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Evaluative feedback and the need for cognition

Roufail, Mary Michel, Ph.D.

The University of North Carolina at Greensboro, 1992

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EVALUATIVE FEEDBACK AND THE NEED FOR COGNITION

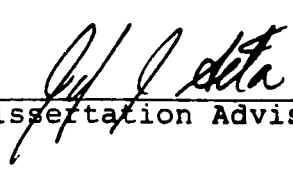
by

Mary Michel Roufail

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1992

Approved by



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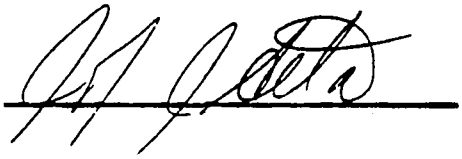
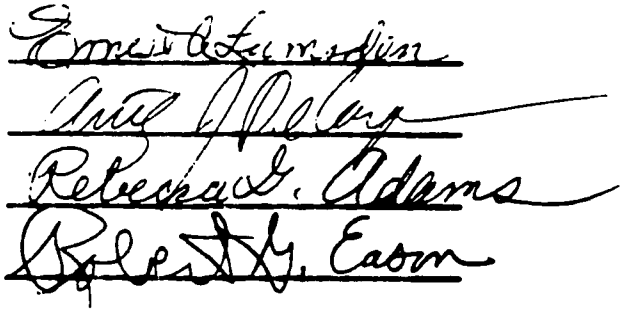
Dissertation Adviser 

Committee Members 

March 24, 1992
Date of Acceptance by Committee

March 24, 1992
Date of Final Oral Examination

ACKNOWLEDGMENTS

I was privileged to be guided by my adviser, Dr. John Seta, whose skill and patience greatly contributed to the final form of my dissertation. I am also extremely grateful to the other members of my committee, Drs. Rebecca Adams, Anthony DeCasper, Robert Eason, and Ernest Lumsden. Their invaluable suggestions and support were much appreciated.

A special thank you to Dr. Herr and to Cheryl Ann Carlin for sharing with me their statistical expertise.

I would also like to thank Michele Roufail and Frances Davis for their help as my independent raters, and Ibby Hunt for her skill in typing this manuscript.

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ROUFAIL, MARY MICHEL, Ph.D. Evaluative Feedback and the Need for Cognition. (1992) Directed by Dr. John J. Seta. 60 pp.

Research in social psychology has shown that individuals differ in the way they process information. For example, a central processing approach, consisting of an analytic consideration of relevant arguments, characterizes people high in need for cognition. Individuals low in need for cognition, on the other hand, tend to be swayed by the peripheral aspects of a communication. The need for cognition is broadly defined as a motivation to engage in cognitively challenging activities. The present study was conducted to assess the effect of evaluative feedback on people's need for cognition, as measured by the Need for Cognition Scale (NCS), and by the subjects' performance on a cognitive task. We found that, compared to people low in need for cognition, individuals who reported a high need for cognition were less affected by feedback and generated a higher number of arguments for and against an issue. We discussed the practical as well as the theoretical implications of these findings.

CHAPTER I

INTRODUCTION

Social psychology has traditionally been concerned with the complex cognitive activities associated with our need for consistency (Festinger, 1957; Paulhus, 1982), for systematically assigning causes for observed events (Heider, 1958; Holtzworth-Munroe & Jacobson, 1985; Kelley, 1973), and for comparing ourselves to others for the purpose of evaluating our opinions and abilities (Festinger, 1954; Miller & McFarland, 1987; Seta, Seta, & Donalson, 1991; Wood, 1989). Another line of research has given much attention to the cognitive deficits which seem to characterize our thinking process (e.g., Langer, 1978; Nisbett & Ross, 1980). Particularly in the area of persuasion, Cialdini and his colleagues (1975) suggested that much of the compliance phenomenon can be understood in terms of a preference for heuristics, rules of thumb designed to simplify or speed up our judgment. At a time when we are assaulted by an ever-increasing number of persuaders yielding an ever-increasing number of messages, many of which are of little importance, the shortcuts afforded by automatic responses are invaluable. However, in cases where the message may be crucial to our well-being, researchers have found that high involvement in an issue

will generally elicit an analytical rather than a mindless response (Chaiken, 1980; Petty & Cacioppo, 1979). Still, even when holding environmental events constant, individuals nevertheless differ significantly in the way they process information. They may either weigh the relevant factors of a communication, or attend to the peripheral aspects of a message. These differences are considered to be due to variations in need for cognition, a person construct.

Although the usefulness of personality characteristics in predicting behavior has long been and still remains a subject of debate (e.g., Mischel, 1968), impressive consistencies have been found in the domain of cognitive style. For example, Mischel's (1973) person variables include cognitive and behavioral competencies, which he defines as a potential to construct and generate patterns of organized behavior. Witkin and his colleagues (Witkin, Dyk, Faterson, Goodenough, & Karp, 1979) distinguished between the cognitive style of field-dependent individuals, characterized by a tendency to perceive a stimulus as a global entity, and that of field-independent persons, who are sensitive to both the complexities and the differentiation of stimuli. Levelers and sharpeners fall along the same lines, respectively (Klein, 1970). Kagen (1972) also stressed the importance of examining individual differences in cognition. He suggested that people exhibit either a propensity toward or an avoidance of complex cognitive activity.

The way we process information should obviously be taken into consideration in most, if not all, social interactions. The purpose of the present study was primarily to further investigate the notion of a need for cognition, one that has been defined somewhat differently by various researchers. In the mid-fifties, Cohen and his colleagues (Cohen, Stotland, & Wolfe, 1955) demonstrated that a differential need for cognition influenced people's affective and behavioral responses. Their experimental stimuli consisted of either a structured or an ambiguous form of the same story concerning a student's interview with a potential employer. Unlike the structured story, events in the ambiguous version were somewhat incoherent, no rationale was given for the behavior described, and the outcome was inconclusive. Compared to those low in need for cognition (LNC), the subjects high in need for cognition (HNC) reacted negatively to the obvious flaws in the narrative. Furthermore, a high need for cognition did not correspond to a need for achievement, leading the researchers to conclude that they had demonstrated support for "the notion of a need for cognition as a need in its own right" (p. 294). Cohen and his colleagues defined the need for cognition as a "need to structure relevant situations in meaningful, integrated ways" (p. 291). They assessed it with the Situations Checklist and the Hierarchy of Needs Measure, neither of which is available any longer.

