To the Graduate Council:

I am submitting herewith a dissertation written by H. Allen White entitled "Heuristic Reasoning: An Examination of the Relationship Between Need for Cognition and One's Proclivity for Making Heuristic-Based Judgments." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Communications.

M. Mark Miller, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

HEURISTIC REASONING:
AN EXAMINATION OF THE RELATIONSHIP BETWEEN NEED FOR COGNITION AND ONE'S PROCLIVITY FOR MAKING HEURISTIC-BASED JUDGMENTS

A Dissertation

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Degree

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ABSTRACT

Research dealing with the personality trait need for cognition and the trait's implications for the Elaboration Likelihood Model answer many questions about how people react to written persuasive communication. The same research, however, leaves other questions unanswered. Combining research dealing with the construct "need for cognition" with earlier work dealing with human beings' proclivity for making heuristic-based probability judgments led to this study's hypothesizing the existence of the constructs heuristic reasoning and cognitive reasoning. People low in need for cognition were found to engage in heuristic reasoning when required to evaluate a persuasive message. People high in need for cognition were found to use cognitive reasoning up to a certain point during an encounter with the same persuasive communication. Upon reaching that point, the result of their cognitive activities became their heuristic cue which was used in further, heuristic-based evaluative considerations of the communication.

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CHAPTER I

INTRODUCTION

Channel, source, and receiver characteristics all are potential sources of an internal dysfunction in an information dissemination system. Channel, source, and receiver attributes have all been modeled by researchers. [1] Virtually all of the current models represent attempts to explain interactions among senders, receivers, and the channels they use to communicate.

Different mass media are more adept at presenting particular kinds of information than are others, and different individuals are more adept at receiving particular kinds of information than are others. For example, Chaiken and Eagley found that a print medium was a more effective channel of persuasion than either video or audio media when the message being delivered was difficult to understand. [2] Further, they found that comprehension of a difficult message was greater when a print medium was employed. [3] When a message was easily understood, then audio and video

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[1] A.S. Tan, Mass Communication Theories and Research (New York: John Wiley & Sons, 1985), pp. 113-209.

[2] S. Chaiken and A. Eagley, "Communication Modality as a Determinant of Message Persuasiveness and Message Comprehensibility," Journal of Personality and Social Psychology, 34:610-11 (1976).

[3] Chaiken and Eagley, op. cit.

media were the more effective channel of communication. [4] Clearly, then, there are channel effects that must be considered for one to have an understanding of mass communication.

Just as different channels have different abilities for delivering different message types, receivers have different abilities and proclivities for receiving different kinds of messages. Cacioppo and Petty developed a scale for, tested for, and found a difference in a need for cognition among people. [5] Some people, they found, have a proclivity for thinking; that is, they enjoy engaging in mental exercise just as some joggers enjoy engaging in physical exercise. On the other hand, they found others dislike engaging in mental exercise just as many sedentary people abhor physical exercise.

Despite the intriguing nature of need for cognition, the construct's effects on the communication process have not as yet been examined to their fullest extent. In particular, the effect need for cognition has on the process of persuasion isn't fully understood.

Chaiken and Eagley, and Cacioppo and Petty allow one to conclude that by matching the wrong kind of receivers with

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[4] Chaiken and Eagley, op. cit.

[5] J. Cacioppo and R. Petty, "The Need For Cognition," Journal of Personality and Social Psychology, 42:116-131 (1982).

the wrong kind of media, one could render the persuasion process ineffective. That is, the ineffectiveness of message senders who know little or nothing at all about the relationships among source, channel, message, and receiver characteristics could be as damaging to the process of persuasion as would be prior restraint or any other external source of information control. A step in being able to deal with the interrelationships among the many variables involved in the persuasion process is understanding receiver characteristics, and a step in being able to deal with receiver characteristics in the persuasion environment is understanding the role of the receiver characteristic need for cognition, the purpose of this study.

