

## Central and Peripheral Routes to Persuasion: An Individual Difference Perspective

John T. Cacioppo  
University of Iowa

Chuan Feng Kao  
University of Iowa

Richard E. Petty  
University of Missouri—Columbia

Regina Rodriguez  
University of Iowa

According to the elaboration likelihood model, both situational and dispositional factors can influence the extent to which attitudes are formed through issue-relevant thinking. The results of Experiment 1 indicated that individuals high in need for cognition are more likely to think about and elaborate cognitively on issue-relevant information when forming attitudes than are individuals low in need for cognition. Analyses further indicated that individuals low in need for cognition acted as cognitive misers rather than as verbal dolts. In Experiment 2, individual differences in need for cognition were used to test the prediction from the elaboration likelihood model that subjects who tend to engage in extensive issue-relevant thinking when formulating their position on an issue also tend to exhibit stronger attitude-behavior correspondence. Results confirmed this hypothesis: The attitudes of individuals high in need for cognition, which were obtained in a survey completed approximately 8 weeks before the 1984 presidential election, were more predictive of behavioral intentions and reported voting behavior than were the attitudes of individuals low in need for cognition.

One of the major sources of variance in attitude research is that attributable to individual differences among subjects. In discussing this feature of experimentation, Underwood and Shaughnessy (1975) noted that certain questions allow individual differences to be an integral part of theoretical thinking, and this capability provides an important means of testing the adequacy of theoretical notions. They also maintained that "no variable has been so consistently ignored as has the individual-difference variable in theory construction" (p. 151). The purpose of the present research was to refine the contemporary conceptualization of need for cognition, to examine whether the effects of need for cognition on message processing and persuasion observed in previous research are attributable simply to intelligence, and to test a self-contained individual difference assumption in the elaboration likelihood model (ELM; Petty & Cacioppo, 1981, 1986a, 1986b) that subjects who tend to engage in extensive (in contrast to meager) issue-relevant thinking when formulating their position on an issue also tend to exhibit stronger attitude-behavior correspondence.

The ELM is based on the notion that people are motivated to

hold correct attitudes but have neither the resources to process vigilantly every persuasive argument nor the luxury—or apparently the inclination—of being able to ignore them all (Petty & Cacioppo, 1981). The fact that the situational factors that have been used to manipulate the extent to which attitudes are based on issue-relevant thinking sometimes account for only a small portion of variance is theoretically due, in part, to systematic individual differences among people in their desire to engage in issue-relevant thinking when they formulate their attitudes. This suggests that an individual differences strategy could be used to measure chronic variations among people in elaboration likelihood prior to the presentation of a persuasive appeal.

In particular, we reasoned that there are stable (though not invariant) individual differences in intrinsic motivation to engage in effortful cognitive endeavors generally (Cacioppo & Petty, 1982, 1984; Cacioppo, Petty, & Morris, 1983), just as there are stable individual differences in intrinsic motivation to engage in effortful physical endeavors. Individual difference factors such as competence and effectance motivation (White, 1959), cognitive style (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962/1974), and self-efficacy (Bandura, 1977), although related when dealing with cognitive tasks to the theoretical distinction for which we were searching, fail to fully capture the specificity we sought. For instance, general differences across individuals in competence, effectance motivation, and self-efficacy can influence people's fears and anxieties about non-cognitive as well as cognitive tasks and their behavior on physical as well as mental tasks (e.g., see White, 1959, p. 297). An individual difference variable that would influence people's fears and anxieties specifically about tasks involving vigilant information processing and behaviors on cognitive tasks would, of course, provide a stronger test of hypotheses regarding the importance of issue-relevant thinking in attitude change and in

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Correspondence concerning this article should be addressed to John T. Cacioppo, Department of Psychology, University of Iowa, Iowa City, Iowa 52242 or to Richard E. Petty, Department of Psychology, University of Missouri, Columbia, Missouri 65211.

attitude-behavior correspondence. Our analysis of Cohen and his colleagues' work on need for cognition (Cohen, 1957; Cohen, Stotland, & Wolfe, 1955) suggested that it might be possible to scale individuals along their tendency to engage in and enjoy effortful cognitive endeavors (Cacioppo & Petty, 1982, 1984).

### Need for Cognition Construct

Cohen et al. (1955) conceptualized need for cognition as "a need to understand and make reasonable the experiential world" (p. 291) and argued that "stronger needs lead people to see a situation as ambiguous even if it is relatively structured, indicating that higher standards for cognitive clarity are associated with greater need for cognition" (p. 292). Although one might avoid ambiguity and achieve an integrated and meaningful world through carefully scrutinizing incoming information, one might also achieve this goal by using heuristics and by relying on the advice of experts. That this is a feature of Cohen and his colleagues' conceptualization of need for cognition is evident in a study by Adams (1959, p. 171). It is also clear from this early research that the emphasis in Cohen and his colleagues' conceptualization of need for cognition was on tension reduction (Cohen et al., 1955, p. 291). For instance, Cohen et al. (1955) distinguished theirs from a Gestalt formulation by stating that "the latter conceptualization does not incorporate a need and tension reduction sequence" (p. 291).

In contrast, the emphasis in contemporary research on need for cognition is on the statistical tendency of and intrinsic enjoyment individuals derive from engaging in effortful information processing (Cacioppo & Petty, 1982). In this sense, our conceptualization of need for cognition embraces White's (1959) central thesis that there are directed and persistent behaviors that have a motivational aspect that cannot be wholly derived from sources of energy conceptualized as needs, drives, or instincts. We view individuals low in need for cognition as being *cognitive misers* (Taylor, 1981) relative to individuals high in need for cognition, and this difference is conceived as attained slowly through repeated or prolonged episodes of effortful problem solving. Despite the modifications to the conceptualization (e.g., the notion that need for cognition reflects intrinsic motivation rather than a true need), we retained the term *need for cognition* when developing a method of measuring this individual difference construct. We did this in recognition of Cohen and his colleagues' pioneering emphasis in persuasion research on individual differences in cognitive motivation.<sup>1</sup>

Cacioppo and Petty (1982; Cacioppo, Petty, & Kao, 1984) reported a series of studies developing the Need for Cognition Scale (NCS) and provided evidence that the NCS taps one dominant factor that was stable across community and student samples. Yet additional evidence for the stability of the factor structure and internal consistency of the NCS was provided in three recent laboratory studies involving college undergraduates (Chaiken, in press) and in a field study involving a random sample of 233 residents from Gainesville, Florida (Ferguson, Chung, & Weigold, 1985). In the former studies, factor analyses revealed one dominant factor best characterized as a tendency to engage in and enjoy effortful cognitive endeavors. Ferguson et al. did not report a factor analysis, but rather, they reported

a Cronbach's alpha of .86 for the subset of 15 items they used from the Cacioppo and Petty (1982) NCS.

A number of recent studies also indicate that the NCS validly marks individual differences in people's tendency to engage in and enjoy effortful cognitive endeavors. For instance, research has demonstrated that individuals put less effort into a task when they share responsibility for the outcome as part of a group rather than when they are individually responsible for the outcome (e.g., Ingham, Levinger, Graves, & Peckham, 1974; Latané, Williams, & Harkins, 1979). If individuals high in need for cognition (as identified by their responses to the NCS) are more intrinsically motivated to engage in effortful cognitive endeavors, then they should be less likely to socially loaf on a cognitive task than would individuals low in need for cognition. In a test of this hypothesis, Petty, Cacioppo, and Kasmer (1985) asked subjects to perform a brainstorming task (generating uses for objects) after they were led to believe that they were individually responsible or that they were part of a group that was responsible for performing the task. Results revealed a significant interaction showing that subjects low in need for cognition generated fewer ideas under group than under individual conditions, whereas subjects high in need for cognition generated equally high numbers of ideas regardless of social condition. For comparison purposes, another group of subjects performed a physical task (screwing and unscrewing bolts and nuts) under individual or group instructions. Results revealed a main effect for social condition, showing greater loafing by subjects both high and low in need for cognition in the group conditions. That is, only subjects high in need for cognition working on cognitively challenging tasks failed to show the motivational deficit that usually results from shared responsibility.