The Situations Checklist was described as a group of forced choice reactions to a number of hypothetical situations, where they had identified the high need response a priori. Cohen's view of the need for cognition stressed the motivational aspects of that need, assuming that a state of tension would lead to negative affect and to active efforts to remedy a situation where the need for cognition was unfulfilled. Cohen (1957) also found that HNC individuals were intrinsically motivated to elaborate on information regarding an issue, independently of a need-arousing communication. This was not true of LNC subjects. Participants read a message advocating grading on a curve before or after being told that their own university had worrisome grading problems. Results showed that the LNC subjects changed their attitudes in favor of the message, but only when it was preceded by the fear arousing communication. The order of presentation had no effect on the HNC students' attitude change. They obviously attended to the substance of the message, regardless of personal involvement.

Similarly, a focus on the drive reduction properties of the need for cognition led Rosen (1964) to define this construct as a relatively enduring disposition whose function is to reduce tension. Hence, he predicted that it would be aroused in some situations and not in others. Rosen and his colleagues (Rosen, Siegelman, & Teeter, 1964) found that

individuals who showed a desire to be cognitively challenged preferred information unknown to most other people as opposed to widely known information. Rosen (1964) developed an instrument consisting of 293 true-false items resulting in 12 scales. He administered his questionnaire to a High cognitive group which comprised college students in an Honors program, a Low group from a minimally competitive college, and a Middle group consisting of liberal arts and science students. In general the differences between the Low and Middle groups were slim but the High cognition group differed significantly from the other two. Rosen found the Highs to be more intellectually motivated than the others but found no substantial differences among the groups on orientation to academic subject matter, emphasis on prestige, defensive denial, or independent self-confident intellectualism. Moreover, the 12 factors identified by factor analysis led Rosen to conclude that his scale described a number of needs which may not all be found in the same individual.

The latest view of the need for cognition discounted the tension reduction aspect of the need for cognition. Cacioppo and Petty (1982) emphasized that they used the term "need" in a statistical rather than in a biological sense. They suggested that there were stable individual differences in people's tendency to engage in and enjoy effortful cognitive activity, and concluded that the need for cognition was

probably aquired in the course of development, that it would be rather consistent but also affected by the demands of the situation.

Cacioppo and Petty's review of the compliance literature had revealed that some of the contradictory experimental findings could be accounted for by the differential way that people attend to a message. Their (1986) Elaboration Likelihood Model proposed one of two routes to persuasion: a central processing approach reflecting a particular attention to the relevant arguments and characteristic of HNC people, and a peripheral approach, considering for example some trivial aspect of the communication, primarily used by those low in need for cognition. While Cohen et al. (1955) conceptualized the need for cognition as "a need to experience an integrated and meaningful world" (p. 293), Petty and Cacioppo argued that one might fulfill this need either by careful investigation of the relevant aspects of the information or by relying on an expert source, as noted by Adams (1959). In the first eventuality but not in the latter, the individual would demonstrate a high need for cognition.

To distinguish between individuals who differ in their need for cognition, Cacioppo and Petty (1982) used criteria of ambiguity, irrelevance and inconsistency in selecting the items for the Need For Cognition Scale (NCS), which yielded one dominant factor. Furthermore, they validated their

questionnaire by asking their subjects to perform a tedious either very simple or more complex circling numbers task. Participants did not generally enjoy either task but the HNC subjects tended to prefer the complex to the simple task and the opposite was true of the LNC subjects. In addition, the higher the subjects' need for cognition score, the less likely they were to derogate the experimenter. Finally, Cacioppo and Petty's measure was found to correlate with ACT scores (r=.39, p<.01) but not with the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) and to relate negatively to Troldahl and Powell's (1965) measure of dogmatism (r=-.27, p<.05). The Need for Cognition Scale (NCS) was found to idnetify

> one primary factor in a reliable manner, to discriminate between groups known to differ by their occupations in need for cognition, to assess a construct related to but distinguishable from cognitive style, and to be unrelated to (and unbiased by) respondents' level of test anxiety. (1982, p. 124)

In addition, Cacioppo and his colleagues (Cacioppo, Petty, & Morris, 1983) reported two studies which found a weak correlation between the Shipley-Hartford verbal intelligence score (Shipley, 1940) and the need for cognition (r=.15 and .21). Another study yielded a moderate correlation between these two measures (r=.32; Cacioppo, Petty, Kao, & Rodriguez, 1986). To investigate the possibility that individual differences in message processing, which they had attributed to need for cognition, could be attributed to

intelligence, Cacioppo et al. divided their subjects into high intelligence and low intelligence groups and gave them a recall test. A main effect for verbal intelligence indicated that subjects with high-verbal intelligence scores recalled more message arguments than did those with low-verbal scores. These results paralleled the results obtained with the need for cognition. However, a stepwise regression analysis demonstrated that verbal intelligence and need for cognition accounted for significant but distinct sources of variance with respect to message recall. Moreoever, all the significant effects of need for cognition on message processing remained significant when differences in verbal intelligence were controlled statistically. These findings suggest that intelligence is at least partially independent of need for cognition.

In his critique of the need for cognition, Heesacher (1984) praised the empirical construction of the scale, its convergent and divergent validity, and its internal consistency as shown by the scale high theta reliability, a maximized Cronbach's alpha coefficient (.91; Cacioppo, Petty, & Kao, 1984). He noted, however, that the test-retest reliability of the NCS was provided only indirectly: People typed as high and low in need for cognition showed systematic differences in performance 8 weeks later.

Various lines of research have tested the need for cognition, lending support for both the validity of the

construct and its applicability. Investigations of the need for cognition have revealed that high and low in need for cognition individuals differ in the way they process, recall, and are influenced by communications. Cacioppo et al. (1983) found that HNC subjects recalled more message arguments and expended more effort thinking about an editorial than did LNC subjects. Furthermore, they reported thinking more about the weak than the strong arguments of the message. Additional data showed a significantly larger correlation for HNC than for LNC individuals between message evaluation and attitude change. Cacioppo and Petty (1986) found the NCS to be positively but weakly related to field independence, negatively related to close-mindedness, and unrelated to Sarason's (1972) measure of test anxiety. The need for cognition was also found to correlate negatively with receiver's apprehension, a predisposition to respond to tasks with anxiety (Burr & Pryor, 1988). Olson, Camp, and Fuller (1984) reported a significant correlation between scores on the NCS and eight measures of curiosity, a moderate relationship between achievement (ACT) scores and NCS and a small correlation between NCS and social desirability. Furthermore, individuals who differ in their need for cognition also differ in their learning style (Srull, Lichenstein, & Rothbart, 1985).

