence as a determinant of persuasion: The self-validation hypothesis. *Journal of Personality and Social Psychology, 82*, 722–741.

Petty, R. E., Briñol, P., Tormala, Z. L., & Wegener, D. T. (2007). The role of metacognition in social judgment. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd ed., pp. 254–284). New York: Guilford Press.

Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches.* Dubuque, IA: Brown.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Petty, R. E., DeMarree, K. G., Briñol, P., Horcajo, J., & Strathman, A. J. (2008). Need for cognition can magnify or attenuate priming effects in social judgment. *Personality and Social Psychology Bulletin, 34*, 900–912.

Petty, R. E., Haugtvedt, C., & Smith, S. M. (1995). Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 93–130). Mahwah, NJ: Erlbaum.

Petty, R. E., & Jarvis, B. G. (1996). An individual differences perspective on assessing cognitive processes. In N. Schwarz & S. Sudman (Eds.), *Answering questions: Methodology for determining cognitive and communicative processes in survey research* (pp. 221–257). San Francisco: Jossey-Bass.

Petty, R. E., Schumann, D. W., Richman, S. A., & Strathman, A. J. (1993). Positive mood and persuasion: Different roles for affect under high- and low-elaboration conditions. *Journal of Personality and Social Psychology, 64*(1), 5–20.

Petty, R. E., Tormala, Z., Hawkins, C., & Wegener, D. T. (2001). Motivation to think and order effects in persuasion: The moderating role of chunking. *Personality and Social Psychology Bulletin, 27*, 332–344.

Petty, R. E., Tormala, Z. L., & Rucker, D. D. (2004). Resisting persuasion by counterarguing: An attitude strength perspective. In J. T. Jost, M. R. Banaji, & D. A. Prentice (Eds.), *Perspectivism in social psychology: The yin and yang of scientific progress* (pp. 37–51). Washington, DC: American Psychological Association.

Priester, J., Wegener, D., Petty, R. E., & Fabrigar, L. (1999). Examining the psychological processes underlying the sleeper effect: The elaboration likelihood model explanation. *Media Psychology, 1*, 27–48.

Priester, J. R., Dholakia, U. M., & Fleming, M. A. (2004). When and why the background contrast effect emerges: Thought engenders meaning by influencing the perception of applicability. *Journal of Consumer Research, 31*, 491–501.

Priester, J. R., & Petty, R. E. (1995). Source attributions and persuasion: Perceived honesty as a determinant of message scrutiny. *Personality and Social Psychology Bulletin, 21*, 637–654.

Priluck, R., & Till, B. D. (2004). The role of contingency awareness, involvement, and need for cognition in attitude formation. *Journal of the Academy of Marketing Science, 32*, 329–344.

Rucker, D. D., & Petty, R. E. (2004). When resistance is futile: Consequences of failed counterarguing for attitude certainty. *Journal of Personality and Social Psychology, 86*, 219–235.

Rucker, D. D., Petty, R. E., & Briñol, P. (2008). What's in a frame anyway? A meta-cognitive analysis of one- versus two-sided message framing. *Journal of Consumer Psychology, 18*, 137–149.

Ruiter, R. A. C., Verplanken, B., De Cremer, D., & Kok, G. (2004). Danger and fear control in response to fear appeals: The role of need for cognition. *Basic and Applied Social Psychology, 26*, 13–24.

Sargent, M. (2004). Less thought, more punishment: Need for cognition predicts support for punitive responses to crime. *Personality and Social Psychology Bulletin, 30*, 1485–1493.

Schei, V., Rognes, J. K., & Mykland, S. (2006). Thinking deeply may sometimes help: Cognitive motivation and role effects in negotiation. *Applied Psychology: An International Review, 55*, 73–90.

Shestowsky, D., & Horowitz, L. M. (2004). How the Need for Cognition Scale predicts behavior in mock jury deliberations. *Law and Human Behavior, 28*, 305–337.

Shestowsky, D., Wegener, D. T., & Fabrigar, L. R. (1998). Need for cognition and interpersonal influence: Individual differences in impact on dyadic decisions. *Journal of Personality and Social Psychology, 74*, 1317–1328.