### Need for Cognition, Message Processing, Message Recall, and Persuasion

Evidence for the notion that need for cognition can be used to assess chronic differences in elaboration likelihood in communication settings via an individual difference approach has

<sup>1</sup> Note that Cohen and his colleagues never published their need for cognition scale, and copies of their scale were not available when we began our research in this area (Cacioppo & Petty, 1982). Rosen and his colleagues (Rosen, 1963, 1964; Rosen, Siegelman, & Teeter, 1963; Rydell & Rosen, 1966) had scaled an individual difference they termed need for cognition, but they conceived of need for cognition as representing cognitive motivation, broadly defined. Their scale tapped 12 separate factors (e.g., cognitive bookworm, incurious dependence, orientation to knowledge for prestige and security, religious anti-intellectualism), whereas like Cohen and his colleagues we sought to identify and measure a more specific and limited individual difference in cognitive motivation. It might also be noted that Rosen and his colleagues never marshalled strong evidence for the stability and validity of their various scales. For instance, Rosen (1964) reported that students from a college honors program scored higher than did liberal arts and sciences students on subscales such as cognitive bookworm, social anti-intellectualism, and religious anti-intellectualism ( $ps < .001$ ), but the liberal arts and sciences students did not differ from, or actually score lower than, students in a 2-year general program on these subscales. Hence, this research is not discussed further.

been obtained in several studies. For instance, Ferguson et al. (1985) found that a random sample of community residents from Gainesville who were characterized by high levels of need for cognition reported relying more on newspapers and magazines for news and reported watching television less than did residents characterized by low levels of need for cognition; Heppner, Reeder, and Larson (1983), who were interested in the counseling process, found that individuals high in need for cognition were more likely to engage in personal problem solving; and Ahlring and McClure (1985) reported that individuals high in need for cognition were more likely to have followed the 1984 presidential debates than were individuals low in need for cognition. In three studies on communication and persuasion, Cacioppo et al., (1983) exposed subjects to either a strong or weak set of arguments for a counterattitudinal recommendation (e.g., raising student tuition; instituting senior comprehensive exams). Results from the studies revealed that subjects high in need for cognition recalled more message arguments from both the strong and the weak versions of the message, and they reported expending more cognitive effort when deliberating about the message to which they had been exposed than did subjects low in need for cognition. The manipulation of argument quality also had a greater impact on the message evaluations and postcommunication attitudes of subjects high in need for cognition than it did on those of subjects low in need for cognition, suggesting that the former derived more information from and elaborated more on the externally provided message arguments.

### Experiment 1

Throughout this research, we have assumed that need for cognition acts primarily as a motivational factor. To paraphrase White (1959, p. 321), the motivation underlying individual differences in need for cognition cannot be conceived as having a source in tissues external to the nervous system, nor can it be conceived as a deficit motive; instead, it represents intrinsic motivation to engage in effortful cognitive endeavors (Cacioppo & Petty, 1982, 1984; Cacioppo et al., 1983). One might also expect a positive, but modest, correlation between need for cognition—a motivational construct—and intelligence—an ability construct. For instance, individuals high in need for cognition may be more likely to be exposed to and look up unfamiliar words, thereby building a more extensive vocabulary than would equally able individuals low in need for cognition. Moreover, although positive reinforcement per se is not sufficient for the development of intrinsic motivation (e.g., Deci & Ryan, 1980; Lepper, Greene, & Nisbett, 1973), intelligent individuals should be more likely to experience success and attain aspired goals in difficult cognitive tasks. Consistent with this reasoning, studies indicate a moderately positive relation between need for cognition and verbal intelligence and no relation between need for cognition and abstract reasoning (cf. Heesacker, in press).

Nevertheless, concerns have been expressed that the modest relation between need for cognition and verbal intelligence may be sufficient to suggest that verbal intelligence, not need for cognition, underlies the observed individual differences in message processing and persuasion (e.g., see Chaiken, in press). The aim of Experiment 1, therefore, was to provide a clearer picture of

the nature of individuals high and low in need for cognition and of the distinctions between them in terms of the manner in which they think about incoming counterattitudinal communications.

### Method

#### Design and Procedure

One hundred ninety-two male and female undergraduates participated in the experiment to earn extra credit in an introductory psychology course. Data from 7 subjects were excluded from the analysis because they failed to complete the need for cognition and/or verbal intelligence measures. The design was a 2 (need for cognition: low or high)  $\times$  2 (argument quality: strong or weak) between-subjects factorial. Subjects were tested in groups of 5 to 20 in cubicles constructed to preclude subject interaction.

On arrival at the laboratory, subjects were told that the study dealt with extrasensory communication. This was done to minimize their awareness of the actual hypotheses being tested. They were informed that their role in this study was to listen to an audiotaped message and to try to transmit their thoughts during the message to a receiver located in another room. To lend credence to this cover story, the experimenter recruited a volunteer from the subjects to act as the receiver. The volunteer was informed that he or she should sit quietly until the first signal was given, at which time he or she should concentrate on *sensing* the thoughts and ideas being transmitted. Finally, the receiver was told that at a second signal, he or she should stop trying to detect the transmissions of thoughts and should begin listing everything that he or she thought about during the reception period. The receiver was then given a form to use to list thoughts (see Cacioppo & Petty, 1981, for details) and was taken to and seated at a table in a nearby room.

Next, subjects read a background sheet stating that the recommendation about which they would be hearing had been advanced recently by the University Committee on Academic Affairs and Policy Formation. They read that the committee was convened to consider university policies for the 1990s. Subjects then listened to a message in which the speaker was introduced and that consisted of either eight strong or eight weak arguments favoring the proposal that tuition be increased substantially at the University of Iowa in 1990. This recommendation was selected because previous research had indicated that recommendations that were to take place in the distant future would not motivate individuals generally to think extensively about the issue, and because pilot testing had indicated that subjects high and low in need for cognition held similar attitudes both in terms of mean attitude and in terms of attitude extremity. After exposure to the message, subjects completed dependent measures, and both need for cognition and verbal intelligence were assessed. When the receiver subsequently returned to the room and proved unable to identify the recommendation (none was successful), an active discussion ensued on the importance of scientific research in evaluating social beliefs. A complete debriefing was accomplished during this discussion.

#### Independent Variables

*Need for cognition.* Among the measures in the subjects' postmessage questionnaire was the abbreviated NCS (Cacioppo et al., 1984). The NCS consists of 18 statements that pertain to one's reactions to demands for effortful thinking in a variety of situations (e.g., "I find satisfaction in deliberating hard and for long hours," "I prefer to think about small, daily projects to long-term ones"). Subjects rated how characteristic each of the 18 statements was of themselves. Subjects whose scores were above the median were classified as being high in

need for cognition, and those with scores below the median were classified as low in need for cognition.

**Argument quality.** The audiotaped message was approximately 700 words long and contained either eight strong or eight weak arguments for increasing undergraduate tuition. Each version of the message was developed in pretests such that the strong arguments elicited more favorable than unfavorable thoughts, whereas the weak arguments elicited more unfavorable than favorable thoughts for both individuals high in need for cognition and individuals low in need for cognition when they were instructed to think about them (cf. Cacioppo et al., 1983).

### Dependent Variables

**Postcommunication attitude.** Immediately after listening to the audiotape, subjects read: "Since your personal views on the desirability of the policy recommendation about which you heard might influence the manner in which you transmit information about it, a measure of your own opinion is desired." Participants used five 9-point semantic differential scales (good/bad, beneficial/harmful, wise/foolish, favorable/unfavorable, agree/disagree) to indicate their own feelings about raising tuition. The average of each subject's responses served as the measure of postcommunication attitude.

**Message evaluation.** Subjects were asked to evaluate the communication using the following five 9-point rating scales: (a) "To what extent do you feel the arguments presented in the audiotape made their points effectively?" (1 = *not at all*, 9 = *completely*); (b) "To what extent did you like the message presented in the audiotape?" (1 = *not at all*, 9 = *very much*); (c) "To what extent do you feel the message arguments presented in the audiotape were convincing?" (1 = *not at all convincing*, 9 = *very convincing*); (d) "Considering both content and style, how well written was the message presented in the audiotape?" (1 = *poorly written*, 9 = *very well written*); and (e) "Would you judge the reasons given for supporting the recommendation in the audiotape presentation as being?" (1 = *very poor quality and unconvincing reasons*, 9 = *very good quality and compelling reasons*). Subjects' responses to these five questions were averaged to obtain a general index of message evaluation.

**Cognitive responses.** Next, subjects were told that because we were interested in their effectiveness in transmitting thoughts to the receiver, it was necessary to obtain as accurate and complete a list of thoughts that occurred to them during the presentation of the audiotaped message as possible. Subjects were instructed to list everything about which they were thinking during the presentation of the audiotaped message. The subjects were given 2.5 min to complete this task. After completing the dependent variable booklet, subjects rated each item they had listed as being favorable (+), unfavorable (-), or neutral/irrelevant (0) to the recommendation. A complete description of the thought-listing assessment procedure is provided in Cacioppo and Petty (1981).