Other studies, which distinguished between people high and low in their need for cognition on the basis of their

scores on the NCS, found a correlation between lower NCS scores and greater anxiety about tests, grades, and performing in front of others, but not physical harm, college life, and same and opposite-sex friends (Cacioppo & Petty, 1984). Compared to LNC subjects, HNC subjects worked harder to get information, and were more confident about intellectual but not about other issues, such as money (Sidera, 1983). Those who differed in their need for cognition also differed in their choices of magazines and in their preferences for activities demanding high cognitive effort (Tolentino, Curry, & Leak, 1990). Additionally, Ahlering and McClure (1985) reported that more HNC than LNC individuals planned to watch the Reagan-Mondale and the Bush-Ferrari debates, and generated more thoughts about the consequences of electing a particular candidate. Cacioppo and his assistants (1986) also found that HNC subjects thought more about the elections, had more information about the candidates, and showed a stronger relationship between their attitudes and their voting behavior than did LNC subjects.

Experimental manipulations further supported the relevance of the need for cognition in understanding social behavior. In a brainstorming task, LNC but not HNC subjects generated fewer ideas in group conditions than individually, but this social loafing phenomenon was present for both HNC and LNC subjects when they were asked to perform a

noncognitive task (Petty, Cacioppo, & Kasmer, 1985). Furthermore, HNC, compared to LNC subjects, demonstrated lower sensitivity to peripheral cues, such as the number of arguments in a persuasive communication, and the presence of audience cues, such as applause (Axsom, Yates, & Chaiken, 1987; Haughvedt, Petty, & Cacioppo, 1986).

The practical value of the need for cognition has been demonstrated in a number of ways. Assessments of both problem solving ability and need for cognition indicated that, compared to LNC, HNC people used more efficient ways of coping (Heppner, Reeder, & Larson, 1983). Martin (1985) also noted the usefulness of considering people's need for cognition in counseling and psychotherapy. Moreover, Cacioppo and Petty (1984) suggested that the NCS, in conjunction with such tests as college entrance examinations, could be invaluable as a diagnostic test of scholastic performance.

Additionally, even though research has supported the notion of the need for cognition as an intrinsic motivation to engage in certain activities, the need for cognition has not been studied in the context of the literature on intrinsic motivation. The present study, therefore, investigated that concept from the perspective of both intrinsic motivation and persuasion research. More specifically, we attempted to understand the mediating effects of the need for cognition on people's responses to evaluative feedback.

Intrinsic motivation is the desire to engage in a behavior for its own sake rather than a means to an end (Lepper, 1980). Deci and Ryan's (1985) cognitive evaluation theory proposes that three types of events affect intrinsic motivation: informational, controlling, and amotivating events. Informational events such as positive feedback or freedom in the choice of activities enhance intrinsic motivation because they make us feel competent and self-determining, respectively. Tangible rewards such as money given for engaging in a task are generally viewed as controlling in the sense that they elicit a particular behavior. Thus, they undermine self-determination and lead to a decrease in intrinsic motivation. Amotivating events are those which threaten an individual's sense of competence. Thus, the effects of negative feedback should also be a decrease in motivation. In support of the theory, positive verbal feedback enhanced motivation, while negative performance feedback was shown to decrease motivation to engage in cognitive tasks (e.g., Deci, 1971; Vallerand & Reid, 1988; Weiner & Mander, 1978). Moreover, self-determination was found to be an important factor underlying intrinsic motivation (Zuckerman, Porac, Lathin, Smith, & Deci, 1978). Prior research has shown that an illusion of choice (allowing subjects to "choose" by letting them draw a slip from a jar) is sufficient to create a situation where people feel self-determining (e.g., Sansone, 1989). In the

present study, subjects were required to generate a number of arguments in favor of or/and against a campus issue. Furthermore, subjects were told beforehand that they could refuse to participate, at any time during the experimental session, without incurring any penalty. Finally, the experimenter did not in any way suggest that the subjects may be evaluated on their performance. Thus, the controlling aspects of the feedback were kept at a minimum, and the sense of self-determination was maximized, as the subjects were free both to continue with the experimental procedure and to express their opinions on an issue.

Whereas cognitive evaluation theory describes the factors which maintain and enhance intrinsic motivation, Bandura's (1982) self-efficacy model explains how people may develop an interest in certain activities, provided they feel a sense of competence. However, it is sometimes difficult to predict how people will interpret events, especially evaluative information. Some researchers have argued that women tend to react negatively to feedback, including positive evaluations, presumably because they react to the controlling aspects of the evaluative process (Deci, 1975; Deci, Casio, & Krusell, 1975; Zinser, Young, & King, 1982). Other studies found that positive feedback enhances intrinsic motivation regardless of age (Anderson, Manoogian, & Reznick, 1976; Dollinger & Thelen, 1978) and gender (e.g., Blanck, Reis, & Jackson, 1984; Vallerand & Reid, 1988).

The impact of feedback on intrinsic interest may also depend on personality characteristics. For example, Harackiewiz, Sansone, and Manderlink (1985) reported that motivating factors such as a need for achievement (n ach) also affected the way people responded to evaluative feedback. They gave their subjects two of three kinds of informations. In the expectancy manipulation condition, subjects were provided with a prediction of a better than average performance, based on their past performance. Additionally, they were given either a normative standard, which was set low enough to ensure that it would provide subjects in the standard condition with positive competence information about their ongoing experimental task, or a normative feedback, which allowed them retrospective evaluation of their performance on the experimental task. Thus, all three manipulations yielded positive information. Harackiewicz and her colleagues found that subjects low in achievement motivation who began their task with high expectations because of a positive expectancy manipulation enjoyed their subsequent task, but only when they were given competence cues that provided them with a sense of efficacy while they were solving word puzzles. Evaluations given before or after completion of the task undermined their enjoyment. The researchers concluded that situations where people low in n ach feel evaluated and are given feedback about their performance only

after the task is completed should be extremely aversive. On the other hand, subjects high in achievement motivation, expecting to do better than average, believed that they had performed better and enjoyed the task better, relative to their pretest report of enjoyment of such tasks. Normative feedback, supplied after task engagement, did not affect enjoyment of the task for achievement-oriented subjects. The finding that poeple who differ in achievement motivation are affected differentially by evaluative positive feedback has implications for a concept such as the need for cognition which is, like the need for achievement, both a motivating factor and a personality characteristic. Thus, we hypothesized that need for cognition might mediate the effects of evaluative feedback, as was the case with achievement motivation.

The present study investigated the stability of a tendency to engage in a cognitively demanding activity and the effects of a situational variable such as evaluative feedback on the need for cognition. Inasmuch as measures of intrinsic motivation generally concern enjoyment of the task at hand, our present study incorporated a specific as well as the global, probably more stable, interest measure. Subjects in our experiment rated the extent to which they enjoyed both the cognitive activity in which they had just engaged and cognitive tasks in general, as reflected by their scores on

the NCS. We assumed that the post-task enjoyment ratings would indicate the subjects' momentary response to the task at hand, and we focused on both the second NCS score (NCS2) and the difference between the two NCS scores as measures of the effect of feedback on people's customary interest in cognitive activities. Prior research has shown that feedback may convey competence cues which affect intrinsic motivation (e.g., Vallerand & Reid, 1988). Feedback actually communicates multiple messages, one of which is competency and another relaying the information that others have favorably or unfavorably judged one's performance.

