Need for Cognition Can Magnify or Attenuate Priming Effects in Social Judgment

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This article hypothesizes that the individual-difference variable, need for cognition (NFC), can have opposite implications for priming effects, depending on prime blatancy. Subtle primes are argued to be more effective for high- versus low-NFC individuals. This is because for high-NFC individuals, (a) constructs are generally easier to activate, (b) their higher amount of thought offers more opportunity for an activated construct to bias judgment, and (c) their thoughtfully formed judgments are more likely to affect behavior. However, because high-NFC individuals are adept at identifying and correcting for bias, with blatant primes the activated construct should be less likely to exert its default influence. Furthermore, with blatant primes, low-NFC individuals may achieve sufficient activation for primes to affect judgment. Across three studies, it is shown that as NFC increases, the magnitude of priming effects increases with a subtle prime but decreases with a blatant prime.

Keywords: *priming; need for cognition; assimilation; bias*

People vary in the extent to which they chronically engage in effortful information processing. This individual difference, known as *need for cognition* (NFC; Cacioppo & Petty, 1982), has been examined in well over 150 empirical investigations (for reviews, see Cacioppo, Petty, Feinstein, & Jarvis, 1996; Petty, Briñol, Loersch, & McCaslin, in press). People high in NFC tend to exert more effort on difficult cognitive tasks (Cacioppo & Petty, 1982), think more deeply about persuasive messages (Cacioppo, Petty, Kao, & Rodriguez, 1986), and form stronger attitudes (Haugtvedt & Petty, 1992) that are based on more knowledge (Cacioppo et al., 1986).

Although the evidence that high-NFC individuals are more likely to engage in high-thought processes is overwhelming, characteristics of these individuals can also make them more susceptible to certain biases in their judgments (Petty & Jarvis, 1996). In this article we aim to provide the first evidence that in certain situations, the contaminating influence of primes on judgment and behavior will be more likely to occur among individuals high rather than low in NFC. We also identify conditions under which high-NFC individuals will be less susceptible to priming effects.

NFC and Priming

A common finding in the social psychological literature is that the activation of a social construct through

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priming can affect subsequent judgments and behaviors. For example, priming individuals with adventurous (vs. reckless) in one task causes them to rate an ambiguously described individual (Donald) in a more adventurous (vs. reckless) manner (Higgins, Rholes, & Jones, 1977). Such effects have been observed using a wide range of priming methods, activated constructs, and target judgments (e.g., Srull & Wyer, 1979; see DeCoster & Claypool, 2004; Higgins, 1996, for reviews). More recently, this research has been extended to a wide range of additional outcomes beyond person perception, including changes in behavior (e.g., Carver, Ganellen, Froming, & Chambers, 1983), motives (e.g., Chartrand & Bargh, 1996), and self-perceptions (e.g., DeMarree, Wheeler, & Petty, 2005).

Research in social cognition has begun to examine a number of individual differences in the propensity of primes to modify these outcomes. For example, research on prime-to-behavior effects has observed larger priming effects on behavior among individuals high in private self-consciousness (Hull, Slone, Meteyer, & Matthews, 2002) and low in self-monitoring (DeMarree et al., 2005; for a review, see Wheeler, DeMarree, & Petty, 2007). These moderation effects appear to occur when primes affect behavior by influencing the self-concept. Private self-consciousness effects might be due to increased thought about the prime content in relation to the self among those high in this trait (Hull et al., 2002; Wheeler, Morrison, DeMarree, & Petty, in press). Moderation effects by self-monitoring are likely due to low self-monitors seeing prime content as potentially diagnostic of the self and increased use of changed self-perceptions in guiding behavior (DeMarree et al., 2005). Although these individual differences are likely specific to the impact of primes on the self, the current research examines more general effects that might be obtained with an individual-difference variable that is plausibly associated with some of the underlying processes by which primes affect judgment and behavior.

Petty and Jarvis (1996) noted that priming effects likely involved three basic steps. First, a construct must be activated from memory as a result of the priming induction. Second, this activated construct must bias interpretation of some target (e.g., Donald, the self, the situation). Finally, the person must use the developed interpretation to guide judgment or behavior. Notably, at each of these steps there is reason to believe that high-NFC individuals would be more influenced by primes than low-NFC individuals. If so, high-NFC individuals might show a greater assimilative effect of primes on judgments and behavior than low-NFC individuals.

Our hypothesis regarding the first step of the previously described sequence stems from the idea that if a targeted knowledge structure is well developed, the input needed to achieve a given degree of construct activation will be less. Because high-NFC individuals think more about a variety of topics, constructs in memory should, on average, be more integrated and well connected (see, e.g., McGuire, 1981; Tesser, 1978). To the extent that this is true, it might take less input (e.g., fewer priming trials or weaker priming) to achieve construct activation. That is, the threshold for construct activation for high-NFC individuals would be lower than for low-NFC individuals. Furthermore, because of the greater linkage among constructs, it might be that activating one element of a social construct (e.g., the "wrinkles" associated with the elderly stereotype) activates related elements (e.g., "gray hair" associated with the elderly stereotype) more easily.

Evidence in support of the idea that there is easier construct activation for high- than low-NFC individuals comes from a study on repeated attitude expression (Smith, Haugtvedt, & Petty, 1994). In this study, it was found that repeatedly expressing one's attitude increased the accessibility of attitudes for all participants but that the increase in accessibility with expression was greater for high- than low-NFC individuals. That is, given the same number of attitudinal repetitions (i.e., the same input), high-NFC individuals demonstrated greater construct (i.e., attitude) activation than did low-NFC individuals. Thus, priming might exert a greater impact on the judgments of high- than low-NFC individuals because the prime produces greater activation of the underlying construct.