**Recall of message arguments.** Finally, subjects were asked to list as many of the arguments they heard for increasing undergraduate tuition as they could remember. Subjects had not expected this recall test. They were given 5 min to list any arguments that they could recall from the message. Subsequently, two judges independently determined the number of arguments each subject recalled correctly. The judges were not aware of subjects' level of need for cognition. An item listed by a subject was counted as correctly recalled if it expressed one of the eight arguments contained in the message to which he or she had been exposed. Arguments listed twice by a subject were counted only once. The interrater reliability was  $r = .76$ ,  $p < .001$ , and judges' counts were averaged to obtain a measure of the number of arguments correctly recalled by each subject.

**Cognitive effort.** Two questions were embedded in the postexperimental questionnaire to assess independently the cognitive effort subjects expended when exposed to the persuasive communication: "To what extent were you trying hard to think about the merits of the recom-

mendation?" (1 = *not at all*, 9 = *very much*), and "How much effort did you put into evaluating the rationale provided for the recommendation by the speaker?" (1 = *none*, 9 = *very much*). Subjects' responses to these questions were averaged to obtain a general index of cognitive effort.

**Ancillary measures.** Three measures of issue involvement were as follows: "How important to you is the recommendation that undergraduate tuition be increased in 1990?" (1 = *not at all important*, 9 = *very important*); "How involved were you while listening to the audiotape presentation?" (1 = *not at all*, 9 = *very much*); and "How likely is it that the University of Iowa will institute this recommendation while you are a student here?" (1 = *not very likely*, 9 = *very likely*). Subjects' responses to these questions were averaged prior to analysis. A measure of distraction, asking subjects to indicate how distracted they felt, was worded "How distracted were you from paying attention to the audiotape presentation?" (1 = *not at all distracted*, 9 = *very distracted*). Finally, four filler items were included in the questionnaire to maintain the cover story. These items inquired about subjects' beliefs about extrasensory communication. Analyses revealed no differences across conditions on any of these ancillary measures. Hence, they will not be discussed further.

**Verbal intelligence measure.** After subjects completed the dependent measure booklet, they were given the Shipley-Hartford Vocabulary Test (Shipley, 1940) and allowed 10 min to complete the test. This test contains 40 words and is arranged in a multiple-choice format with one explanatory sample. Subjects were asked to choose one word from four alternative words (e.g., maniacal, curious, devout, complaining) that means the same thing, or most nearly the same thing, as the test word (e.g., querulous). The number of correct responses serves as the measure of subjects' verbal intelligence. Although an imperfect measure of intelligence, a number of studies have found that correlations between this scale and other assessments of intellectual functioning are quite high (e.g., Watson & Klett, 1968; Wiens & Banaka, 1960). For example, Watson and Klett (1968) reported a correlation of .78 between this scale and the Wechsler Adult Intelligence Scale (WAIS). Because this scale has been found to be a rapid and reasonably accurate intellectual screening instrument, other researchers have also provided tables for deriving IQ equivalent scores from Shipley-Hartford scores (cf. Bartz & Loy, 1970; Sines & Simmons, 1959).

### Results and Discussion

#### Cognitive Responses, Message Evaluation, and Attitudes

The first aim of this study was to test the hypothesis that the topic-relevant thinking, message evaluation, and postcommunication attitudes of subjects high in need for cognition, in contrast to subjects low in need for cognition, are more affected by argument quality. To protect against Type-I error, the data were submitted to a 2 (need for cognition: low or high)  $\times$  2 (argument quality: strong or weak) multivariate analysis of variance (MANOVA) in which both variables served as between-subjects factors. Wilks' criterion and  $F$  approximations were used to evaluate statistical significance. Results revealed a main effect for argument quality,  $F(4, 175) = 17.96$ ,  $p < .01$ , and a Need for Cognition  $\times$  Argument Quality interaction,  $F(4, 175) = 2.61$ ,  $p < .05$ .

A two-way analysis of variance (ANOVA) on the index of message evaluation revealed a significant main effect for argument quality,  $F(1, 178) = 34.43$ ,  $p < .01$ . The strong version of the message ( $M = 6.24$ ) was rated more positively than the weak version of the message ( $M = 4.91$ ). More important, the analysis of this measure revealed a significant Need for Cognition  $\times$  Ar-

Table 1  
*Message Evaluation and Postcommunication Attitude as a Function of Need for Cognition and Argument Quality*

Measure	Low need for cognition		High need for cognition	
	Weak arguments	Strong arguments	Weak arguments	Strong arguments
Message evaluation	5.37 <sub>b</sub>	6.29 <sub>c</sub>	4.38 <sub>a</sub>	6.20 <sub>c</sub>
Attitude	5.01 <sub>b</sub>	6.30 <sub>c</sub>	4.04 <sub>a</sub>	6.62 <sub>c</sub>

Note. Means in a given row with the same subscript are not significantly different at  $p < .05$  by the Newman-Keuls test.

gument Quality interaction,  $F(1, 178) = 4.59, p < .05$ . As can be seen in Table 1, subjects low in need for cognition provided less discriminating evaluations of the strong and weak versions of the message than did subjects high in need for cognition.

Analysis of the postcommunication attitude index also revealed a main effect for argument quality,  $F(1, 178) = 56.15, p < .01$ , and a significant interaction between need for cognition and argument quality,  $F(1, 178) = 6.63, p < .02$ . The main effect indicated that subjects expressed more positive attitudes toward the recommendation after exposure to strong arguments ( $M = 6.46$ ) than to weak arguments ( $M = 4.55$ ), whereas the interaction revealed that individuals low in need for cognition were affected less by argument quality on their postcommunication attitudes than were individuals high in need for cognition.

Finally, analyses of topic-relevant thoughts indicated the argument quality manipulation was effective. The ANOVA performed on the number of favorable thoughts indicated that subjects generated more favorable thoughts toward the recommendation when exposed to strong arguments ( $M = 1.62$ ) than when exposed to weak arguments ( $M = 1.04$ ),  $F(1, 181) = 7.91, p < .01$ . Analysis of unfavorable thoughts also revealed a main effect for argument quality,  $F(1, 181) = 26.71, p < .001$ , indicating that subjects generated more unfavorable thoughts when processing the weak arguments ( $M = 2.47$ ) than when processing the strong arguments ( $M = 1.36$ ). In addition, the analysis of the frequency of unfavorable thoughts revealed a Need for Cognition  $\times$  Argument Quality interaction,  $F(1, 178) = 6.01, p < .02$ . Consistent with the results on the measures of attitude and message evaluation, argument quality had a weaker impact on the number of unfavorable thoughts generated by subjects low in need for cognition ( $M_{\text{strong}} = 1.46, M_{\text{weak}} = 2.09, p < .05$ ) than by subjects high in need for cognition ( $M_{\text{strong}} = 1.27, M_{\text{weak}} = 2.92, p < .05$ ). A similar pattern of results was observed for the measure of favorable thoughts ( $M_{\text{strong}} = 1.42, M_{\text{weak}} = 1.21$  for subjects low in need for cognition;  $M_{\text{strong}} = 1.75, M_{\text{weak}} = 0.85$  for subjects high in need for cognition), but the interaction was not significant,  $F(1, 178) = 2.70, p = .10$ .

### Cognitive Effort and Recall

As noted, the assumption underlying this research is that individuals low in need for cognition tend to avoid (rather than be incapable of) effortful analyses of persuasive communications. Although the measure of cognitive effort required subjects to

report on a psychological process, as such is of possibly limited validity (cf. Nisbett & Wilson, 1977), and MANOVAS and ANOVAS of both cognitive effort and recall were conducted to probe this assumption. The MANOVA revealed one significant effect—the main effect for need for cognition,  $F(2, 179) = 10.07, p < .01$ . Similarly, the ANOVAS revealed two main effects for need for cognition. Replicating prior research (Cacioppo et al., 1983): (a) individuals low in need for cognition reported expending less cognitive effort to think about the merits of the recommendation ( $M = 6.13$ ) than did individuals high in need for cognition ( $M = 6.86$ ),  $F(1, 180) = 9.78, p < .01$ ; and (b) subjects low in need for cognition recalled fewer arguments presented ( $M = 3.72$ ) than did subjects high in need for cognition ( $M = 4.44$ ),  $F(1, 180) = 13.99, p < .001$ .

### Are the Observed Individual Differences in Message Processing and Persuasion Attributable to Intelligence?

Cacioppo et al. (1983) reported two studies in which need for cognition was weakly related to the Shipley-Hartford verbal intelligence score, with correlations of .15 and .21. In the present data, an even more substantial correlation was obtained ( $r = .32, N = 185, p < .001$ ). Hence, the present data allowed us to examine the notion that verbal intelligence underlies the effects on message processing and persuasion that have been attributed to need for cognition.