However, HNC individuals may be less likely than LNC subjects to be affected by positive or negative evaluations. People who have a high need for cognition have been found to be relatively unconcerned about the judgments of others. They are also confident in their ability, having presumably experienced repeated success with cognitive tasks; therefore, competency information related to this area should be of little value. Thus we predicted that, on the NCS2 measure, reflecting the subjects's level of interest in cognitive activities that they reported at the experimental session, HNC subjects would remain relatively impervious to evaluative feedback (either positive or negative) and would not significantly alter their stated overall interest in cognitive tasks. This would not be the case for individuals low in

need for cognition. Their tendency to be influenced by external cues should make them sensitive to evaluative information. Thus we expected to find a difference in their NCS2 scores across positive and negative feedback conditions, positive feedback leading to an increase of their NCS2 scores and negative feedback to a decrease of those scores. Furthermore, an additional measure, representing the difference between NCS and NCS2 scores (change score), should yield a main effect for need for cognition, if as expected, HNC subjects change less across contexts than do LNC subjects.

In addition, we employed two control groups. Subjects in the first no feedback control group followed the same procedure as that of both the positive and negative feedback conditions, but were not given feedback. In the second no feedback control group, subjects' initial task consisted of the NCS scale. Thus, unlike the first control group, they took the NCS scale again at the laboratory session before, not after, completing the experimental task. We included this additional control condition to measure subjects' NCS scores in the immediate context. This measure would not be influenced by any expectations subjects might have developed concerning their performance had they engaged in a cognitive task prior to responding to the NCS. Thus, the first control group tested primarily the effect of no feedback on the need for cognition whereas the second control group yielded data

pertinent to the test-retest reliability of the instrument. In both control conditions, both change and NCS2 scores in the HNC and the LNC conditions should remain virtually unchanged.

The enjoyment ratings may show a similar pattern of results as the change scores. Because people with a high need for cognition generally enjoy challenging cognitive activities, we expected the HNC group to rate the experimental task higher than would the LNC group. In addition, if as we expected, the HNC subjects are relatively impervious to feedback, then their enjoyment ratings should also be unaffected by feedback. People low in need for cognition, however, were presumed to be more likely to be sensitive to feedback than those high in need for cognition. Therefore, we predicted that their enjoyment ratings would also be influenced by feedback--a positive evaluation should enhance and a negative evaluation should decrease their enjoyment of the task.

In addition to the participants' self-reports of their need for cognition, we measured their performance in terms of both the number and the quality of arguments generated for and/or against a given issue. We predicted that overall, HNC would generate better and more arguments than would LNC subjects.

Finally, a manipulation check ascertained the credibility of the bogus feedback. We asked subjects in the feedback

conditions to report the score that they expected to get on a subsequent task. We predicted that people in the positive feedback conditions would have higher expectations than those in the negative feedback conditions.

CHAPTER II

METHOD

Subjects

Participants were 168 female students from Introduction classes in Psychology at The University of North Carolina at Greensboro who took part in our study, in partial fulfillment of their class requirement.

Design

The study was a 2 (high and low need for cognition) X 4 (positive, negative, first no feedback control, second no feedback control) factorial design. The second control differed from the other groups in the order of the experimental procedure. Our dependent measures were (a) NCS2 scores, (b) change scores, (c) enjoyment ratings of the experimental task, and (d) number of arguments.[1]

Stimulus Materials

Subjects were given the short form of the Need for Cognition Scale (NCS; Cacioppo, Petty & Kao, 1982) at the beginning of the semester, along with other personality tests, as part of the general screening program of the department. They were tested in a large group (of approximately 100 subjects). Materials used at the laboratory sessions,

which were conducted between 2 and 6 weeks later, consisted of four packets, each one of which included instructions to the subjects, the descriptions of the experimental tasks, the NCS, and between one and three posttask questions.

Procedure

We used a median split to divide the subjects in low and high need for cognition groups. We then recruited them for a laboratory session and randomly assigned them to one of four feedback groups,with the restriction that subjects were assigned to each of the feedback conditions before the n+1th subject was assigned to a condition. Subjects were run either one at a time or in small groups of two to four people.[2] All subjects were given four packets, one packet at a time. The first one was the same for every subject in the positive, negative, and no feedback first control conditions. The second control group followed a different order which will be described later.

At the start of the session, the experimenter handed the subjects a packet consisting of three pages. On page 1, instructions to the subjects emphasized the confidentiality of the experimental situation, reminded the participants that there were no right or wrong answers to the tasks that they would be required to perform, but insisted on the need to attend to the task to the best of their ability (see Appendix A). On page 2, subjects read a cover story about

the purpose of the experiment which was reported to assess the attitudes of the student population at UNCG concerning a number of campus issues raised in colleges and universities across the country (see Appendix B). Description of the experimental task followed. The task consisted of generating as many arguments in favor of and/or aginst two campus issues, whose order was counterbalanced. Thus, each subject was free to choose whether to argue for, against, or for and against a topic. One issue concerned the desirability of allowing freshmen to keep a car on campus 5 years hence, the other had to do with raising college tuition, along the same timetable. The 5-year lag was chosen to minimize personal involvement (subjects would have presumably graduated by then). Subjects had 5 minutes to complete the task[3] at which time the experimenter told them that she would have to leave the room for a few minutes to seek the help of a fellow graduate student. Subjects were instructed not to communicate with one another during this time. When she returned, having ostensibly scored the essays, she handed the subjects the second packet. For people in the positive or negative feedback conditions, page 1 of the second packet consisted of:

(a) the bogus feedback information about their performance on the task. In the positive feedback condition, subjects were told that departmental guidelines stated that experiments should be informational for

the participants as well as for the experimenter; therefore, we would share with them the additional information yielded by their responses on the preceding task. We informed them that their performance had been rated in terms of ease of task, number of arguments generated, quality of their arguments, and originality. They were advised that their score (90) indicated that they had done better than 90% of the students who had performed a similar task. In the negative feedback condition, the percentile score was 10, and the subjects were informed that that score indicated that they had done better than 10% of the students who had engaged in a similar task.

(b) a rating scale, ranging between 0 and 100, of the extent to which they had enjoyed the task.

(c) a question about the score that they expected to get on a subsequent task. This was a manipulation check (see Appendix C).