Second, in common explanations of priming, for primes to affect judgment or behavior, the activated construct is presumed to exert a biasing impact on information processing related to the judgmental target (for reviews, see DeCoster & Claypool, 2004; Higgins, 1996; Markman & McMullen, 2003; Mussweiler, 2003; Stapel & Koomen, 2001; Wheeler et al., 2007). Therefore, for example, one's thoughts about "Donald" can go either in a reckless or adventurous direction depending on which construct is primed (Higgins et al., 1977). Although many forms of bias can occur with minimal thought, biases are often still present among individuals engaging in a great deal of thought (Forgas, 1995). Indeed, because activated constructs can bias the content of thoughts, the more thoughts an individual has about a target, the more opportunity there is for the biasing construct to exert its influence. For example, as the amount of thought devoted to a comparison process increases, the impact of this comparison standard on judgment also increases (Chapman & Johnson, 1999; Mussweiler, 2003). High-NFC individuals (relative to low) tend to generate more thoughts in response to a stimulus (e.g., Axsom, Yates, & Chaiken, 1987; Priester & Petty, 1995); therefore, the content of these thoughts

can be more affected by a potential biasing agent. For example, in one study, the thoughts of high-NFC individuals were more biased by an induced emotion than were the thoughts of low-NFC individuals (Petty, Schumann, Richman, & Strathman, 1993).

Finally, high-NFC individuals are more likely to translate their thoughts into judgments and their judgments into behaviors than are low-NFC individuals. For example, the thoughts of high-NFC individuals are better predictors of the attitudes they form than are the thoughts of low-NFC individuals (e.g., Petty et al., 1993), and attitudes of high-NFC individuals have been found to be better predictors of their behavior than the attitudes of low-NFC individuals (e.g., Cacioppo et al., 1986). In general, judgments formed through careful thought tend to be better represented in memory, more persistent over time, resistant to change, and more influential in determining subsequent behavior and information processing (Petty, Haugtvedt, & Smith, 1995). Each of these tendencies has been observed among high-NFC individuals (e.g., Haugtvedt & Petty, 1992; see Cacioppo et al., 1996). Thus, we expected that prime-induced thoughts would be more likely to be reflected in judgments for high- than low-NFC individuals and their judgments would be more likely to be reflected in behavior as well.

In sum, although not previously demonstrated, there are at least three reasons to expect greater priming effects on judgment and behavior among individuals high (relative to low) in NFC, each of which would be sufficient to produce larger priming effects. First, it should be easier to activate social constructs among high- than low-NFC individuals because of their better developed knowledge structures. Second, once a construct is activated, high-NFC individuals should have more judgment-relevant thoughts than low-NFC individuals, offering more opportunity for the prime to have a biasing impact. Finally, the thoughts of high-NFC participants should be more likely than those of low-NFC participants to affect judgments, and those judgments should be more likely to have an impact on behavior. In each of these cases, even if NFC did not affect the preceding process, the subsequent process would be expected to produce the predicted outcome, with high-NFC individuals demonstrating larger effects of primes on judgments and behaviors than low-NFC individuals.

Existing Research

Because there are several reasons to predict greater assimilative effects of primes among high- than low-NFC individuals, it might be surprising to note that the only prior study examining NFC and priming actually predicted and found the opposite—greater assimilation to primes among *low-NFC individuals* (Martin, Seta, & Crelia, 1990, Study 3). In this research, Martin et al. (1990) primed high- and low-NFC individuals with the concept of persistent or stubborn by having them generate statements that conveyed similar feelings to target statements related to these constructs. In a subsequent impression formation task, it was low-NFC individuals who rated the target individual more positively when primed with the positive construct (persistent) than when primed with the negative construct (stubborn). The opposite was true of high-NFC individuals—they showed a contrast effect, rating the target individual less positively when primed with the positive rather than the negative construct. These findings were interpreted in terms of Martin's (1986) set/reset model, which posits that assimilation is a relatively low-effort default effect and that contrast results from a more effortful correction process. Because assimilation is assumed to require less cognitive effort than contrast, it was postulated that it should be more likely to occur among those least inclined to engage in thought—those low in NFC.

However, research conducted after Martin et al. (1990) showed that contrast is not invariably more effortful than assimilation. According to the flexible correction model (Petty & Wegener, 1993), either assimilation or contrast can be the default effect of a prime. Which occurs depends on a myriad of factors such as the extremity of the prime—the more extreme the prime, the more likely a default contrast effect is to occur over a default assimilation effect (e.g., see Herr, Sherman, & Fazio, 1983; Sherif & Hovland, 1961; Stapel & Koomen, 2001). Importantly, if people correct for an expected assimilation effect, contrast can result, and if people correct for an expected contrast effect, assimilation can result (see Wegener & Petty, 1997, for a review). In the current research we follow the dominant pattern in the priming literature and use primes that have been pretested to produce default assimilation effects. Thus, correction processes would operate in the direction of contrast.

In addition to the study already mentioned by Martin et al. (1990), other research has suggested that high-NFC individuals are more likely to correct for biasing influences than are low-NFC individuals. For example, in one study (DeSteno, Petty, Wegener, & Rucker, 2000, Study 4), low-NFC participants made predictions of event likelihood that were congruent with an induced mood state (e.g., higher estimates of the number of people promoted each year when in a happy than sad state; an assimilation effect), whereas high-NFC individuals made mood-incongruent likelihood predictions (a contrast effect).

Conceptually parallel results have been obtained in another study using a false feedback paradigm (Briñol, Rucker, Tormala, & Petty, 2004). These authors provided participants with false personality feedback

indicating that participants were either open or resistant to changing their opinions. The false feedback influenced participants' self-ratings and their resistance to persuasive information. Specifically, the feedback affected low-NFC participants in an assimilative manner and high-NFC participants in a contrastive manner on both self-report and behavioral dependent measures.

Opposite Predictions Depending on Salience of the Prime?