As an initial test on the impact of verbal intelligence on the various dependent measures obtained in the present experiment, subjects were divided into high-intelligence and low-intelligence groups on the basis of a median split on their verbal intelligence distribution. Separate 2 (verbal intelligence: high or low)  $\times$  2 (argument quality: strong or weak) ANOVAS were performed on the dependent measures.

The measure most likely to be affected by verbal intelligence was message recall (cf. Eagly & Warren, 1976), and results revealed a main effect for verbal intelligence on the measure of recall. Paralleling the results obtained when subjects were blocked on need for cognition, subjects with high-verbal intelligence scores recalled more message arguments ( $M = 4.37$ ) than did subjects with low-verbal intelligence scores ( $M = 3.75$ ),  $F(1, 180) = 10.19, p < .002$ . The framework outlined in the present article would lead us to expect, however, that the recall data were due primarily to differences in motivation in the case of the analyses of need for cognition, but due primarily to differences in ability in the case of the analyses of verbal intelligence. That is, separate bases of these effects would be expected. Consistent with this reasoning, a stepwise regression analysis using the number of recalled message-arguments as the criterion and the verbal intelligence and need for cognition scores as the predictors revealed: (a) Verbal intelligence was entered first into the regression equation and accounted for 12% of the variance in the arguments recalled ( $\beta = .34$ ),  $F(1, 182) = 23.67, p < .001$ ; and (b) need for cognition accounted for an additional 4% of the variance in the arguments recalled ( $\beta = .20$ ),  $F(1, 181) = 7.55, p < .01$ . These findings clearly demonstrate that, although verbal intelligence was a better predictor of the number of arguments recalled than was need for cognition, verbal intelligence and need for cognition accounted for significant and distinct sources of variance with respect to the arguments recalled by

subjects. These results are clearly consistent with the conceptualization of intelligence and need for cognition as separable recipient factors in studies of attitudes and social cognition.

Further evidence for the conceptualization of need for cognition and intelligence as motivational and ability factors, respectively, was obtained in the remaining analyses. Subjects high in need for cognition reported expending more cognitive effort than did subjects low in need for cognition, yet there was no significant difference between people high in verbal intelligence versus people low in verbal intelligence on this measure ( $M_{\text{high-IQ score}} = 6.67$ ,  $M_{\text{low-IQ score}} = 6.29$ ;  $p > .20$ ). Moreover, the Verbal Intelligence  $\times$  Argument Quality interactions on the indexes of counterargumentation, message evaluation, and attitude, which were significant when subjects were blocked in terms of their need for cognition scores, were not significant when verbal intelligence served as the blocking variable. Instead, and consistent with McGuire's (1969) postulate regarding the effect of intelligence on persuasion, a significant main effect for verbal intelligence on the measure of message evaluation revealed that the relatively intelligent subjects rated the message more negatively overall ( $M = 5.30$ ) than did their less-intelligent counterparts ( $M = 6.01$ ),  $F(1, 180) = 9.65$ ,  $p < .01$ . No other tests were significant.

To yet further explore the effects on message processing of the subjects' need for cognition without variations in verbal intelligence, analyses of covariance (ANCOVAs) were conducted with subjects' need for cognition serving as the blocking variable and verbal intelligence serving as the covariate (cf. Insko, Lind, & LaTour, 1974, for a discussion of this procedure). Results revealed that the interaction between need for cognition and argument quality on the index of attitude, unfavorable thoughts, and message evaluation remained significant even when variations in subjects' verbal intelligence were statistically controlled. The main effects for need for cognition on recall and self-reported cognitive effort also remained significant. The results of the ANCOVAs using subjects' verbal intelligence as the blocking variable and need for cognition score as the covariate also revealed that the tests that were significant in the ANOVAs remained significant, suggesting that need for cognition and intelligence are separable constructs with distinctive effects on attitudinal processing.

### Summary

Previous studies exploring the effects of need for cognition on message processing have not assessed verbal intelligence, and thus it was not possible to examine the extent to which results were due to differences in subjects' motivation or their ability to scrutinize the arguments given for a counterattitudinal proposal. The present data, however, clearly indicate that need for cognition and verbal intelligence account for at least partially independent components of attitudinal processing. The fact that verbal intelligence accounted for more variance in recall than did need for cognition suggests both that people's comprehension of externally provided message arguments is strongly influenced by their level of verbal intelligence (Eagly & Warren, 1976) and that verbal intelligence was validly assessed in the present research. Also consistent with previous research, however, the retention of the externally provided message argu-

ments predicted neither the overall attitude change ( $r = -.09$ ,  $ns$ ) nor the attitude change observed within the strong arguments conditions ( $r = .01$ ,  $ns$ ) or the resistance to attitude change within the weak arguments condition ( $r = -.18$ ,  $ns$ ). Despite the strong relation observed between verbal intelligence and recall, need for cognition still accounted for a significant portion of the remaining variance in recall. Also, all of the significant effects of need for cognition on message processing remained significant when variations in measured verbal intelligence were controlled statistically. Thus, converging evidence was obtained for the view that individuals low in need for cognition think less about persuasive communications than do individuals high in need for cognition, and that this difference is due to the relative likelihood that individuals low in need for cognition will try to avoid effortful cognitive analyses of incoming information (i.e., their being cognitive misers) rather than to their being less intelligent (i.e., their being verbal dolts).

### Experiment 2

A wide variety of variables can affect a person's motivation and ability to consider issue-relevant arguments in either a relatively objective or in a relatively biased manner. However, according to Petty and Cacioppo's (1981, 1986a, 1986b) ELM, extensive issue and argument processing is only one (central) route to persuasion or resistance. When people are relatively unmotivated or unable to process issue-relevant arguments, attitude changes may still occur if peripheral cues are present in the persuasion situation (peripheral route). In fact, the ELM postulates that as argument scrutiny (whether objective or biased) is reduced, peripheral cues become more important determinants of persuasion, but as argument scrutiny (whether objective or biased) is increased, peripheral cues become less important in persuasion. Moreover, Petty and Cacioppo (1980, 1986b) postulated that attitudes formed via the central route are more predictive of subsequent behavior than are attitudes formed via the peripheral route.

The results of Experiment 1 replicated those of Cacioppo et al. (1983) by showing that argument quality is a more important determinant of the attitudes of individuals high rather than of individuals low in need for cognition. Cacioppo et al. (1983, p. 817) also suggested that subjects low in need for cognition may be more likely to travel the peripheral route to persuasion because, in their effort to derive a *reasonable* position on the issue while minimizing the expenditure of cognitive resources, they use obvious cues in the persuasion context (e.g., the *apparent* number of arguments for the recommendation). In a first attempt to examine the differential use of peripheral cues by individuals high and low in need for cognition, we exposed undergraduates to a videotape in which either an attractive or unattractive source presented eight strong arguments for the imposition of senior comprehensive exams (Cacioppo, Petty, Kao, & Hargitt, cited in Cacioppo & Petty, 1984). Two results from the study indicated that subjects low in need for cognition made greater use of the attractiveness cues than did subjects high in need for cognition. First, subjects low in need for cognition but not subjects high in need for cognition used attractiveness for judging other characteristics such as trustworthiness. More interestingly, a Source Attractiveness  $\times$  Need for Cogni-



tion interaction on the measure of attitude change (postscore – prescore) showed that the unattractive communicator affected subjects high and low in need for cognition similarly, but the attractive source had a significantly greater impact on individuals low in need for cognition.

In a more recent study, we examined the differential susceptibility of subjects low and high in need for cognition to cues in a situation in which no arguments actually were presented (Haugtvedt, Petty, & Cacioppo, 1986). In order to examine the relative impact of cues on attitude issues for which the elaboration likelihood would normally be high or low, issues were identified toward which students showed equivalent agreement but which differed in terms of their knowledge and personal importance. Specifically, students showed equivalent agreement toward statements supporting stiffer penalties for drunk driving and the dangers of nuclear power plants, but students indicated that they knew more about the first issue and that it was more personally important to them. To manipulate a simple peripheral agreement/disagreement cue, subjects were informed that “over 80% of college students completely *agreed* with” or “completely *disagreed* with” stiffer penalties for drunk driving or the dangers of nuclear power plants immediately prior to asking for their own attitudes. Results revealed strong support for the theoretical role of both situational and dispositional factors in persuasion. The simple cue had no effect on the attitudes of either individuals high or low in need for cognition when the issue was one of high relevance and knowledge (i.e., high-elaboration likelihood); however, for the low-relevance and knowledge (i.e., low-elaboration likelihood) issue, a significant Need for Cognition  $\times$  Peripheral Cue interaction revealed that subjects low in need for cognition were affected by the simple agreement cue, but subjects high in need for cognition were not. Two recent studies by Chaiken and her colleagues have provided additional support for the notion that subjects low in need for cognition are more susceptible to peripheral cues than are individuals high in need for cognition (Axsom, Yates, & Chaiken, cited in Chaiken, in press; Chaiken, Axsom, Hicks, Yates, & Wilson, cited in Chaiken, in press).