An Applied Research Perspective

In an applied sense, understanding any possible dysfunction in their persuasion attempts can keep advertisers and marketers from wasting their money. Advertisers and marketers seek to persuade people. They want to sell their products. Whether the messages they send through mass media channels are effective persuaders depends, in part, on the characteristics of the receivers of the messages. Having little knowledge of those characteristics leaves marketers and advertisers with no choice but to treat those characteristics as random error that works in the senders' favor at times and against them

at other times. As more is known about customers' characteristics, what previously was treated as random error becomes either systematic variance or extraneous systematic variance that can be used or controlled for to enhance the persuasion process.

It behooves applied persuasive communicators such as advertisers and marketers, therefore, to understand the workings, characteristics, and interrelationships of the messages they send, the channels they use, and the receivers they wish to reach. In this specific case, then, it behooves applied persuasive communicators to have a better understanding of the effects of need for cognition.

Just as it is apparent that understanding need for cognition can aid applied persuasive communicators, it also is clear that communication research can be enhanced by a better understanding of need for cognition.

A Basic Research Perspective

For example, a burgeoning area of communications research is the expectancy-value approach to the media uses and gratifications model.

An examination of the model makes it clear that the construct need for cognition is applicable to this area of research. People of differing levels of need for cognition will have differing expectations of what mass media offer them. In short, the expectancy-value approach posits that

media audiences members' use of the mass media is predicated on what they expect from the mass media and on what they value. Palmgreen and Rayburn said gratifications sought from the mass media are a function of expectations (beliefs) audience members hold of what the media offer and the affective evaluations they have ascribed to the media's attributes. [6] Algebraically, the model states:

$$GS_i = b_i e_i$$ [7]

where:

GS_i is the i^{th} gratification sought from some medium x;

b_i is the belief that x possesses some attribute or that a behavior related to x will have a particular outcome;

e_i is the affective evaluation of the particular attribute or outcome.

Thus, the likelihood of a person's using a medium to satisfy a need (be gratified) depends on two factors -- how much the person expects the medium to possess an attribute and whether the person values the attribute. Obviously, different people evaluate attributes differently; media have more than one attribute; and different media have different attributes. So, whether a person is likely to seek

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[6] P. Palmgreen and J. Rayburn, "An Expectancy-Value Approach to Media Gratifications," in Media Gratifications Research -- Current Perspectives, K. Rosengren, L. Wenner, and P. Palmgreen eds. (Beverly Hills: Sage, 1985), p. 62.

[7] Palmgreen and Rayburn, op. cit. p. 63.

gratifications from a medium depends on a number of factors that are interrelated in a complex fashion. And, upon considering the work of Chaiken and Eagley in conjunction with the above, it becomes just as obvious that people have come to expect certain kinds of messages to be carried by different kinds of channels. Thus, although there are exceptions (PBS documentaries and People Magazine, for example), in general, a person interested in complex messages will tend to turn to print media, the channel shown to be the most effective carrier of complex messages.

Both Palmgreen and Rayburn [8] and Babrow and Swanson [9] found evidence supporting the expectancy-value approach to the uses and gratifications model in research concerning television news.

Becker, [10] Blumler and McQuail, [11] and McLeod and

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[8] P. Palmgreen and J. Rayburn, "Uses and Gratifications and Exposure to Public Television: A Discrepancy Approach," Communication Research, 6:155-80 (1979).

[9] A. Babrow and D. Swanson, "Disentangling the Antecedents of Media Exposure," Presented at the meeting of the Speech Communications Association (1984).

[10] L. Becker, "Measurement of Gratifications", Communication Research, 6:54-73 (1979).

[11] J. Blumler and D. McQuail, Television in Politics: Its Uses and Influences, (Chicago: University of Chicago Press).

Becker [12] made distinctions between positive gratifications (reasons to seek media use) and negative gratifications (reasons to avoid using media). Palmgreen and Rayburn argued there are different kinds of motivations for using mass media:

-- A person who has a positive evaluation of a media attribute will be likely to use a medium that he believes possesses that attribute.

-- A person who has a positive evaluation of a media attribute may or may not use a medium he believes does not possess that attribute, depending on the medium's other attributes.