So far we have noted that when assimilation is expected to be the default effect of a prime, there are several reasons to expect that high-NFC individuals would show greater assimilative effects of the prime than low-NFC individuals. However, the literature has, if anything, suggested the opposite. Why might this be? One key commonality of the studies showing greater assimilation to biasing agents for low- than high-NFC individuals (Briñol, Rucker, et al., 2004; DeSteno et al., 2000; Martin et al., 1990) is the apparent blatancy of the biasing manipulations used. Martin et al. (1990) had participants generate sentences that conveyed the same meaning as prime sentences, forcing them to pay careful attention to the priming stimuli. DeSteno et al. (2000) had participants complete an emotion manipulation check immediately following the emotion induction (but before judgments were made) to make emotion especially salient. Briñol, Rucker, et al. (2004) gave participants explicit false feedback regarding their own personality, making this feedback highly salient. These blatant inductions resulted in assimilation effects among low-NFC individuals and contrast effects among high-NFC individuals in each case.

According to the flexible correction model (Petty & Wegener, 1993; Wegener & Petty, 1997), one factor that influences whether correction occurs is whether the biasing agent is salient. If the biasing agent is not salient, people are unlikely to correct for it because they will not be aware of it. Blatant priming inductions make it clear to participants that the source of the accessible construct is not their reactions to the subsequent target (or judgment, or persuasive message) but rather the priming induction itself. Other research on priming indicates that correct attributions for the source of accessibility can lead to contrast (Mussweiler & Neumann, 2000). Because identifying and correcting for the source of accessibility is likely to require some thought, it should be more likely to occur among high-NFC participants, consistent with the pattern of data observed initially by Martin et al. (1990). Thus, when a prime or other potential source of bias is blatant, assimilation should be *less* likely as NFC increases.

Furthermore, blatant primes might produce the opposite effect for low-NFC individuals. Recall that one reason high-NFC individuals might show increased priming effects to subtle primes is that they plausibly have a lower threshold for activation because of more fully developed cognitive structures related to the prime. Thus, the threshold for activation might be lower among high- than low-NFC individuals. By increasing the blatancy, strength, or explicitness of the priming manipulation, however, low-NFC individuals should reach the threshold for construct activation and thus the prime can begin to exert its influence. In sum, although we have outlined why high-NFC individuals could show stronger default assimilation effects to primes, the available literature on NFC supports the opposite conclusion. We argue that this is because past research has largely examined blatant primes, whereas the greater assimilation effect for high- than low-NFC individuals should be evident largely for subtle primes. The latter effect has not been demonstrated in the literature.

The Present Research

The primary goal of the current research was to provide the first evidence for the hypothesis that when primes are subtle, high-NFC individuals will show a greater effect of the prime than low-NFC individuals. We examined this prediction across three studies. Because greater assimilation to primes among high- than low-NFC individuals has never been produced, Studies 1 and 2 attempted to demonstrate this using priming manipulations that are more subtle than those used in past studies of priming and NFC. Specifically, Study 1 tested the hypothesis that subtly priming a construct (winning or losing) would influence the betting behavior of high-NFC individuals to a greater extent than it would low-NFC persons. We expected a win prime (vs. lose prime) to lead high-NFC individuals to bet more money on an ambiguous roulette wheel consistent with the idea that they expected to win. We predicted that low-NFC individuals would be less influenced by the prime. Study 2 offers a conceptual replication of this effect using a subliminal priming manipulation and a judgmental rather than a behavioral dependent variable.

A second goal of the current research was to isolate the enhanced priming effect for high- rather than low-NFC individuals to situations in which a subtle prime is used. Consistent with past research, when a blatant prime was used we expected high-NFC individuals to show a smaller assimilation effect (or even a contrast effect) relative to low-NFC individuals. To examine these ideas, in Study 3 we manipulated whether the same conceptual prime is subtle or blatant. Thus, our final study was aimed at reconciling our perspective with existing findings in the literature by showing that NFC can be associated with increased or decreased

assimilative priming effects, depending on the blatancy of the priming manipulation.

STUDY 1

Method

Participants were presented with a roulette game and the rules of the game were explained. A win or lose prime was hidden within the game instructions. Participants then viewed a video clip after which the win or lose prime was restated. Following the prime, participants were given $1 in change and asked to place their bets. The amount of money that each participant bet was the primary dependent measure. Participants also completed a questionnaire of ancillary measures including the NFC scale, were probed for suspicion, and were debriefed.

Participants

Participants were 161 undergraduates at The Ohio State University who received partial fulfillment of an introductory psychology course requirement for their participation. Because of an error in data coding, 1 participant's data were unavailable for analysis. Sessions were conducted in groups of 4 to 6. Participants were seated in a room with partitions so that they could view the experimenter and the roulette wheel, but not each other.

The experiment was a 2 (prime: win vs. lose) × NFC (continuous) between-participants design where participants were randomly assigned to either the win or lose prime condition and NFC was measured for each participant.

Materials

Roulette game. The roulette wheel was composed of one half black and one half red markers, which were arranged in such a way that the exact percentage of black and red, though actually 50-50, appeared ambiguous. Each participant was given $1 with which they could bet as much or as little as they wanted in favor of the ball landing on black. The rules of the roulette game were first explained so as not to mention winning or losing as follows:

> Some of the markers are red and some are black. Your task is to bet in favor of the ball landing on a black marker. It is totally up to you whether you want to bet, and how much of the dollar you want to bet, if at all. If the ball lands on red, you give me back the amount of money you bet; if the ball lands on black, you get back what you bet plus an additional amount equal to your bet. Whatever money you end up with is yours to keep.

Prime. After the basic game instructions, participants were then subtly primed with the concept of winning or losing the bet in what appeared to be just a verbal summary of the rules of the game. The prime instructions were stated as follows:

> Remember, if you win (lose), you win (lose) whatever you bet. Therefore, if you bet one cent, you win (lose) one cent; if you bet forty-eight cents, you win (lose) forty-eight cents; if you bet one dollar, you win (lose) a whole dollar. So, if the ball lands on black (red), you will win (lose) whatever you bet.