In sum, research on need for cognition is clearly consistent with the view that the NCS at least allows gross distinctions to be made between individuals who differ chronically in their tendency to engage in and enjoy effortful cognitive endeavors, and the cumulative research on need for cognition and persuasion indicates, as would be expected, that the attitudes of individuals high in need for cognition are more likely to be affected by issue-relevant thinking (central route), whereas the attitudes of individuals low in need for cognition are more likely to be influenced by peripheral cues (peripheral route). In Experiment 2, individual differences in need for cognition were used to test a postulate from the ELM with regard to the differential consequences of attitudes formed via the central versus peripheral route: Attitudes that result mostly from processing issue-relevant arguments (central route) will show greater prediction of behavior than attitudes that result mostly from the operation of peripheral cues.

A political survey and the NCS were embedded in a much larger questionnaire in order to assess attitudes toward the 1984 presidential candidates, confidence in their selection, reported thought and knowledge about the candidates, behavioral inten-

tions, and level of need for cognition. The questionnaire was administered to a large sample of students approximately 8 weeks prior to the 1984 presidential election, and a pool of individuals differing widely in their scores on the NCS were identified for follow-up. Under the guise of a postelection phone survey, 108 of these individuals were contacted within 72 hr of the presidential election, and follow-up measures, including reported voting behavior, were obtained. In addition, 61 subjects were recruited during the fall of 1984 to complete a brief (objective) knowledge test concerning the 1984 presidential candidates. It was hypothesized that (a) all subjects would report having thought about and having more knowledge about the candidates immediately following the election than they would 8 weeks prior to the election (situational influence); (b) subjects high in need for cognition would report having thought more about and having more knowledge about the presidential candidates than would subjects low in need for cognition (dispositional influence); and (c) the attitudes of subjects high in need for cognition obtained approximately 8 weeks prior to the presidential election would be more predictive of their behavioral intentions and reported voting behavior than would the attitudes of subjects low in need for cognition.

### Method

#### *Preelection Survey and Assessment of Need for Cognition*

A large pool of students from introductory psychology classes participated in a 1-hr session approximately 8 weeks prior to the 1984 presidential election. Included in the materials was the NCS (Cacioppo et al., 1984) and a set of questions regarding the 1984 Democratic and Republican presidential tickets. The NCS and the preelection survey regarding the political candidates were embedded among a larger set of items, and responses were made on 7-point (–3 to +3) Likert-type scales. Scale labels were counterbalanced and were later transformed so that higher numbers marked higher quantities or more agreement. The target questions and transformed scales were as follows: (a) “What is your attitude toward Mondale/Ferraro?” (–3 = *very much opposed*, +3 = *very much in favor*); (b) “How much do you know about the Mondale/Ferraro ticket?” (–3 = *very little*, +3 = *very much*); (c) “What is your attitude toward Reagan/Bush?” (–3 = *very much opposed*, +3 = *very much in favor*); (d) “How much do you know about the Reagan/Bush ticket?” (–3 = *very little*, +3 = *very much*); (e) “For whom do you intend to vote?” (–3 = *Reagan/Bush*, +3 = *Mondale/Ferraro*); (f) “How confident are you in your selection?” (–3 = *not at all confident*, +3 = *very confident*); and (g) “I have given this issue a lot of thought” (–3 = *strongly disagree*, +3 = *strongly agree*).

The pool of potential participants for this study was restricted to students whose scores on the NCS fell in the top or bottom third of the distribution. This restriction was imposed to enhance the differences between samples because the limited time interval in which to obtain postelection surveys prohibited the use of a large sample size in this study. Two hundred sixty-four students were classified as being low or high in need for cognition and, therefore, as being potential interviewees.

#### *Postelection Phone Survey*

To test the experimental hypothesis, we sought to contact approximately 100 individuals within the three evenings following the 1984 presidential election. The interviews were conducted by an individual

who was unaware of the experimental hypothesis regarding attitude-behavior correspondence, and each phone interview took approximately 5 min to complete. No mention was made during the phone interview of the group testing conducted 8 weeks earlier, but rather, the interviewer simply indicated that she was conducting a postelection survey and asked the subject's indulgence for a few minutes. The interview consisted of the same questions as listed above with one exception: Rather than asking for whom they intended to vote, subjects were asked whether they had voted and, if so, for whom they had voted (1 = *Reagan/Bush*, 2 = *Mondale/Ferraro*). Subjects who indicated they had not voted were asked to indicate for whom they *would* have voted. Of the 56 individuals low in need for cognition who were contacted, 41 (73%) reported having voted, and 43 (83%) of the 52 individuals high in need for cognition reported having voted in the presidential election ( $Z = 1.26$ , *ns*).

The interviewer was not able to reach everyone the first time that she phoned them, although many were reached on the second or third callback. This raised the important questions of whether, as would be the case if chance determined which of the potential respondents we were able to contact by phone, the subjects high in need for cognition interviewed by phone were representative of subjects high in need for cognition in the initial pool and whether the subjects low in need for cognition interviewed by phone were representative of subjects low in need for cognition in the pool. Data bearing on these questions were obtained by comparing the preelection survey responses of subjects high and low in need for cognition who were interviewed following the election with those of subjects high and low in need for cognition who were not part of the postelection sample. The 2 (need for cognition: low vs. high)  $\times$  2 (group: preelection only vs. preelection and postelection) MANOVA of the preelection survey data revealed that neither the need for cognition or group main effect nor the Need for Cognition  $\times$  Group interaction approached significance ( $ps > .15$ ). Moreover, univariate ANOVAs revealed no significant Need for Cognition  $\times$  Group interaction on any measure. Hence, the 108 students from whom we were able to secure complete postelection data appeared representative of the students high and low in need for cognition tested initially.

### Knowledge Test

An objective measure of subjects' knowledge about the political candidates was also sought in the present study. Pairs of students who differed dramatically in need for cognition (i.e., who fell in the bottom or top tripartite of scores) were recruited for participation in a brief laboratory session. A total of 61 students were tested during the fall semester—33 three to five weeks prior to the election and 28 three to five weeks following the election. Students were tested in cubicles constructed so that no subject could have visual or verbal contact with any other subject. In this session, subjects were asked to list everything they knew about the presidential candidates. Subjects were instructed to list one fact per line and were told that grammar and spelling were unimportant. Subjects were given 5 min to complete this task and were then thanked and dismissed. Afterward, a judge, blind to the experimental conditions, counted the number of unique items of information that were listed by each subject, and a second judge independently scored a random sample of approximately 25% of these tests. Interrater agreement was satisfactory ( $r > .90$ ), so the frequency counts of the first judge served as the dependent variable. Need for Cognition (low vs. high) and Measurement Time (preelection vs. postelection) served as between-subjects factors in the analysis of the knowledge-test.