Smith, B. N., Kerr, N. A., Markus, M. J., & Stasson, M. F. (2001). Individual differences in social loafing: Need for cognition as a motivator in collective performance. *Group Dynamics: Theory, Research, and Practice, 5*, 150–158.

Smith, S. M., Haugtvedt, C. P., & Petty, R. E. (1994). Need for cognition and the effects of repeated expression on attitude accessibility and extremity. *Advances in Consumer Research, 21*, 234–237.

Smith, S. M., & Levin, I. P. (1996). Need for cognition and choice framing effects. *Journal of Behavioral Decision Making, 9*, 283–290.

Smith, S. M., & Petty, R. E. (1996). Message framing and persuasion: A message processing analysis. *Personality and Social Psychology Bulletin, 22*, 257–268.

Sommers, S. R., & Kassin, S. M. (2001). On the many impacts of inadmissible testimony: Selective compliance, need for cognition, and the overcorrection bias. *Personality and Social Psychology Bulletin, 27*, 1368–1377.

Stephan, J., & Brockner, J. (2007). Spaced out in cyberspace? Evaluations of computer-based information. *Journal of Applied Social Psychology, 37*, 210–226.

Tormala, Z. L., & DeSensi, V. L. (2008). The perceived informational basis of attitudes: Implications for subjective ambivalence. *Personality and Social Psychology Bulletin, 34*, 275–287.

Tormala, Z. L., Falces, C., Briñol, P., & Petty, R. E. (2007). Ease of retrieval effects in social judgment: The role of unrequested cognitions. *Journal of Personality and Social Psychology, 93*, 143–157.

Tormala, Z. L., & Petty, R. E. (2004). Resistance to persuasion and attitude certainty: The moderating role of elaboration. *Personality and Social Psychology Bulletin, 30*, 1446–1457.

Tormala, Z. L., Petty, R. E., & Briñol, P. (2002). Ease of retrieval effects in persuasion: A self-validation analysis. *Personality and Social Psychology Bulletin, 28*, 1700–1712.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*(4157), 1124–1131.

Verplanken, B. (1991). Persuasive communication of risk information: A test of cue versus message processing effects in a field experiment. *Personality and Social Psychology Bulletin, 17*, 188–193.

Vidrine, J. I., Simmons, V. N., & Brandon, T. H. (2007). Construction of smoking-relevant risk perceptions among college students: The influence of need for cognition and message content. *Journal of Applied Social Psychology, 37*, 91–114.

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67*, 1049–1062.

Wegener, D. T., Clark, J. K., & Petty, R. E. (2006). Not all stereotyping is created equal. Differential consequences of thoughtful versus non-thoughtful stereotyping. *Journal of Personality and Social Psychology, 90*, 42–59.

Wegener, D. T., Kerr, N. L., Fleming, M. A., & Petty, R. E. (2000). Flexible corrections of juror judgments: Implications for jury instructions. *Psychology, Public Policy, and Law, 6*, 629–654.

Wegener, D. T., & Petty, E. (1995). Flexible correction processes in social judgment: The role of naive theories in corrections for perceived bias. *Journal of Personality and Social Psychology, 68*(1), 36–51.

Wegener, D. T., & Petty, R. E. (1997). The flexible correction model: The role of naïve theories in bias correction. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 141–208). San Diego, CA: Academic Press.

Wheeler, S. C., Petty, R. E., & Bizer, G. Y. (2005). Self-schema matching and attitude change: Situational and dispositional determinants of message elaboration. *Journal of Consumer Research, 31*, 787–797.

Williams-Piehota, P., Schneider, T. R., Pizarro, J., Mowad, L., & Salovey, P. (2003). Matching health messages to information-processing styles: Need for cognition and mammography utilization. *Health Communication, 15*, 375–392.

Yang, Y., & Lee, H. J. (1998). The effect of response mode, prior knowledge, and need for cognition on consumers' information acquisition process. *Korean Journal of Industrial and Organizational Psychology, 11*, 85–103.

Zhang, Y., & Buda, R. (1999). Moderating effects of need for cognition on responses to positively versus negatively framed advertising messages. *Journal of Advertising, 28*, 1–15.

Ziegler, R., Diehl, M., & Ruther, A. (2002). Multiple source characteristics and persuasion: Source inconsistency as a determinant of message scrutiny. *Personality and Social Psychology Bulletin, 28*, 496–508.