Following these instructions, participants viewed a brief (5 min) video clip. This gave them time to think about their bets if they chose to do so. The video clip contained happy, sad, or neutral content. Because the clip viewed had no effect on participants' bets, it is not discussed further. Following the clips, the priming manipulation was repeated and participants were asked if they understood the rules before placing their bets. If they did not, the game was explained to participants again, and they were asked to place their bets. The roulette wheel was spun and the amount of money that each participant bet was doubled if the ball landed on black or returned to the experimenter if the ball landed on red. Participants kept any money they won, as well as any portion of the dollar they did not bet.

NFC scale. Embedded in a series of ancillary measures administered after the bet was the 18-item NFC scale (Cacioppo, Petty, & Kao, 1984). The NFC scale is a well-validated, single-factor, individual-difference measure assessing individuals' intrinsic enjoyment of thinking (see Cacioppo et al., 1996). It includes items such as "I would prefer complex to simple problems" and "Thinking is not my idea of fun" (reverse scored). Each item is answered on a 5-point Likert-type scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). The range of scores in this sample was 27 to 85 with a median of 63.

Results

NFC scores were mean centered to aid in interpretation (Aiken & West, 1991). Bets were then submitted to a Prime (win vs. lose) × NFC multiple regression analysis. A significant effect of prime emerged ($B = 14.46$), $t(157) = 3.45$, $p = .001$. This was qualified by the predicted Prime × NFC interaction ($B = 0.91$), $t(156) = 3.19$, $p = .002$ (see Figure 1). Decomposition of the Prime × NFC interaction 1 *SD* above and below the mean (Aiken & West, 1991) indicated that there was a significant assimilative effect of the prime among high-NFC participants ($B = 27.49$), $t(156) = 4.76$, $p < .001$, but not among low-NFC participants ($B = 1.37$), $t(156) = 0.24$,

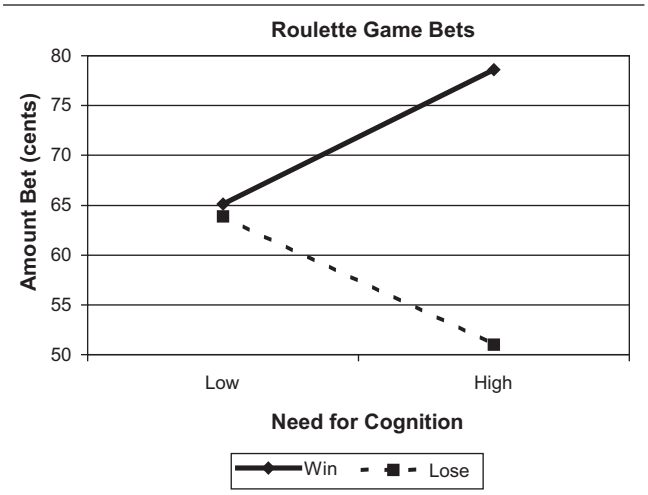

Figure 1 Bets placed (Study 1) as a function of need for cognition (NFC) and priming condition (win or lose).
NOTE: Graph is plotted at +/– 1 *SD* on NFC.

ns. As can be seen in Figure 1, at relatively high levels of NFC (+1 *SD*), the predicted bet in the win condition was \$0.79, whereas in the lose condition it was \$0.51. In contrast, for low levels of NFC (–1 *SD*), there was little difference between the win and lose prime conditions, with predicted bets of approximately \$0.65 and \$0.64, respectively.

Discussion

Study 1 provided the first evidence of greater assimilation to a prime for high- than low-NFC individuals. This effect was consequential as following a win (relative to lose) prime, high-NFC participants bet more of their own money on a roulette game, but low-NFC participants did not. This effect is consistent with our predictions based on the likely mechanisms underlying priming effects but contrary to the existing research on NFC and priming (DeSteno et al., 2000; Martin et al., 1990).

However, there are some possible alternative explanations for these results. For example, it might be that our findings occurred because high-NFC participants wanted to be more cooperative with the experimenter or were more motivated to demonstrate their cognitive prowess to the experimenter than low-NFC participants. Thus, in Study 2, we use a subliminal priming induction and a dependent measure involving private judgments rather than a public behavior. Specifically, in Study 2, we subliminally primed either the construct of resistance/rigidity or openness/flexibility and had participants read passages where the main characters could be construed as being either resistant or flexible. Participants then rated the characters with respect to their resistance or flexibility. This is conceptually parallel to classic research on judgmental priming effects where participants rate a target individual on a dimension relevant to the prime (e.g., Higgins et al., 1977; Srull & Wyer, 1979).

STUDY 2

Method

Participants were subliminally primed with the construct of resistance or flexibility using a lexical decision task. Following the prime, participants read four scenarios where the main characters could be viewed as being either resistant or flexible and were asked to rate the target individuals with respect to this dimension. Finally, participants completed the NFC scale, were probed for suspicion, and were debriefed.

Participants

Forty-two Ohio State University undergraduates who participated in partial fulfillment of a course requirement were randomly assigned to conditions. Sessions were conducted in a computer lab with divided workstations with up to 7 participants per session. Participants were informed that the study examined personality differences in language processes and that they would complete several personality questionnaires and language tasks on the computer.

The experiment was a 2 (prime: resistant vs. flexible) × NFC (continuous) between-participants design where participants were randomly assigned to either the resistant or flexible priming condition and NFC was measured for each participant.

Materials

Priming manipulation. For the priming manipulation, participants completed a lexical decision task. The trials began with an asterisk at the center of the screen for 1 s to serve as an orienting stimulus. This was followed by a prime word for 15 ms, which was covered immediately by a string of X's for 225 ms. Finally, the target word appeared on the screen until the participant responded. Participants responded with the "?" key when the target stimulus was a word and with the "Z" key when it was a nonword. The flexibility prime included words related to openness and flexibility (e.g., *accept, open, yield, flexible*), whereas the resistance prime included words related to resistance and close-mindedness (e.g., *oppose, resist, rigid, reject*). The target words for the lexical decision task were neutral in valence and were unrelated to either prime (e.g., *class, acrobat, walnut*). The nonwords used in the task were anagrams of the target words (e.g., *salcs, bcaator, nuwalt*).