## Results and Discussion

### Political Cognitions and Attitudes

The first aim of the study was to test the hypothesis that subjects high in need for cognition think more about significant

**Table 2**  
*Political Cognitions, Attitudes, and Reported Behaviors as a Function of Measurement Time and Need for Cognition*

	Low need for cognition		High need for cognition	
	Pre-election	Post-election	Pre-election	Post-election
Reported amount of thought				
about candidates	-0.02 <sub>a</sub>	1.09 <sub>b</sub>	1.20 <sub>b</sub>	1.56 <sub>b</sub>
Confidence in selection	1.42 <sub>a</sub>	1.98 <sub>a</sub>	1.90 <sub>a</sub>	2.12 <sub>a</sub>
Reported knowledge				
about Mondale/Ferraro	-0.84 <sub>a</sub>	0.14 <sub>b</sub>	0.21 <sub>b</sub>	0.65 <sub>b</sub>
Reported knowledge				
about Reagan/Bush	-0.27 <sub>a</sub>	0.38 <sub>ab</sub>	0.79 <sub>b</sub>	0.94 <sub>b</sub>
Preference index	-0.32 <sub>a</sub>	-0.38 <sub>a</sub>	0.33 <sub>b</sub>	0.40 <sub>b</sub>
Behavioral index	-0.24 <sub>a</sub>	-0.09 <sub>ab</sub>	0.25 <sub>c</sub>	0.09 <sub>bc</sub>

*Note.* Means in a row with a similar subscript do not differ by the Newman-Keuls pair-wise comparison test ( $p < .05$ ).

events in their social environment, such as a presidential election, than do individuals low in need for cognition. To protect against Type-I error, the responses of the 108 subjects for whom complete survey data were obtained were submitted to a 2 (need for cognition: low or high)  $\times$  2 (time: preelection or postelection) mixed model MANOVA in which time served as a within-subjects factor. Wilks's criterion and  $F$  approximations were used in evaluating statistical significance. Six criterion measures were included in this analysis. Subjects' responses to questions regarding how much they knew about Reagan/Bush, how much they knew about Mondale/Ferraro, how much they had thought about the candidates, and how confident they were in their selection served as four of the criterion measures. Subjects' attitudes toward Reagan/Bush and Mondale/Ferraro within the preelection survey and within the postelection survey were redundant conceptually and empirically ( $rs = -.84$  and  $-.82$ , respectively). Hence, each attitude measure was standardized, and a *preference index* was calculated for each subject within the preelection and the postelection surveys by subtracting the standardized attitude measure regarding Reagan/Bush from the corresponding standardized attitude measure regarding Mondale/Ferraro. Low scores on the preference index reflected a pro-Reagan/anti-Mondale position, whereas high scores reflected an anti-Reagan/pro-Mondale position. Finally, subjects reported their behavioral intention using a 7-point scale in the preelection survey, and they indicated for whom they had (or would have) voted in the postelection survey. Subjects' responses to each scale were standardized, and these standardized behavioral reports represented the sixth criterion measure. The MANOVA revealed main effects for time,  $F(6, 90) = 7.36$ ,  $p < .01$ , and need for cognition,  $F(6, 101) = 4.18$ ,  $p < .01$ , and a Need for Cognition  $\times$  Time interaction,  $F(6, 90) = 2.23$ ,  $p < .05$ .

Cell means and standard deviations for the criterion measures are presented in Table 2. Analyses of the individual measures revealed main effects for time of measurement, showing that, as might be expected, subjects reported having thought



more about the candidates,  $F(1, 95) = 21.54, p < .01$ , having more knowledge about the Mondale/Ferraro ticket,  $F(1, 95) = 26.14, p < .01$ , having more knowledge about the Reagan/Bush ticket,  $F(1, 95) = 6.28, p < .02$ , and having more confidence in their selection,  $F(1, 95) = 7.81, p < .01$ , following the election than they did 8 weeks preceding the election. This evidence for a situationally induced increase in thinking about the presidential candidates was repeated almost exactly by the dispositional effects of need for cognition. Individuals high in need for cognition reported having thought more about the candidates,  $F(1, 106) = 12.80, p < .01$ , knowing more about the Mondale/Ferraro ticket,  $F(1, 106) = 12.27, p < .01$ , and knowing more about the Reagan/Bush ticket,  $F(1, 106) = 16.07, p < .01$ , than did individuals low in need for cognition. The only significant Need for Cognition  $\times$  Time of Measurement interaction was found for the measure of the amount of thinking subjects said they had done regarding the candidates,  $F(1, 95) = 4.26, p < .05$ . As can be seen in Table 2, individuals high in need for cognition reported having thought considerably about the candidates weeks prior to the election, whereas both individuals high and low in need for cognition reported having thought about the candidates when queried shortly after the election. Finally, analyses of subjects' attitudes toward the presidential candidates revealed that subjects low in need for cognition preferred the Reagan/Bush ticket ( $M = -0.36$ ) more than did individuals high in need for cognition ( $M = 0.37$ ),  $F(1, 106) = 4.68, p < .05$ . No other test was significant.

### Knowledge Test

Although the preceding analyses provide evidence consistent with the experimental hypotheses, it is not absolutely clear whether subjects high in need for cognition actually possessed more knowledge about the candidates or they simply reported having more knowledge about the candidates than did subjects low in need for cognition. To clarify this issue, the data obtained from the 61 subjects who separately completed the knowledge test were submitted to a 2 (need for cognition)  $\times$  2 (time of measurement) ANOVA. Results revealed that subjects high in need for cognition generated more facts about the presidential candidates ( $M = 8.13$ ) than did subjects low in need for cognition ( $M = 6.10$ ),  $F(1, 59) = 4.52, p < .05$ . Neither the main effect for time nor the Need for Cognition  $\times$  Time interaction was significant, but it should be recalled that the knowledge test was administered to subjects either several weeks before the election or several weeks following the election. Hence, the absence of effects attributable to time in this particular analysis is not surprising.

Subjects' attitudes toward the political candidates are unlikely to have contributed to the knowledge difference obtained as a function of need for cognition because an ANOVA of the standardized preference index revealed no significant difference in this sample. Instead, analyses of these subjects' responses to the preelection survey revealed significant differences only on the measures of reported knowledge about the Reagan/Bush ticket ( $M_{\text{high}} = 1.30, M_{\text{low}} = -0.16$ ),  $F(1, 59) = 16.21, p < .01$ , reported knowledge about the Mondale/Ferraro ticket ( $M_{\text{high}} = 0.93, M_{\text{low}} = -0.45$ ),  $F(1, 59) = 11.85, p < .01$ , reported confidence in their selection ( $M_{\text{high}} = 2.10, M_{\text{low}} = 1.13$ ),  $F(1, 59) =$

5.36,  $p < .05$ , and reported extent to which they had thought about the candidates ( $M_{\text{high}} = 1.50, M_{\text{low}} = -0.19$ ),  $F(1, 59) = 13.41, p < .01$ . In sum, individuals high in need for cognition not only reported having thought more about the candidates and being more knowledgeable about the candidates, but they also listed more information when asked to indicate what they knew about the political candidates. Moreover, for several reasons it is unlikely that response biases can account for these differences. First, previous research shows weak to null relations between need for cognition and response-biasing factors such as social desirability and test anxiety (e.g., Cacioppo & Petty, 1982; Olson, Camp, & Fuller, 1984; see recent review by Heesacker, in press). Second, it would be difficult to explain the objective differences found on the knowledge test if one reasoned that the results of the preelection survey were attributable to subjects high in need for cognition inflating their reports of how much thinking they had done and how much knowledge they possessed about the political candidates. Third, although low correlations could be expected to exist between the self-report measures of knowledge (obtained 8 weeks prior to the election) and performance on the knowledge test (administered several weeks prior to and following the election), the average correlation between reported knowledge and performance should be lower for individuals high in need for cognition than for individuals low in need for cognition if the former's self-reports are more influenced by some form of response bias. Analyses, however, revealed that the average correlation between reported knowledge about the political candidates and the number of items listed in the knowledge test were essentially equal within the low and high in need for cognition groups ( $r_{\text{high}} = .22, r_{\text{low}} = .23$ ).

### Attitude-Behavior Correspondence

To test the hypothesis that the preelection attitudes of subjects high in need for cognition, in contrast to those low in need for cognition, would be more predictive of subsequent behavior, the correlation between the preference index representing subjects' attitudes 8 weeks prior to the election and their reported voting behavior was calculated separately for the high and low in need for cognition groups. The analysis provided support for this hypothesis. The preelection preference index predicted the candidate for whom individuals high in need for cognition reported voting significantly better ( $r = .87, N = 49$ ) than did the preelection preference index of individuals low in need for cognition ( $r = .46, N = 52, Z = 4.12, p < .01$ ). These calculations include all subjects from whom postelection surveys were secured—some of whom had not voted and who reported for whom they would have voted. Therefore, this analysis was repeated with only those individuals who indicated they had voted in the election. Results again indicated greater behavioral prediction for individuals high ( $r = .86, N = 40$ ) rather than low in need for cognition ( $r = .41, N = 41, Z = 3.71, p < .01$ ). Finally, differential attitude-behavior correspondence was also evident, although not as dramatic, within the preelection survey data. Results revealed that the preelection preference index correlated more highly with the behavioral intentions expressed by individuals high in need for cognition ( $r = .96, N = 49$ ) than by

individuals low in need for cognition ( $r = .90$ ,  $N = 55$ ,  $Z = 2.34$ ,  $p < .05$ ).

Experimental demands are unlikely to be a contributory factor to these results because the questions constituting the pre-election survey were embedded in a larger questionnaire, which was completed by students during large group-testing sessions conducted at the beginning of the semester, and a cover story was used to mask any link between students' participation in the group testing session and the postelection survey conducted by phone approximately 8 weeks later. What, therefore, might account for the observed differences in attitude-behavior correspondence? We turn to this issue next.