-- A person who has a negative evaluation of a media attribute may or may not use a medium that he believes does not possess that attribute, depending on the medium's other attributes. [13]

In the first case above, Palmgreen and Rayburn defined the behavior as positive approach. That is, a person will actively seek exposure to a medium he believes possesses an attribute he values positively. For example, if a person's

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[12] J. McLeod and L. Becker, "Testing the Validity of Gratification Measures Through Political Effects Analysis," in The Uses of Mass Communications: Current Perspectives of Gratifications Research, J. Blumler and E Katz eds. (Beverly Hills: Sage).

[13] Palmgreen and Rayburn, op. cit., p. 68.

history with print media were that he usually found it cognitively satisfying to read the complex messages he found there, that person would tend to seek out print media, expecting to find the kinds of messages he enjoys. The stronger the belief is, the more likely the person is to seek out the use of that medium. [14]

In the second case, the behavior is defined as true avoidance. That is, a person will actively avoid exposure to a medium he believes possesses an attribute he values negatively. For example, if a person's history with print media were that he usually found it cognitively dissatisfying to read the complex messages he found there, that person would tend to avoid exposure to those, expecting to avoid the kinds of messages he does not enjoy. The stronger the belief is and the more negative the evaluation is, the more likely the person is to avoid the use of those media. [15]

In the third case, the behavior is defined as seeking alternatives. That is, a person who has a positive evaluation of an attribute but no belief of a medium's possessing that attribute will seek an alternative. [16] For

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[14] Palmgreen and Rayburn, op. cit., p. 68.

[15] Palmgreen and Rayburn, op. cit., p. 68.

[16] Palmgreen and Rayburn, op. cit., p. 68.

example, if a person's history with broadcast media were that he rarely found there the complex messages he found to be cognitively satisfying, that person would tend to seek out alternative media in hopes of finding the kinds of messages he does enjoy being exposed to.

In the fourth case, the behavior is defined as negative approach. That is, a person who has no belief of a medium's possession of negatively valued attributes may seek out use of that medium particularly if any alternative media are believed to possess the negatively valued attributes. [17] For example, if a person's history with broadcast media were that he rarely found there the complex messages he found to be cognitively dissatisfying, that person would tend to seek out those media in hopes of avoiding the kinds of messages he does not enjoy being exposed to.

Much of the research dealing with the expectancy-value approach has dealt with the first case, those instances where media consumers are seen as having varying degrees of belief of a medium's possession of those attributes. [18]

No matter the case, an integral component of the expectancy-value approach is beliefs. Palmgreen and Rayburn suggested beliefs about media attributes come from three

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[17] Palmgreen and Rayburn, op. cit., p. 68.

[18] Palmgreen and Rayburn, op. cit., p. 69.

sources -- descriptive beliefs from direct exposure to media, informational beliefs gathered second-hand from other sources besides the media themselves, and inferential beliefs formed logically from what one knows about media. [19] It becomes apparent, then, that an understanding of how receivers make judgments about things they are exposed to will help explain the workings of the expectancy-value approach to the uses and gratifications model of human communication. Additionally, an understanding of the relationship between an audience need and a medium's ability to satisfy that need will not only provide a basis for further understanding how descriptive beliefs are formed, it will also provide descriptive, diagnostic, and predictive power in determining how audience members will react to a message. The need for cognition is one of those audience needs, and, therefore, understanding it will lend itself to a better understanding of the expectancy-value approach to the uses and gratifications model of communication.

Not only do different media have different effects on the reception of difficult and easy to understand messages as Chaiken and Eagley found, people, differentiated as having either a high or low need for cognition will also have an impact on the effectiveness of an information exchange in a persuasion environment.

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[19] Palmgreen and Rayburn, op. cit., pp. 69-70.

Thus, in at least two areas of the field -- applied and theoretical research, compelling arguments can be presented demonstrating that a further understanding of need for cognition will enhance the knowledge of the field. An understanding, therefore, of how need for cognition interacts with, for example, a message characteristic is a worthwhile undertaking.

Understanding the construct need for cognition includes examining its relationship with Petty and Cacioppo's Elaboration Likelihood Model. Additionally, however, an examination of research dealing with heuristic-based judgments made by subjects in a number of experiments in a second area of study presents a number of contradictions to some of the predictions made by the Elaboration Likelihood Model. Fortunately, research in a third area of study provides a possible resolution of the contradictions noted.