Resistance scenarios. After the priming task, participants read four scenarios followed by a series of questions. Each scenario depicted two individuals whose behavior toward each other could be construed as depicting varying degrees of resistance or openness. For example, in one scenario a union representative is negotiating a new labor contract with a representative from management. After several days of negotiation, the union representative asked the employees to strike to pressure the company during the negotiation process (see the appendix for the full text of this scenario). Following each scenario, the key questions asked participants to rate how resistant or flexible each character was on a 9-point scale from –4 (*extremely flexible*) to +4 (*extremely resistant*). The average of these items served as the primary dependent variable.

NFC. Following several filler questionnaires, participants were administered the 18-item NFC scale (Cacioppo et al., 1984) as in Study 1. In this sample the range was 22 to 83 with a median of 54.

Results

NFC scores were mean centered to aid in interpretation (Aiken & West, 1991). Resistance aggregate ratings (alpha = .58) were then submitted to a Prime (resistance vs. openness) × NFC multiple regression analysis (see Figure 2). The only significant effect was the predicted Prime × NFC interaction ($B = –0.06$), $t(38) = 2.23$, $p < .02$. Decomposition of this interaction 1 *SD* above and below the mean indicated that there was a significant effect of prime among high-NFC individuals ($B = –0.93$), $t(38) = 2.39$, $p = .02$, but not among low-NFC individuals ($B = 0.55$), $t(38) = 1.39$, $p = .17$. That is, high-NFC individuals primed with resistance construed the targets in these ambiguous scenarios as being more resistant than did individuals primed with openness, and there was no significant effect of prime for low-NFC individuals.

Discussion

Results from Study 2 again supported our hypothesis that high-NFC individuals would show greater effect of a subtle prime on judgment, using a different priming method, primed constructs, and dependent variable (private judgments vs. public behavior) than in Study 1. Specifically, as NFC increased, so did the assimilative effect of a resistance (vs. flexibility) prime on ratings of target characters in ambiguous situations. This extends Study 1 in several ways. First, by using a subliminal prime, we show that our effect extends beyond consciously processed prime stimuli. In addition, whereas Study 1 used a public behavioral dependent measure, Study 2 used a private judgment, highlighting the robustness of the NFC moderation.

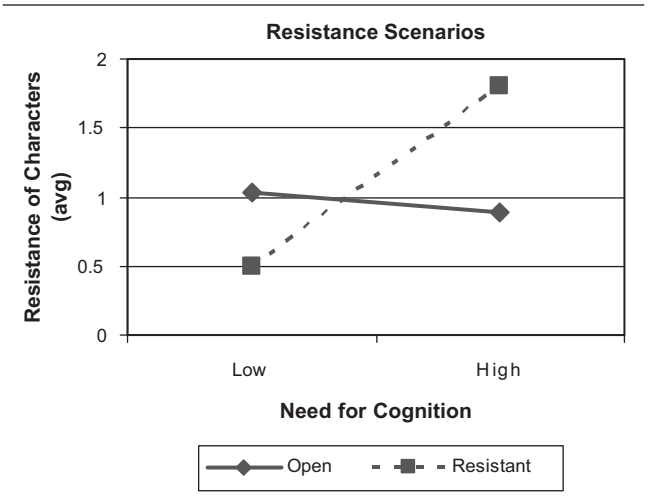

Figure 2 Rating of resistance of characters in ambiguous situations (Study 2) as a function of need for cognition (NFC) and priming condition (resistance or openness).
NOTE: Graph is plotted at +/– 1 *SD* on NFC.

Reconciling Inconsistent Effects

Although the results of Studies 1 and 2 show a completely new effect—greater assimilation to a prime on the part of high- rather than low-NFC individuals—they are inconsistent with the previous research we reviewed on NFC and priming. Recall that Martin et al. (1990, Study 3) found greater assimilation among low-NFC and contrast among high-NFC individuals. Martin et al. argued that because contrast occurs because of more effortful processes, it should be more likely to occur among high-NFC individuals. Although as suggested earlier, some mechanisms that produce contrast are more effortful than assimilation (e.g., theory-driven correction when an assimilative theory of bias exists; see Wegener & Petty, 1997), this need not always be the case. For example, a comparison contrast effect (rather than correction contrast) can occur with relatively little effort as the default judgmental effect (e.g., with subliminal presentation of an extreme exemplar; see Mussweiler, Ruter, & Epstude, 2004). However, if correction is the process underlying past contrast effects observed among high-NFC individuals exposed to various primes as articulated by Martin et al. and others (e.g., DeSteno et al., 2000), the degree to which participants are aware of a potential source of bias should increase the likelihood of obtaining contrast. Using more subtle primes should reduce the likelihood of correction processes and therefore increase the likelihood of assimilation.

In Study 3, we manipulate the blatancy of the prime. When the prime is blatant, high-NFC individuals should

be more likely to correctly attribute the accessible construct to the prime. To the extent that they correct for the possibly biasing effect of the blatant prime, assimilation will be reduced, and if they overcorrect for the prime, contrast is likely. However, as we noted earlier, low-NFC individuals might demonstrate assimilation to a blatant prime as in the research by Martin et al. (1990). One reason low-NFC individuals were expected to show smaller priming effects in Studies 1 and 2 is because they might have a higher threshold for activation due to less fully developed cognitive structures related to the prime. By increasing the blatancy or strength of the priming manipulation, low-NFC individuals might be more likely to reach the threshold for construct activation and thus the prime can begin to exert its influence. When the prime is subtle, of course, we expected to replicate the pattern observed in Studies 1 and 2 that showed that assimilation effects to the prime were greater among high- than low-NFC individuals.