### *Was Differential Attitude Stability a Contributory Factor?*

One possible explanation for the greater correspondence between preelection attitudes and postelection behaviors within high than within low in need for cognition groups was that the initial attitudes of the former changed less across the 8-week interval separating the preelection and postelection surveys. Given the uncontrolled events intervening between the preelection survey and the election—such as the nearly ruinous performance by Reagan in the first presidential debate, the surprisingly strong performances by Bush and by Reagan in the remaining debates, and the differential likelihoods that high and low in need for cognition individuals watched the presidential debates (Ahlering & McClure, 1985)—predictions regarding the stability of attitudes across individuals high and low in need for cognition were not as straightforward as in studies in which the information to which subjects were exposed and the intervening events were controlled (e.g., Chaiken, 1980; Cialdini, Levy, Herman, Kozlowski, & Petty, 1976; Cohen, 1957).

To examine this question, however, a *preference-change* score was calculated by taking the absolute value of the difference between each individual's standardized preference indexes. This preference-change score was then submitted to a one-way (need for cognition) ANOVA. Results revealed a nonsignificant difference ( $M_{\text{low}} = 0.72$ ,  $M_{\text{high}} = 0.67$ ;  $F < 1$ ). Similarly, no difference was found as a function of need for cognition when the preference change score was calculated by taking the simple difference between each individual's standardized preference scores. Moreover, the correlations between subjects' preelection preference and behavioral reports remained higher within the high than within the low in need for cognition groups when the preference-change score was partialled out.

### *Was Differential Attitude Extremity a Contributory Factor?*

It is possible that the preferences of individuals high in need for cognition were more extreme, particularly in light of the following: (a) research by Tesser and his colleagues (Tesser, 1978) showing that individuals who have thought about attitude issues tend to possess more polarized attitudes;<sup>2</sup> (b) research by McGuire (1981) showing that people who have been induced to think about an issue exhibit a more logically consistent and more highly interwoven belief structure; and (c) the results of Experiment 1 and of previous research on need for cognition

showing that individuals high in need for cognition formulate more extreme message evaluations and attitudes when confronted with either a set of strong or a set of weak message arguments for a position. To determine whether extremity differed as a function of need for cognition, an *extremity index* was calculated by taking the absolute value of the preference index obtained from the preelection survey. Higher scores on the extremity index reflected a greater preference for one candidate over the other. The ANOVA of this index revealed that subjects high in need for cognition did indeed express more extreme preferences ( $M = 1.91$ ) than did individuals low in need for cognition ( $M = 1.30$ ),  $F(1, 106) = 9.83$ ,  $p < .01$ .

The correlations between the preference index and the behavioral reports remained significantly higher within the high than within the low in need for cognition groups when the extremity index was partialled out, however, suggesting that something other than extremity was contributing to the relation. Determining whether the factors of attitude extremity, need for cognition, and temporal proximity of the decision (i.e., time of survey) contributed separately and/or jointly to attitude-behavior correspondence required a different tact. Hence, subjects were classified as possessing *moderate* or *extreme* preferences, irrespective of their level of need for cognition, on the basis of the absolute value of their preference index. A criterion measure for attitude-behavior correspondence (i.e., an *A-B index*) was derived using the standardized behavioral-report measure such that: (a) if subjects expressed a preference for the Mondale/Ferraro ticket, then the preelection A-B index was set to equal the standard score for the behavioral intention measure and the postelection A-B index was set to equal the standard score for the reported voting measure (recall that higher scores on these measures indicate greater voting intentions/reports for Mondale/Ferraro over Reagan/Bush); and (b) if subjects expressed a preference for the Reagan/Bush ticket, then the preelection A-B index was set to equal  $-1$  times the standard score for the behavioral intention measure and the postelection A-B index was set to equal  $-1$  times the standard score for the reported voting measure.<sup>3</sup> The A-B index was then subjected to a 2 (need for cognition)  $\times$  2 (attitude extremity)  $\times$  2 (time of measurement) weighted-means ANOVA. The expected main effect for extremity was significant,  $F(1, 104) = 21.35$ ,  $p < .01$ , showing that individuals with extreme preferences also exhibited greater attitude-behavior consistency ( $M = .97$ ) than did individuals

<sup>2</sup> This is not to suggest that enhanced thinking will necessarily lead to more polarized attitudes for individuals high in need for cognition than for individuals low in need for cognition. For example, if the arguments on an issue are mixed or if a two-sided message is presented, individuals high in need for cognition may exhibit more balanced rather than more polarized attitudes.

<sup>3</sup> The correlational analysis reported above demonstrated that the covariation between the standardized measures of preference and behavior was greater for individuals high in need for cognition than for individuals low in need for cognition even when the extremity of the preference was partialled out. The present analysis (and the A-B index) was designed to isolate and examine the separable effects of attitude extremity, time of measurement, and need for cognition by treating these factors as blocking rather than as dependent variables. Hence, to eliminate attitude extremity from the dependent variable, a dichotomous ( $-1$ ,  $+1$ ) preference measure was used in calculations of the A-B index.

with moderate preferences ( $M = .43$ ). The main effect for time was also significant,  $F(1, 93) = 6.50, p < .05$ , showing, as Schwartz (1978) has contended, that attitude-behavior consistency was greater when the behavioral measure was secured at the same time as attitude measurement ( $M = .79$ ) than when the behavioral measure was made 8 weeks later ( $M = .62$ ). These main effects were qualified by a significant Extremity  $\times$  Time interaction,  $F(1, 104) = 7.72, p < .01$ , which was due to the fact that time had a stronger impact on the attitude-behavior consistency of individuals with an extreme preference ( $M_s = 1.17$  and  $.77$  for preelection and postelection, respectively;  $p < .05$  by Newman-Keuls test) than on individuals with moderate attitudes ( $M_s = .40$  and  $.46$  for preelection and postelection surveys, respectively; *ns*). Importantly, the analysis also revealed an unqualified main effect for need for cognition,  $F(1, 104) = 7.22, p < .01$ , showing that individuals high in need for cognition exhibited stronger attitude-behavior correspondence ( $M = .91$ ) than did individuals low in need for cognition ( $M = .52$ ). No other test was significant.<sup>4</sup>

### *Was Differential Cognitive Elaboration a Contributory Factor?*

We were led to the hypothesis that individuals high in need for cognition, in contrast to individuals low in need for cognition, would exhibit stronger attitude-behavior correspondence because of their greater chronic tendency to engage in effortful cognitive analyses of communications and events in their social environment. Confidence in one's attitude, which has been proposed as contributing to attitude behavior correspondence (Fazio & Zanna, 1981), did not vary across the high and low in need for cognition groups, whereas individuals high in need for cognition reported having thought more about the presidential candidates (see Table 2). Moreover, the higher attitude-behavior correspondence among individuals high in need for cognition than among individuals low in need for cognition was not limited to their simply possessing more knowledge (cf. Davidson, Yantis, Norwood, & Montano, 1985), as the correlational analysis in which the self-report measures of knowledge were partialled out failed to eliminate the difference in the correlation between preference and behavioral reports across individuals low and high in need for cognition. Finally, although the only measure of the extent to which subjects thought about the candidates was subjects' response on a 7-point scale that ranged from *not at all* to *very much*, the correlations between this measure and the extremity of subjects' preference scores was significantly greater than zero for individuals high in need for cognition ( $r = .43, p < .01$ ), but not for individuals low in need for cognition ( $r = .26, ns$ ). These results suggest that the observed differences in attitude extremity were due to differences in issue-relevant thinking (cf. Tesser, 1978) but should be considered tentative because these correlations were not significantly different from one another.

Note that a correlational analysis in which the self-report measure of amount of prior thinking was partialled out also failed to eliminate the difference in the correlations between preference and behavioral reports across individuals high and low in need for cognition. However, because of the limited utility of self-report measures of cognitive processes (Nisbett &

Wilson, 1977) and because of both Cohen and his colleagues' (1955) and Cacioppo and Petty's (1982) previous expressions of concern about the limited validity of self-report measures of cognitive effort in studies of individual differences in need for cognition, this result is not particularly surprising. Data such as those provided in Experiment 1 showing that individuals high in need for cognition differentiate more between sets of strong and weak message arguments above and beyond any differences attributable to intelligence, and those showing that individuals low in need for cognition are more likely to be influenced by peripheral cues when formulating their attitudes toward an issue, speak more definitively to the processes underlying the attitudes formed by individuals high in need for cognition versus individuals low in need for cognition than are differences in reported effort per se. Hence, despite the absence of unequivocal correlational evidence for the role of cognitive elaboration, the present study clearly demonstrates that attitude-behavior consistency is higher for individuals high in need for cognition than for individuals low in need for cognition, and the accumulated research favors cognitive elaboration as playing a role in this effect. In sum, the results of Experiments 1 and 2 provide support for the ELM wherein individuals high in need for cognition show greater attitude-behavior correspondence because their attitudes are based more on issue-relevant thinking.