The research undertaken here is an attempt to meld these three areas of research and to provide a resolution to the contradictions. The following literature review outlines the three areas of research and concludes with a set of four hypotheses.

CHAPTER II

LITERATURE REVIEW

The Need For Cognition

Katz, Gurevitch, and Haas suggested a five-category typology for media-related needs. In addition to affective, personal integrative, social integrative, and escapist needs, the typology included cognitive needs. [20] Katz, Gurevitch, and Haas said cognitive needs are based on a desire to understand one's environment and to satisfy curiosity and exploratory drives.

Cacioppo and Petty found that people have differing degrees of a need for cognition. They defined the construct "need for cognition" as one's proclivity for and enjoyment of thinking. [21] They also found some evidence suggesting the need for cognition and intelligence are related. [22]

Using what they operationalized as weak and strong arguments in a written persuasive message, Cacioppo and

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[20] E. Katz, M. Gurevitch, and H. Haas, "On the Use of Mass Media for Important Things," American Sociological Review, 38:169 (1973).

[21] J. Cacioppo and R. Petty, "The Need For Cognition," Journal of Personality and Social Psychology, 42:117 (1982).

[22] Cacioppo and Petty, op. cit., p. 125.

Petty found their manipulations of strong arguments to be more persuasive than their manipulations of weak arguments. In addition, they found a pair of interactions between subjects' need for cognition and argument quality. [23]

Subjects high in need for cognition evaluated the strong argument message more positively than did subjects low in need for cognition, and subjects high in need for cognition rated the weak argument message more negatively than did subjects low in need for cognition. In addition, subjects with a high need for cognition were found to spend more time thinking about the weak arguments than the strong arguments. Finally, the subjects high in need for cognition reported expending more cognitive effort in dealing with both the weak and strong arguments than did the subjects low in need for cognition. [24] Cacioppo and Petty's findings are in agreement with Miller and Tesser's. They found that the more people tend to elaborate on an object, the more polarized their opinions of that object tend to become. [25] In other words, a person who likes an object will tend

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[23] J. Cacioppo, R. Petty, and K. Morris, "Effects of Need For Cognition on Message Evaluation, Recall, and Persuasion," Journal of Personality and Social Psychology, 45:809 (1983).

[24] Cacioppo and Petty, op. cit., pp. 808-9.

[25] M. Miller and A. Tesser, "Thought-Induced Attitude Change: The Effects of Schema Structure and Commitment," Journal of Personality and Social Psychology, 51:263 (1986).

to like it more as he thinks about it more, and a person who dislikes an object will tend to dislike it more as he thinks about it more.

The findings suggest a relationship between message characteristics and the degree of satisfaction persons high and low in need for cognition will derive from reading that message.

That subjects high in need for cognition spent the greater amount of time and effort considering the weak argument message, suggests they were looking for meaning hidden in the ambiguities of the message's weak arguments. That they evaluated the strong argument message more highly than the weak argument message suggests they were more satisfied with the outcome of their cognitive effort when dealing with strong arguments. That is, the strong argument condition left the subjects less frustrated than did the weak argument condition. Try as they may, the subjects high in need for cognition were not going to find a great deal of meaning in the weak arguments; meaning simply was not there to be found.

On one level, the above findings make perfect sense, but on a theoretical level they present a contradiction. Subjects high in need for cognition were defined as those who enjoy thinking. In one instance, they were prompted to engage in an activity they are defined as enjoying -- thinking. In the alternative case, they were able to

discern meaning through a lower level of cognitive effort which was made possible by relatively easy to follow connections between message arguments and message conclusions.

Therein exists an apparent contradiction. Subjects high in need for cognition were less satisfied with a written message that prompted their thinking than they were with a written message that prompted a lower level of cognitive effort. As defined by Cacioppo and Petty, subjects high in need for cognition are those who enjoy thinking. It follows, then, that those subjects would evaluate highly an object that prompted their engaging in an activity they enjoy -- thinking. That was not the case, however; the subjects high in need for cognition evaluated the object (the message in this case) less highly than another object that prompted less thinking. Cacioppo and Petty's study illustrated a contradiction. That some messages can elicit a negative response from receivers high in need for cognition despite prompting high levels of cognition, illustrates an interaction between the receiver attribute and the message attribute. Thus, there is reason to argue that other message attributes, as well as levels of argument strength like those used by Cacioppo and Petty, interact with the receiver attribute need for cognition.