All participants in Study 3 were primed with the "skinhead" stereotype, but depending on experimental condition, the prime differed as to whether it was relatively blatant or subtle. For some participants, one fourth of the stimuli in a word completion task were prime relevant (subtle prime), whereas for other participants, half of the stimuli were prime relevant (blatant prime). Following the priming task, participants read an ambiguous description of Donald (adapted from Higgins et al., 1977) and rated him on two dimensions. With the subtle prime, and consistent with Studies 1 and 2, we expected an increase in prime-consistent judgments as NFC increased. With the blatant prime, and consistent with previous research (e.g., Martin et al., 1990), we expected a *decrease* in prime-consistent judgments as NFC increased.

STUDY 3

Method

After completing the NFC scale, participants were given a word completion task that primed the stereotype of skinheads. The prime was either blatant or subtle, as operationalized by the ratio of prime to filler words in the word completion task. All participants then read the classic Donald paragraph (Higgins et al., 1977) and rated Donald on two scales: one that was directly prime relevant and one that assessed general evaluation.

Participants

Sixty-six Universidad Autónoma de Madrid undergraduates who participated in partial fulfillment of a course requirement were randomly assigned to experimental condition. Participants were informed that the study examined personality differences in language processes and that they would complete several personality questionnaires and language tasks within the same questionnaire packet. Six participants were excluded from the analyses because their first language was not Spanish and 1 was excluded because she did not complete the entire NFC scale, leaving a total of 59 participants for the analyses. In addition, two participants did not complete all dependent measures; therefore, the degrees of freedom will vary in the following analyses to reflect this.

The experiment was a 2 (prime blatancy: subtle vs. blatant) × NFC (continuous) between-participants design where participants were randomly assigned to either the subtle or blatant priming condition and NFC was measured for each participant.

Materials

NFC. Participants were first administered the 18-item Spanish version of the NFC scale (Falces, Briñol, Sierra, Becerra, & Alier, 2001). The Spanish version of the scale has psychometric properties similar to the original scale, including a single-factor structure (Briñol, Petty, & Tormala, 2004; Falces et al., 2001). In this sample the range was 43 to 82 with a median of 66.5.

Prime blatancy. For the priming manipulation, participants were asked to do a word completion task, ostensibly as a test of language processes. For all participants, prime words included in this task were associated with skinheads (e.g., *hostility, racist, radical*), whereas filler words were unrelated to skinheads (e.g., *pilot, butterfly, magazine*). This skinhead prime was presented in either a subtle or a blatant task by varying the ratio of prime to filler words. Specifically, the subtle priming task included 40 words, 10 of which were associated with skinheads. The blatant priming task also included 40 words, 20 of which were associated with skinheads.

Donald paragraph and ratings. Following the priming task, participants read a Spanish translation of the classic Donald description (Higgins et al., 1977). Participants then were asked to rate Donald on scales that served as our dependent measures. Because skinheads are associated with a "right wing" (vs. "left wing") ideological stance, participants rated Donald's likely political ideology on a 9-point scale ranging from 1 (*has an extremely left-wing ideology*) to 9 (*has an extremely right-wing ideology*). Next, participants rated the extent to which they saw Donald as a possible friend on a 9-point scale ranging from 1 (*Donald could never be my friend*) to 9 (*It is very likely Donald could be my*

friend). Because skinheads are generally disliked among the student population, to the extent that Donald was seen as similar to a skinhead, it would reduce his chances of being a possible friend. Furthermore, previous research (e.g., Srull & Wyer, 1979) has observed an effect of primes on general evaluations of targets as well as on prime-specific dimensions; therefore, this dependent measure was included to further extend our findings. It should be noted that although the Donald description used in this study was not specifically designed for its ambiguity with respect to the skinhead stereotype, prior research has shown that direct overlap in content between a prime and a target is not necessary to achieve priming effects (e.g., Stapel & Koomen, 2000). What is important, however, is that the dependent measures used assess dimensions that were related to the prime.

Results

Ratings of Donald were submitted to a Prime Blatancy (subtle vs. blatant) × NFC multiple regression analysis. We predicted an increase in prime-consistent judgments as NFC increased in the subtle condition, but a decrease in the blatant condition.

Ideology of Donald

Higher scores on the ideology measure indicated a more right-wing political philosophy, consistent with the implications of the skinhead prime. The only significant effect was the predicted Prime × NFC interaction ($B = –0.12$), $t(53) = 2.55$, $p = .01$. The interaction was due to an opposite direction of priming as a function of NFC depending on whether the prime was subtle or blatant. In the subtle priming condition, as NFC increased so did ratings in the direction of the prime (i.e., more conservative ratings; $B = 0.07$), $t(53) = 1.96$, $p = .055$. In the blatant priming condition, however, the opposite pattern emerged, such that as NFC increased, ratings tended to become less consistent with the implications of the prime ($B = –0.05$), $t(53) = 1.64$, $p = .11$.

Potential Friendship With Donald

Higher scores on the friendship measure indicated greater likelihood of friendship with Donald. The only significant effect was the predicted Prime × NFC interaction ($B = 0.17$), $t(55) = 2.84$, $p = .006$. Decomposition of this interaction among participants in the subtle priming condition revealed that the assimilative impact of the prime increased as NFC increased. That is, as NFC increased, the probability of friendship with Donald decreased ($B = –0.09$), $t(55) = 1.90$, $p = .06$, consistent with viewing Donald in a negative way—as a skinhead. In the blatant priming condition, the opposite effect emerged, such that as NFC increased, the likelihood of friendship increased ($B = 0.08$), $t(55) = 2.26$, $p < .03$.