<sup>4</sup> These calculations include all individuals from whom postelection surveys were secured. The same results obtained when the analysis was repeated including only those individuals who reported voting. The main effects for extremity,  $F(1, 79) = 21.68, p < .01$ , and time,  $F(1, 77) = 9.27, p < .01$ , were again qualified by the Extremity  $\times$  Time interaction,  $F(1, 77) = 5.99, p < .02$ ; and the main effect for need for cognition was significant and unqualified by any higher order interaction,  $F(1, 79) = 12.67, p < .01$ . No other test was significant. Note the present results were obtained when analyses were based solely on subjects' attitudes toward Reagan/Bush, which varied in mean attitude but not in attitude extremity across levels of need for cognition; and when analyses were based solely on subjects' attitudes toward Mondale/Ferraro, which varied in attitude extremity but not in mean attitude across levels of need for cognition.

### References

- Adams, J. S. (1959). Advice seeking of mothers as a function of need for cognition. *Child Development*, 30, 171-176.
- Ahlering, R., & McClure, K. (1985, May). *Need for cognition, attitudes, and the 1984 presidential election*. Paper presented at the meeting of the Midwestern Psychological Association, Chicago.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bartz, W. R., & Loy, D. L. (1970). The Shipley-Hartford as a brief I.Q. screening device. *Journal of Clinical Psychology*, 26, 74-75.
- Cacioppo, J. T., & Petty, R. E. (1981). Social psychological procedures for cognitive response assessment. In T. Merluzzi, C. Glass, & M. Genest (Eds.), *Cognitive assessment* (pp. 309-342). New York: Guilford Press.
- 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. (1984). The need for cognition: Relationship to attitudinal processes. In R. P. McGlynn, J. E. Maddux, C. D. Stoltzberg, & J. H. Harvey (Eds.), *Social perception in clinical and*

- counseling psychology (Vol. 2, pp. 113-140). Lubbock: Texas Tech University Press.
- 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. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. *Journal of Personality and Social Psychology*, 45, 805-818.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39, 752-766.
- Chaiken, S. (in press). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario Symposium* (Vol. 5). Hillsdale, NJ: Erlbaum.
- Cialdini, R. B., Levy, A., Herman, P., Kozlowski, L., & Petty, R. E. (1976). Elastic shifts of opinion: Determinants of direction and durability. *Journal of Personality and Social Psychology*, 34, 663-672.
- Cohen, A. R. (1957). Need for cognition and order of communication as determinants of opinion change. In C. I. Hovland (Ed.), *The order of presentation in persuasion* (pp. 79-97). New York: Yale University Press.
- 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.
- Davidson, A. R., Yantis, S., Norwood, M., & Montano, D. E. (1985). Amount of information about the attitude object and attitude-behavior consistency. *Journal of Personality and Social Psychology*, 49, 1184-1198.
- Deci, E. L., & Ryan, R. M. (1980). The empirical exploration of intrinsic motivational processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 13, pp. 40-81). New York: Academic Press.
- Eagly, A. H., & Warren, R. (1976). Intelligence, comprehension, and opinion change. *Journal of Personality*, 44, 226-242.
- Fazio, R. H., & Zanna, M. P. (1981). Direct experience and attitude-behavior consistency. *Advances in Experimental Social Psychology*, 14, 162-203.
- Ferguson, M., Chung, M., & Weigold, M. (1985, May). *Need for cognition and the medium dependency components of reliance and exposure*. Paper presented at the meeting of the International Communication Association, Honolulu, HI.
- Haugtvedt, C., Petty, R. E., & Cacioppo, J. T. (1986, May). *Need for cognition and the use of peripheral cues*. Paper presented at the meeting of the Midwestern Psychological Association, Chicago.
- Heesacker, M. (in press). A critique of the Need for Cognition Scale. In D. J. Keyser & R. C. Sweetland (Eds.), *Test critiques* (Vol. 3). Kansas City, MO: Test Corp. of America.
- Heppner, P. P., Reeder, B., & Larson, L. M. (1983). Cognitive variables associated with personal problem-solving appraisal: Implications for counseling. *Journal of Counseling Psychology*, 30, 537-545.
- Ingham, A. G., Levinger, G., Graves, J., & Peckham, V. (1974). The Ringlemann effect: Studies of group size and group performance. *Journal of Experimental Social Psychology*, 10, 371-384.
- Insko, C. A., Lind, Z. A., & LaTour, S. (1974). Persuasion, recall, and thoughts. *Representative Research in Social Psychology*, 7, 66-78.
- Latané, B., Williams, K. D., & Harkins, S. G. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, 37, 822-832.
- Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, 28, 129-137.
- McGuire, W. J. (1969). The nature of attitudes and attitude change. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (2nd ed., Vol. 3, pp. 233-346). Reading, MA: Addison-Wesley.
- McGuire, W. J. (1981). The probabilistic model of cognitive structure and attitude change. In R. E. Petty, E. M. Ostrom, & T. C. Brock (Eds.), *Cognitive responses in persuasion* (pp. 291-304). Hillsdale, NJ: Erlbaum.
- Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84, 231-259.
- Olson, K., Camp, C., & Fuller, D. (1984). Curiosity and need for cognition. *Psychological Reports*, 54, 71-74.
- Petty, R. E., & Cacioppo, J. T. (1980). Effects of issue involvement on attitudes in an advertising context. In G. Gorn & M. Goldberg (Eds.), *Proceedings of the Division 23 Program*. Montreal, Canada: Division 23 of the American Psychological Association.
- Petty, R. E., & Cacioppo, J. T. (1981). *Attitudes and persuasion: Classic and contemporary approaches*. Dubuque, IA: Wm. C. Brown.
- Petty, R. E., & Cacioppo, J. T. (1986a). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer-Verlag.
- Petty, R. E., & Cacioppo, J. T. (1986b). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 123-205). New York: Academic Press.
- Petty, R. E., Cacioppo, J. T., & Kasmer, J. A. (1985, May). *Individual differences in social loafing on cognitive tasks*. Paper presented at the meeting of the Midwestern Psychological Association, Chicago.
- Rosen, E. (1963). Need for cognition: Measurement and some correlates. *Psychological Reports*, 13, 408.
- Rosen, E. (1964). Factor analysis of the need for cognition. *Psychological Reports*, 15, 619-625.
- Rosen, E., Siegelman, E., & Teeter, B. (1963). A dimension of cognitive motivation: Need to know the known vs. the unknown. *Psychological Reports*, 13, 703-706.
- Rydell, S. T., & Rosen, E. (1966). Measurement and some correlates of need-cognition. *Psychological Reports*, 19, 139-165.
- Schwartz, S. H. (1978). Temporal instability as a moderator of the attitude-behavior relationship. *Journal of Personality and Social Psychology*, 36, 715-724.
- Shipley, W. C. (1940). *Shipley-Hartford Scale: Manual of directions*. Hartford, CT: Neuro-Psychiatric Institute of the Hartford Retreat.
- Sines, L. K., & Simmons, H. (1959). The Shipley-Hartford Scale and the Doppelt Short Form as estimators of WAIS IQ in a state hospital population. *Journal of Clinical Psychology*, 14, 452-453.
- Taylor, S. E. (1981). The interface of cognitive and social psychology. In J. Harvey (Ed.), *Cognition, social behavior, and the environment*. Hillsdale, NJ: Erlbaum.
- Tesser, A. (1978). Self-generated attitude change. *Advances in experimental social psychology*, 11, 289-338.
- Underwood, B. J., & Shaughnessy, J. J. (1975). *Experimentation in psychology*. New York: Wiley.
- Watson, C., & Klett, W. (1968). Prediction of WAIS IQs from the Shipley-Hartford, the Army General Classification Test, and the Revised Beta Examination. *Journal of Clinical Psychology*, 24, 338-341.
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 297-333.
- Wiens, A., & Banaka, W. (1960). Estimating WAIS IQ from Shipley-Hartford scores: A cross validation. *Journal of Clinical Psychology*, 16, 452.
- Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D. R., & Karp, S. A. (1974). *Psychological differentiation*. Potomac, MD: Erlbaum. (Original work published in 1962)

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