Subjects in the first no feedback control condition received the same materials with the exception that they were not given any feedback about their task performance and were not asked about their expectations (see Appendix D). On page 2, subjects were asked to complete the NCS, described as an instrument designed to assess which tasks were of particular

interest to participants in psychological experiments at UNCG (see Appendix E). When our subjects first took the NSC during screening, the cover story was omitted. This cover story was designed both to minimize any self-presentation concerns that our subjects may have had and to provide a rationale for requiring them to complete the scale again. On page 3, they rated on a scale of 0 (for "not at all") to 100 (for "very much") how enjoyable the preceding task was.[4] Subjects were allowed 5 minutes before the experimenter collected the second packet and handed the third one. The same procedure was followed as with the first experimental task.

The last packet consisted of a performance evaluation (for people in the feedback conditions only), and of an enjoyment rating scale for the preceding task. Subjects in the feedback conditions were all given a highly favorable evaluation, a percentile score of 95. This was done for the sole purpose of relieving any discomfort that subjects in the negative feedback conditions may have felt. Subjects were then debriefed, thanked for their participation, and urged not to discuss the experiment with anyone until the end of the semester.

The second control group received all four packets, but in a different order. Subjects in this group took the NCS at the start of the laboratory session. Their first packet consisted of the instructions on page 1, followed by the

NCS on page 2. Thus, when the other subjects were completing the NCS, subjects in the second control group were performing the first experimental task. In sum, they followed the same procedure as the first control group, but in a different order.

CHAPTER III

RESULTS AND DISCUSSION

A 2 (high, low need for cognition) X 4 (positive feedback, negative feedback, no feedback first control, no feedback second control) analysis of variance on a manipulation check measure of expectations yielded a main effect for feedback. Subjects in the positive feedback conditions reported higher expectation scores (M = 79.15) about their performance on a subsequent task than did those given negative feedback (M = 51.82), $F(1, 81) = 38.58$, $p<.0001$. Our subjects were apparently convinced of the validity of the feedback that they received.

An analysis of the means for the NCS scores for the high and the low need for cognition subjects, in each of the four feedback conditions at mass screening and later at the laboratory session, indicated that for both control groups, the correlation between NCS and NCS2 scores was highly significant (r = .77, N = 40, $p<.0001$ for the first control, and r = .76, N = 41, $p<.0001$ for the second control).

To obtain the error term that we needed to test our various hypotheses, we performed a 2 (need for cognition) X 4 (positive, negative feedback, and 2 controls) analysis of covariance on the NCS2 scores, with the first NCS score as

the covariate. This analysis revealed a significant main effect for feedback, $F(3, 159) = 3.02$, $p<.03$. Need for cognition, $F(1, 159) = 2.48$, was significant at the .11 level (see Table 1 for the adjusted means of the NCS2 scores). We used the error term of this analysis to test our first experimental hypothesis, which involved the effect of feedback (positive or negative) on NCS change scores. Specifically, we predicted that the need for cognition scores of HNC subjects would be roughly equivalent across positive and negative conditions, whereas those of LNC subjects would be high in the positive and low in the negative feedback conditions. To test this hypothesis, we had to determine whether the difference in need for cognition NCS2 scores across the positive and negative feedback conditions was smaller for HNC than for LNC subjects. This comparison was significant, $F(1, 159) = 4.30$, $p<.04$ (see Figure 1), indicating that there was a greater difference across the positive and negative feedback conditions for low than for high in need for cognition subjects. In further support of this hypothesis, HNC subjects' NCS2 scores did not differ from either HNC control groups ($F<1$), supporting the prediction that people high in need for cognition would be relatively unaffected by feedback. However, LNC subjects who received positive feedback had significantly higher NCS2 scores than those of LNC subjects in the first control condition, $F(1, 159) = 6.17$, $p<.01$, and

in the second control condition, $F(1, 159) = 3.69$, $p<.06$. Further analyses revealed that LNC subjects who received negative feedback decreased their NCS scores significantly more than did the corresponding HNC subjects, $F(1, 159) = 5.15$, $p<.02$.

To determine if LNC subjects were generally more influenced by external cues than were HNC subjects, we performed a 2 (need for cognition) X 4 (feedback) analysis of variance on the change scores. This analysis yielded a main effect of need for cognition, $F(1, 160) = 6.21$, $p<.01$. This effect indicated that LNC subjects changed more ($M = 9.52$) across contexts than did HNC subjects ($M = 4.65$; see Table 2 for the means for the change scores).

For the enjoyment ratings, we considered only the first control group, along with the positive feedback and the negative feedback conditions. This is because subjects in the first control group followed the same procedure as the subjects in the feedback conditions, whereas subjects in the second control group started by answering the NCS scale, which may have biased their response to the cognitive task. We predicted that HNC subjects' enjoyment ratings would show no difference across feedback conditions, but that the LNC groups would report greater enjoyment of the experimental task in the positive condition than in the negative condition. Although, as can be seen from Table 3, the pattern was

as expected, the difference was not statistically significant, $F(1, 116) = 1.62$, $p<.20$. The error term for this planned comparison was obtained from a 2 (high and low need for cognition) X 3 (positive, negative, no feedback control) analysis of variance, which yielded a main effect of feedback, $F(2, 116) = 21.08$, $p<.0001$. This effect indicated that people rated the rask as more enjoyable when they were given positive than negative feedback, and this was true of both HNC subjects, $F(1, 155) = 11.68$, $p<.001$, and LNC subjects, $F(1, 155 = 28.59$, $p<.0001$.

Therefore, although NCS scores of HNC subjects were less influenced by feedback than those of LNC subjects, this difference was not significant for the enjoyment ratings. It appears that positive or negative feedback reduced the impact of personality differences for the enjoyment measure. Thus, enjoyment of a cognitive activity may be a function of such variables as audience praise, in addition to intrinsic interest.

Finally, as expected, HNC individuals generated significantly more arguments ($M = 6.01$) than did LNC subjects, $M = 5.16$, $F(1, 166) = 6.68$, $p<.01$. In being consistent with the construct, this finding further validates the need for cognition scale.

In sum, as predicted, NCS scores of HNC individuals did not change across feedback conditions. This was not

the case for LNC subjects, whose NCS scores were greatly affected by feedback. Moreover, compared to HNC subjects, LNC subjects were generally more influenced by external cues. The same pattern of results was found for the enjoyment ratings of the experimental task, although the differences among the scores were not statistically significant. Furthermore, the difference between the actual performance of LNC and HNC subjects on the experimental task supports the validity of the need for cognition construct.