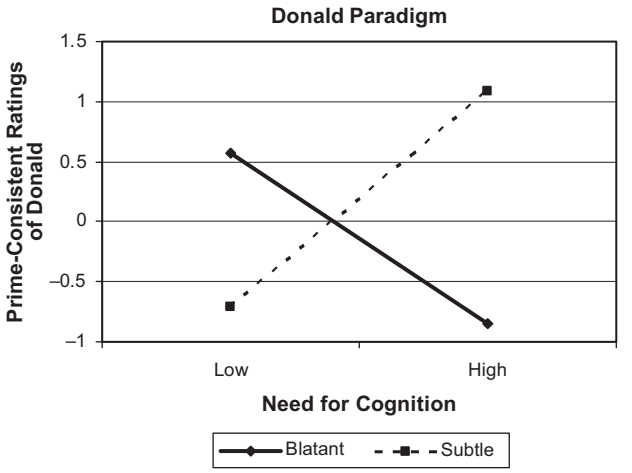

Figure 3 Prime-consistent ratings of Donald (Study 3) as a function of NFC and prime blatancy condition (subtle or blatant skinhead prime).
NOTE: Graph is plotted at +/– 1 *SD* on NFC.

Overall Ratings of Donald

Although the same significant interaction patterns were observed across both dependent measures, the simple slopes were not all significant. To determine whether this pattern was significant taking into account both dependent measures, we reverse coded ratings of potential friendship with Donald and *z*-transformed each of the two dependent variables. These items were weakly correlated ($r = .28$). Thus, low scores on the index would tend to reflect little influence of the prime on either measure. Middle scores would reflect influence on one or the other measure. High scores would reflect influence on both measures (see Jarvis, MacKenzie, & Podsakoff, 2003). When this index, coded so that higher scores represented more prime-consistent ratings of Donald, was submitted to the Prime Blatancy × NFC regression analysis, the only significant effect to emerge was the predicted Blatancy × NFC interaction ($B = –0.20$), $t(53) = 3.73$, $p < .001$ (see Figure 3). Decomposition of this interaction revealed an assimilative effect of the prime in the subtle condition such that as NFC increased, so did negativity toward Donald ($B = 0.11$), $t(53) = 2.61$, $p = .01$. In the blatant priming condition, the opposite effect emerged, such that as NFC increased, negativity toward Donald decreased ($B = –0.09$), $t(53) = 2.73$, $p < .01$.

Discussion

Study 3 suggests a reconciliation of the inconsistent findings between our first two studies that found greater assimilative effects of a prime for high-NFC individuals and the prior literature that found greater assimilative effects of a prime for low-NFC individuals. Study 3 found that when the prime was subtle (as in Studies 1 and 2), prime-consistent judgments (more negativity following a skinhead prime) increased as NFC increased. When the prime was blatant, however, consistent with earlier work (e.g., Martin et al., 1990), the assimilative impact of the prime decreased as NFC increased.

To simplify the study design and maximize power, all participants were primed with the same construct (skinhead). This allowed us to test our hypotheses regarding the effect of subtle and blatant primes as a function of NFC in an efficient manner. That is, this design was sufficient to show more prime-consistent judgments as NFC increased with the subtle prime but *less* prime-consistent judgments as NFC increased with the blatant prime. Notably, although this design allows us to determine the direction of effects with respect to the prime (i.e., judgments more or less consistent with the prime as NFC increases), it does not allow us to determine absolute assimilation or contrast effects. For example, the fact that judgments become less consistent with the implications of the blatant prime as NFC increases could be due to reduced assimilation effects with blatant primes or to increased contrast effects. However, the critical pattern to our hypothesis is that as NFC increased, prime-consistent judgments increased when the prime was subtle (replicating the pattern in Studies 1 and 2) and decreased in the blatant prime condition (replicating prior research). Thus, the blatancy of the prime served as an important moderator of the impact of the prime for individuals who varied in their NFC.

Still, there are two independent effects present in Study 3 for which to account: one for the subtle prime and one for the blatant prime. Assuming the subtle prime condition represented a successful replication of our earlier studies (greater effect of prime on high- than low-NFC individuals), we must also account for the blatant prime conditions (less effect of the prime on high- than low-NFC individuals). The latter effect provides a replication of earlier work on NFC and priming (e.g., Martin et al., 1990). As we described earlier, in the blatant prime conditions the enhanced assimilation effect observed among low-NFC participants might be due to the increased strength of the prime providing sufficient input to fully activate the primed construct. However, high-NFC participants might be better at identifying the pattern in the priming task and thus correctly attribute the accessibility of the skinhead construct to this task and not to "Donald." Furthermore, even if low-NFC individuals had noticed the blatant skinhead prime, they would be less likely to engage in the extra cognitive work necessary to correct their judgments. Because of this, a reduced assimilative effect of the prime should be observed for high- relative to low-NFC individuals. A contrast effect is even possible if high-NFC individuals overcorrected for the estimated effect of the prime (Martin et al., 1990; Wegener & Petty, 1997; see also Mussweiler & Neumann, 2000).

GENERAL DISCUSSION

The present research examined the hypothesis that high-NFC participants would be more susceptible to the effects of a subtle prime on judgment and behavior than would low-NFC participants. Across three studies, we provided support for this hypothesis. In Study 1, the effect of a win (vs. lose) prime embedded in an instruction set before a gambling game increased the amount of money bet as NFC increased. High-NFC individuals demonstrated behavioral assimilation to the prime, whereas low-NFC individuals showed no effect of the prime. In Study 2, we conceptually replicated this effect while making several modifications. Specifically, we subliminally primed resistance or openness and had participants make judgments about the resistance of individuals in ambiguous scenarios. As NFC increased, participants made more resistant judgments following a resistant versus an openness prime.

Finally, in Study 3, we demonstrated a key boundary condition of the observed effect. Examining the impact of a skinhead prime on skinhead-relevant judgments of an ambiguously described target person, we again showed that with a subtle prime, the assimilative impact of the prime increased as NFC increased. However, when the same skinhead prime was more blatant, we showed that as NFC increased, the assimilative impact of the prime decreased, replicating the pattern found in previous research (Briñol, Rucker, et al., 2004; DeSteno et al., 2000; Martin et al., 1990). Together, these studies provide key advances not only by (a) demonstrating a totally new outcome not observed in the literature previously (increased priming among high-NFC individuals) but also by (b) identifying the limiting conditions for this outcome.

Role of Thought in Priming

A great deal of previous research has assumed that many errors in judgment, such as those caused by priming, occur largely when individuals are not thinking carefully enough (e.g., Ford & Kruglanski, 1995; Harkness,

De Bono, & Borgida, 1985; Strack, Schwarz, Bless, Kubler, & Wänke, 1993). Indeed, there is much research that suggests that thinking can overcome the impact of various simple biasing cues (e.g., Petty & Cacioppo, 1986; Thompson, Roman, Moskowitz, Chaiken, & Bargh, 1994). The corrective effect of thinking appears to be most likely when the target to be judged (e.g., a person or persuasive message) is clear and unambiguous. When targets are ambiguous, as they were in the current research, there is greater room for primes and other cues to bias thoughts and therefore color judgment (Asch, 1948; Higgins, 1996; Petty et al., 1993; Chaiken & Maheswaran, 1994). Thus, although priming effects can and do occur when perceivers are not thinking a lot, the present research offers additional evidence that they can also occur among high-thought individuals (see also, Petty, 2001).

One of the reasons high-NFC individuals might show greater priming effects than low-NFC individuals to subtle primes is based on the idea that because of their greater amount of thought in general, high- relative to low-NFC individuals will have better developed knowledge structures that will be easier to activate. This notion is consistent with other research demonstrating increased automatic behavior and stereotyping when stereotypic associations are particularly strong (e.g., Dijksterhuis, Aarts, Bargh, & van Knippenberg, 2000; Gawronski, Ehrenberg, Banse, Zukova, & Klauer, 2003). Although some existing research has examined representational aspects of primed constructs, there is still much to be done, and this therefore represents a fruitful direction for research.

The two other mechanisms we discussed with respect to our predictions of larger priming effects among high- relative to low-NFC participants are centered on the amount of thought devoted to the judgmental task. First, because high-NFC participants engage in more thought at the time of judgment, there are more thoughts to be biased by the activated prime (see also Forgas, 1995; Mussweiler, 2003). Second, the increased thought devoted to forming a judgment can lead that judgment to be highly predictive of behavior (Petty et al., 1995). All of the processes we have outlined likely contribute to the observed moderation of priming by NFC at least in some situations. That is, there are likely to be situational differences in the degree to which each process predominates in determining the impact of primes on judgment and behavior. For example, if a construct is already of high accessibility among high- and low-NFC participants, any priming differences obtained should be due to the processes that result from the additional thought devoted to interpreting and judging the target.

Although we have outlined the reasons high-NFC individuals would be more susceptible to priming effects than low-NFC individuals when the prime is subtle, why would low-NFC individuals be more susceptible to the primes when the prime is blatant? As noted earlier, perhaps low-NFC individuals need a stronger prime to sufficiently activate the concept. Second, it is possible that for individuals who do not like to think, the prime operates in a different manner. That is, the prime does not bias thoughts but is used as a relatively simple cue to judgment (see also Ford & Kruglanski, 1995). This is parallel to research guided by the elaboration likelihood model (Petty & Cacioppo, 1986) in persuasion and stereotyping that has sometimes observed that the same outcome can be obtained via different processes (e.g., emotion can bias judgment directly by serving as a simple cue for low-NFC individuals or indirectly by biasing the thoughts that come to mind for high-NFC individuals; Petty et al., 1993; see also Wegener, Clark, & Petty, 2006).

In addition to enhanced assimilation to blatant primes on the part of low-NFC individuals, past research has suggested that blatant primes can also lead to correction efforts among high-NFC individuals. Prior research has suggested that blatant biasing agents can produce both increased assimilation among low-NFC individuals and correction-based contrast effects among high-NFC individuals (e.g., DeSteno et al., 2000). Thus, it is most plausible that a combination of these factors were responsible for the effects we observed in the blatant prime conditions of Study 3. However, further research is necessary to definitively pin down all of the mechanisms at work. For now, our conceptual analysis of the behavior of individuals who vary in NFC has allowed us to derive a new prediction—that the effects of subtle primes should increase as NFC increases—and to posit that as the primes become more blatant, the effect should be attenuated or even reversed.

Conclusion

The current research demonstrates that thoughtful people can be more susceptible to priming effects than less thoughtful people whether the effect is on judgments or behaviors. This finding, though new to the priming literature, is consistent with a growing body of work suggesting that various subtle biasing agents such as emotions (Forgas, 1995) and bodily responses (e.g., Briñol & Petty, 2003) can sometimes have a greater impact on thoughtful than nonthoughtful people, or affect thoughtful people more because the mechanism of effect is different for thoughtful and nonthoughtful people (Petty & Cacioppo, 1986). When the potentially biasing agents become more blatant, however, these biases are attenuated, and in some cases, the opposite bias can emerge. That is, when a contextual biasing factor became salient, thoughtful people were more likely to show a reverse bias effect than less thoughtful people, presumably as a function of their attempt to remove the

bias (e.g., Martin et al., 1990). Ironically, then, it is the most thoughtful people who will sometimes show the most bias (whether assimilation or contrast) in their judgments and behavior because of irrelevant contextual variables such as primes.

APPENDIX
EXAMPLE RESISTANCE SCENARIO (STUDY 2)

There are two persons negotiating a new contract for the employees of one of the nation's largest companies. One person represents the company and wants the employees to work more hours for the same salary because of the economy. The other person represents the union and wants the employees to work fewer hours for the same salary because of their job satisfaction and health. After a few days of bargaining, the person from the union decides to ask the employees to go on strike as a pressure tactic for the negotiation process.

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