CHAPTER IV

CONCLUSION

Overall, people high in need for cognition were less influenced by either negative or positive feedback than those low in need for cognition. Investigations of the effects of rewards--including positive and negative feedback--on intrinsic motivation generally indicate that task contingent rewards decrease interest in a previously valued activity. On the other hand, performance contingent feedback, which includes competence information, enhances intrinsic motivation (e.g., Pittman, Davey, Alafat, Wetherill, & Kramer, 1980). Results vary, however, according to the salience of either the controlling or the informational aspects of the situation. Indeed, it has been suggested that we should consider the psychological meaning of the reward rather than the contingency (Ryan et al., 1983). The finding that, compared to LNC subjects, HNC subjects were relatively unaffected by feedback, suggests that people who differ in their approach to processing a message are also likely to respond differently to information regarding their own performance.

The results of our study also indicate that, given positive feedback, people low in need for cognition are likely to change their attitudes towards an entire category of

activities, which they had previously deemed uninteresting. A number of researchers have shown that, under certain circumstances, people low in need for cognition will alter their information-processing style. LNC subjects adopted the analytic approach typical of HNC individuals when the message was highly relevant (Petty & Cacioppo, 1984), or when they were primed by a bogus personality assessment test (Petty & Brock, 1979). However, the response, or lack thereof, of HNC subjects to feedback is certainly worth noting, at least for its practical implications. For example, people with a high need for cognition would constitute a highly desirable population in any setting where evaluations are expected to be forthcoming. Being relatively unaffected by feedback information, such individuals would retain their interest in a task, regardless of the nature of the evaluation. Accordingly, they may also be more likely than people low in need for cognition to persist in the performance of their duties, even when receiving negative feedback.

Finally, such results confirm the growing realization that we must continue to look for the person in the situation. Individuals high in need for cognition were shown to remain consistent across feedback conditions as well as across contexts. Moreover, as cited earlier, compared to those who report a low need for cognition, people who are high in need for cognition are not easily influenced by external cues and

tend to show great consistency between their attitudes and their behavior. Thus, at least in the case of high need for cognition individuals, a person variable may help predict behavior.

Footnotes

[1]Two independent judges rated the quality of our subjects' arguments. However, their scores were too discrepant to allow a meaningful analysis, so we omitted this dependent variable.

[2]As the number of subjects participating at any time in the laboratory session depended solely on the subjects' time, it varied randomly and as such did not seem to correspond to any systematic change.

[3]The time allowed for the task was based on discussions among people in our lab, who shared with us their experience with similar tasks.

[4]Rating the NCS was a filler task, designed to alleviate any suspicions subjects may have had concerning the purpose of the experimental task ratings.

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APPENDIX A

INSTRUCTIONS

INSTRUCTIONS

Read the following materials very carefully! Please do not turn to the next page unless instructed to do so. Read the material in the order presented, and do not flip back to a previous page. Today we will ask you to engage in a number of activities. We would like you to perform them to the best of your ability. You will not be doing exactly the same thing as the other people in this room, so do not concern yourself with what they do. Just focus on **your** task. **YOUR PERFORMANCE, AND ANY QUESTIONS THAT YOU MAY ANSWER, WILL REMAIN TOTALLY CONFIDENTIAL.** As the experimental tasks will be varied, it is essential to refrain from talking **at all times.**

If you have a question, please write it on the blank paper that is on your desk, raise your hand, and I will attend to it personally. You have been assigned an experimental number, which is printed at the right corner of this paper. Be sure to write it on each page of the materials that you will fill out today. Your experimental number will help us to keep the various materials in order while allowing us to discard your social security number, thereby preserving your anonymity.

Please begin by filling out the following information:

Session: Experimental number:

Age:

APPENDIX B

EXPERIMENTAL TASKS

Experimental Task A

The purpose of this task is to assess the attitudes of a sample of the student population at UNCG concerning a number of issues raised in colleges in universities across the nation.

Each of you will perform slightly different activities, picked at random, so concentrate only on your particular task.

Your task will be to list as many arguments as possible in favor and/or against an increase in college tuition, to be instituted 5 years from now.

In other words, tell us why the Administration should and/or should not raise the tuition at UNCG, starting in 1996. You are free to choose one or both sides of the issue.

When I tell you to start, turn to the next page and list your arguments for and/or against a 1996 policy of raising the tuition at UNCG. You will have about 5 minutes to complete your task.

When I let you know that the 5 minutes are over, stop immediately, turn this packet over, and wait.

Experimental Task C

The purpose of this task is to assess the attitudes of a sample of the student population at UNCG concerning a number of issues raised in colleges and universities across the nation.

Each of you will perform slightly different activities, picked at random, so concentrate only on your particular task.

Your task will be to list as many arguments as possible in favor and/or against the desirability of allowing freshmen to have a car on campus, effective 5 years from now.

In other words, tell us why the Administration should and/or should not allow freshmen to have a car on campus, starting in 1996. You are free to choose one or both sides of the issue.

When I tell you to start, turn to the next page and list your arguments for and/or against a 1996 policy of allowing freshmen to have a car on campus. You will have about 5 minutes to complete your task. When I let you know that the 5 minutes are over, stop immediately, turn this packet over, and wait.

APPENDIX C

EVALUATION FEEDBACK

Thank you for completing task A (or C). Departmental guidelines state that experiments should be informational for the participants as well as for the experimenter. Therefore, we are sharing with you the additional information yielded by your responses on Task A(C).

Your performance on Task A(C) has been scored according to:

1. task ease (how difficult your task was).
2. creativity (how original your suggestions were).
3. quality (how good).
4. quantity (how many arguments you generated).

The following score is a percentile score. It means that your performance on Task A(C) was superior to that of _____% of the people who participated in a similar experiment.

Score: _____

1. On a scale of 0 to 100, where 0 = not at all, and 100 = very much, please indicate the extent to which you have enjoyed Task A(C).

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

0 10 20 30 40 50 60 70 80 90 100

2. Write down the score (between 0 and 100) that you **expect** to get on the next task: _____

Please turn to the next page.

APPENDIX D

TASK ENJOYMENT RATING

Thank you for completing Task A(or C).

On a scale of 0 to 100, where 0 = not at all, and 100 = very much, please indicate the extent to which you have enjoyed Task A(C).

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

0 10 20 30 40 50 60 70 80 90 100

Please turn to the next page.

APPENDIX E

NEED FOR COGNITION SCALE

PLEASE NOTE

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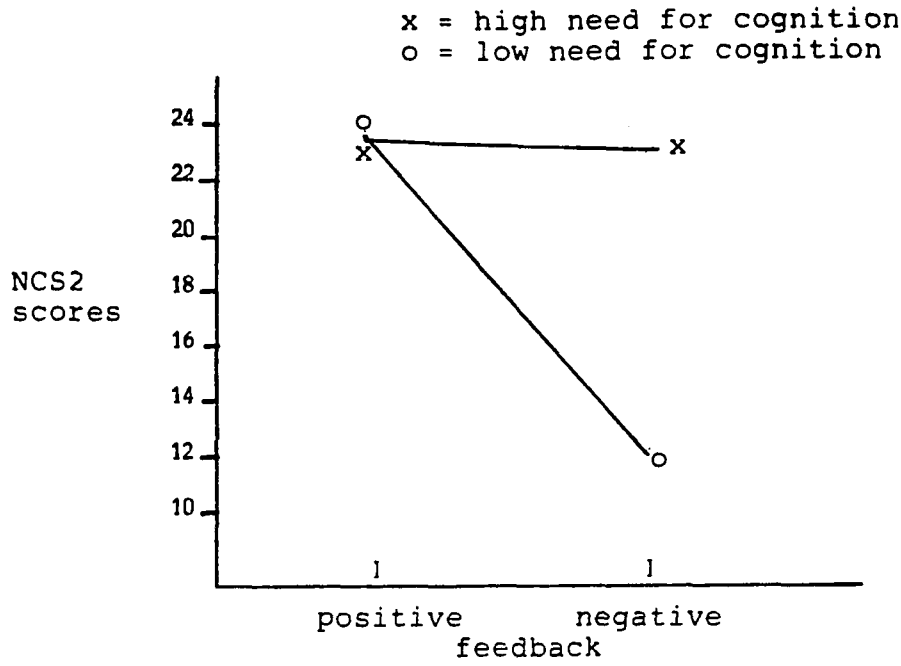

Figure 1. Adjusted NCS2 scores as a function of need for cognition and feedback.

Table 1

Least Square Means of NCS2 Scores as a Function of Need for Cognition and Feedback

Need for cognition	Feedback: positive	Feedback: negative	Feedback: no 1st control	Feedback: no 2nd control
High	23.68 N=22	23.16 N=21	18.05 N=20	22.58 N=19
Low	23.89 N=21	12.03 N=23	13.99 N=20	16.53 N=22

Table 2

Mean Change Scores as a Function of Need for Cognition and Feedback

Need for cognition	Feedback			
	positive	negative	no 1st control	no 2nd control
High	7.18 N=22	4.71 N=21	0.80 N=20	5.68 N=19
Low	15.38 N=21	5.39 N=23	8.40 N=20	9.27 N=22

Table 3

Mean Enjoyment Ratings as a Function of Need for Cognition and Feedback

	Feedback		
Need for cognition	positive	negative	no
High	69.32 N=22	43.83 N=18	48.00 N=20
Low	73.24 N=21	34.52 N=21	46.00 N=20

RAW DATA

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OBS	SUBJ	FBK	NCS	NCS2	CH	ENJ	NC
1	41	4	18	27	9	80	hi
2	42	4	-4	-14	-10	80	lo
3	43	1	28	27	-1	60	hi
4	44	1	9	17	8	88	lo
5	45	3	39	34	-5	70	hi
6	46	2	-14	-9	5	30	lo
7	47	2	26	27	1	20	hi
8	48	3	8	1	-7	0	lo
9	49	4	61	38	-23	80	hi
10	50	4	8	22	14	90	lo
11	51	1	20	64	44	95	hi
12	52	1	-13	-5	8	70	lo
13	53	3	28	41	13	10	hi
14	54	2	-26	-39	-13	30	lo
15	55	2	22	21	-1	50	hi
16	56	3	-31	-39	-8	10	lo
17	57	4	28	32	4	55	hi
18	58	4	1	-1	-2	40	lo
19	59	1	32	40	8	52	hi
20	60	1	8	39	31	80	lo
21	61	4	14	13	-1	60	hi
22	62	2	8	7	-1	.	lo
23	63	2	39	34	-5	10	hi
24	64	3	-35	-23	12	40	lo
25	65	4	23	24	1	80	hi
26	66	4	1	22	21	70	lo
27	67	1	24	32	8	70	hi
28	68	1	-2	7	9	80	lo
29	69	3	26	40	14	65	hi
30	70	2	-13	-15	-2	40	lo
31	71	2	31	51	20	.	hi
32	72	3	-26	6	32	100	lo
33	73	3	27	42	15	70	hi
34	74	4	-1	4	5	95	lo
35	75	1	26	39	13	70	hi
36	76	1	9	13	4	70	lo
37	77	3	19	32	13	70	hi
38	78	2	-28	-16	12	.	lo
39	79	2	21	37	16	.	hi
40	80	3	-33	15	48	100	lo
41	81	4	18	31	13	60	hi
42	82	4	3	25	22	80	lo
43	83	2	26	27	1	.	hi
44	84	1	5	9	4	85	lo
45	85	3	17	7	-10	90	hi
46	86	2	4	12	8	15	lo
47	87	2	19	29	10	60	hi
48	88	3	-38	-9	29	80	lo
49	89	4	14	33	19	50	hi
50	90	4	-38	-4	34	90	lo
51	91	1	48	53	5	65	hi
52	92	1	8	27	19	70	lo
53	93	3	18	34	16	20	hi
54	94	2	-8	0	8	25	lo
55	95	2	33	51	18	100	hi
56	96	3	1	11	10	30	lo

The SAS System 17:51 Monday, March 23, 1992 2

OBS	SUBJ	FBK	NCS	NCS2	CH	ENJ	NC
57	97	4	17	24	7	60	hi

58	98	4	7	15	8	72	lo
59	99	1	36	36	0	15	hi
60	100	1	-6	-1	5	80	lo
61	101	3	32	23	-9	50	hi
62	102	2	-19	-40	-21	0	lo
63	103	2	36	33	-3	30	hi
64	104	3	-7	23	30	70	lo
65	105	4	15	30	15	100	hi
66	106	4	-15	11	26	100	lo
67	107	1	38	52	14	100	hi
68	108	1	-26	-10	16	40	lo
69	109	3	24	9	-15	10	hi
70	110	2	2	27	25	30	lo
71	111	2	36	39	3	20	hi
72	112	3	-3	-16	-13	20	lo
73	113	4	25	47	22	0	hi
74	114	4	8	12	4	95	lo
75	115	1	14	22	8	90	hi
76	116	1	0	17	17	50	lo
77	117	3	41	53	12	40	hi
78	118	2	9	33	24	50	lo
79	119	2	63	68	5	50	hi
80	120	3	2	5	3	60	lo
81	121	4	30	25	-5	50	hi
82	122	4	12	12	0	80	lo
83	123	1	17	20	3	80	hi
84	124	1	11	35	24	85	lo
85	125	3	16	19	3	10	hi
86	126	2	3	2	-1	30	lo
87	127	2	53	44	-9	45	hi
88	128	3	0	21	21	40	lo
89	129	4	38	63	25	90	hi
90	130	4	-17	12	29	90	lo
91	131	1	14	12	-2	60	hi
92	132	1	-2	22	24	40	lo
93	133	3	20	14	-6	40	hi
94	134	3	3	6	3	80	lo
95	135	2	38	54	16	10	hi
96	136	3	8	0	-8	60	lo
97	137	4	21	35	14	80	hi
98	138	4	-22	3	25	30	lo
99	139	1	18	25	7	80	hi
100	140	1	-4	19	23	100	lo
101	141	3	25	22	-3	30	hi
102	142	2	-14	-10	4	35	lo
103	143	2	21	34	13	50	hi
104	144	3	5	14	9	30	lo
105	145	4	39	34	-5	45	hi
106	146	4	-8	1	9	55	lo
107	147	1	22	34	12	50	hi
108	148	1	3	12	9	70	lo
109	149	3	31	27	-4	30	hi
110	150	2	-21	4	25	50	lo
111	151	2	26	22	-4	20	hi
112	152	3	-21	-19	2	0	lo

OBS	SUBJ	FBK	NCS	NCS2	CH	ENJ	NC
113	153	4	23	20	-3	45	hi
114	154	4	-19	-23	-4	70	lo
115	155	1	19	38	19	88	hi
116	156	1	-8	1	9	80	lo
117	157	3	39	4	-35	80	hi
118	158	2	11	25	14	10	lo

119	159	2	25	22	-3	62	hi
120	160	3	4	0	-4	0	lo
121	161	4	33	35	2	80	hi
122	162	4	11	12	1	10	lo
123	163	1	24	18	-6	50	hi
124	164	1	-3	3	6	70	lo
125	165	3	25	29	4	0	hi
126	166	2	-6	2	8	40	lo
127	167	2	30	27	-3	60	hi
128	168	2	-5	-13	-8	50	lo
129	169	4	25	25	0	50	hi
130	170	4	5	9	4	50	lo
131	171	1	38	19	-19	45	hi
132	172	1	12	26	14	70	lo
133	173	3	21	34	13	70	hi
134	174	2	4	9	5	40	lo
135	175	2	35	46	11	80	hi
136	176	3	-15	-8	7	60	lo
137	177	4	30	35	5	60	hi
138	178	4	7	-24	-31	30	lo
139	179	1	23	8	-15	65	hi
140	180	1	10	46	36	80	lo
141	181	3	44	52	8	70	hi
142	183	2	43	44	1	52	hi
143	184	3	5	-1	-6	30	lo
144	185	4	52	61	9	80	hi
145	186	4	-8	22	30	30	lo
146	187	1	37	46	9	100	hi
147	188	1	9	34	25	100	lo
148	189	3	38	27	-11	85	hi
149	190	2	7	-9	-16	50	lo
150	191	2	47	38	-9	40	hi
151	192	3	9	7	-2	70	lo
152	194	4	-5	2	7	60	lo
153	195	1	23	28	5	65	hi
154	196	1	8	11	3	80	lo
155	197	3	44	47	3	50	hi
156	198	2	12	14	2	20	lo
157	199	2	13	34	21	30	hi
158	200	3	-6	4	10	40	lo
159	201	1	24	42	18	75	hi
160	202	4	-8	3	11	40	lo
161	204	1	-11	18	29	50	lo
162	206	2	-3	8	11	40	lo
163	207	1	30	64	34	100	hi
164	210	2	0	9	9	30	lo
165	211	1	24	18	-6	50	hi
166	212	2	-2	25	27	50	lo
167	214	4	12	13	1	90	lo
168	216	2	-19	-20	-1	60	lo

NC=hi FBK=1

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	22	132.5454545	53.5232280	43.0000000	211.0000000
NCS	22	26.3181818	8.7689189	14.0000000	48.0000000
NCS2	22	33.5000000	15.6988019	8.0000000	64.0000000
CH	22	7.1818182	14.1341746	-19.0000000	44.0000000
ENJ	22	69.3181818	21.5061151	15.0000000	100.0000000

NC=hi FBK=2

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	21	121.0952381	46.9488070	47.0000000	199.0000000
NCS	21	32.5238095	12.0483154	13.0000000	63.0000000
NCS2	21	37.2380952	12.1198381	21.0000000	68.0000000
CH	21	4.7142857	9.6651066	-9.0000000	21.0000000
ENJ	18	43.8333333	24.1179699	10.0000000	100.0000000

---------- NC=hi FBK=3 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	20	121.6000000	46.5983962	45.0000000	197.0000000
NCS	20	28.7000000	9.2798593	16.0000000	44.0000000
NCS2	20	29.5000000	14.2699537	4.0000000	53.0000000
CH	20	0.8000000	13.0811234	-35.0000000	16.0000000
ENJ	20	48.0000000	28.1630590	0	90.0000000

---------- NC=hi FBK=4 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	19	112.3684211	45.6900312	41.0000000	185.0000000
NCS	19	27.5789474	12.7249352	14.0000000	61.0000000
NCS2	19	33.2631579	12.5292640	13.0000000	63.0000000
CH	19	5.6842105	11.2844664	-23.0000000	25.0000000
ENJ	19	62.3684211	22.0711237	0	100.0000000

---------- NC=lo FBK=1 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	21	124.0000000	49.6386946	44.0000000	204.0000000
NCS	21	0.8095238	9.7960147	-26.0000000	12.0000000
NCS2	21	16.1904762	14.7736896	-10.0000000	46.0000000
CH	21	15.3809524	10.0273436	3.0000000	36.0000000
ENJ	21	73.2380952	16.6640474	40.0000000	100.0000000

---------- NC=lo FBK=2 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	23	136.3478261	55.5686379	46.0000000	216.0000000
NCS	23	-5.1304348	12.0992274	-28.0000000	12.0000000
NCS2	23	0.2608696	19.2335346	-40.0000000	33.0000000
CH	23	5.3913043	12.8407701	-21.0000000	27.0000000
ENJ	21	34.5238095	15.0752083	0	60.0000000

---------- NC=lo FBK=3 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum

SUBJ	20	122.3000000	46.2636609	48.0000000	200.0000000
NCS	20	-8.5000000	16.2205198	-38.0000000	9.0000000
NCS2	20	-0.1000000	15.3687996	-39.0000000	23.0000000
CH	20	8.4000000	16.2169502	-13.0000000	48.0000000
ENJ	20	46.0000000	31.6892809	0	100.0000000

---------- NC=lo FBK=4 ----------

Variable	N	Mean	Std Dev	Minimum	Maximum
SUBJ	22	126.1818182	52.2627395	42.0000000	214.0000000
NCS	22	-3.1818182	12.8827547	-38.0000000	12.0000000
NCS2	22	6.0909091	13.4338205	-24.0000000	25.0000000
CH	22	9.2727273	15.2477378	-31.0000000	34.0000000
ENJ	22	65.7727273	26.3545999	10.0000000	100.0000000