As Cacioppo and Petty found certain messages caused receivers high in need for cognition to have more extreme

positive or negative evaluations of the message than did receivers low in need for cognition, Miller and Tesser found that people tend to be more polarized in their evaluations of objects as they think about those objects more and more. Miller and Tesser suggested elaboration creates a polarization main effect; Cacioppo and Petty suggested some people tend to elaborate more than others. Those high in need for cognition, then, would be those more likely to be polarized in their judgments of written messages. Cacioppo and Petty's findings agree with Miller and Tesser's in this regard. An interaction between one's need for cognition and message attributes, however, attenuates how one's final judgement of a message will be made. Here, Cacioppo and Petty's interaction effect lends understanding to Miller and Tesser's reported main effect. Thus, there is reason to argue that need for cognition, as a receiver variable, will have applications in other studies of information processing such as the processing of information that takes place in a persuasion context.

The Elaboration Likelihood Model

One information processing context that the need for cognition has obvious implications for is the Elaboration

Likelihood Model developed by Petty and Cacioppo.[26]

The model has seven postulates:

-- People are motivated to hold correct attitudes.

-- Although people want to hold correct attitudes, the amount and nature of issue-relevant elaborations in which they are willing or able to engage to evaluate a message vary with individual and situational factors.

-- Variables can affect the amount and direction of attitude change by (a) serving as persuasive arguments, (b) serving as peripheral cues, and/or (c) affecting the extent or direction of issue and argument elaboration.

-- Variables affecting motivation and/or ability to process a message in a relatively objective manner can do so by either enhancing or reducing argument scrutiny.

-- Variables affecting message processing in a relatively biased manner can produce either a positive (favorable) or negative (unfavorable) motivational and/or ability bias to the issue-relevant thoughts attempted.

-- As motivation and/or ability to process arguments is decreased, peripheral cues become relatively more important determinants of persuasion. Conversely, as argument scrutiny is increased, peripheral cues become relatively less important determinants of persuasion.

-- Attitude changes that result mostly from processing issue-relevant arguments (central) route will show greater temporal persistence, greater prediction of behavior, and greater resistance to counterpersuasion than attitude changes that result mostly from peripheral cues.[27]

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[26] R. Petty and J. Cacioppo, "The Elaboration Likelihood Model of Persuasion," in Communication and Persuasion: Central and Peripheral Routes to Attitude Change, R. Petty and J. Cacioppo eds. (New York: Springer-Verlag, 1986), pp. 1-24.

[27] Petty and Cacioppo, op. cit. pp. 5-21.

The model's second postulate says a person will think about something as a function of his motivation and ability to do so. The Elaboration Likelihood Model suggests people's mental dealings with objects occur in one of two ways -- centrally or peripherally. [28]

In the persuasion context, central route processing requires the refining of information in a manner that message arguments are considered, weighed, and judged as valid or invalid depending on their quality.

Upon encountering a persuasive message, a receiver either is or is not motivated to process the information, and he either is or is not able to process the information. If he is both motivated and able, the receiver, according to the model, begins central route processing. Based on the message's arguments, the receiver has either positive, negative, or neutral thoughts about the communication. If his reaction is either positive or negative, the receiver then may or may not adopt new cognitions about the object of the persuasive message. If he reacts positively to the communication, then he is likely to adopt the advocated position of the message; if he reacts negatively, he is likely to adopt a position opposite to the position advocated by the message. If either of these two

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[28] Petty and Cacioppo, op. cit. p. 4.

possible affective states creates a feeling about the objects of the persuasive message that are different from the feeling held before the message was heard, then attitude change will occur. Attitude change that is attributable to central route processing is "persistent, resistant, and predictive of behavior." [29]

Peripheral cues, on the other hand, "refer to stimuli in the persuasion context that can affect attitudes without necessitating processing of the message arguments." [30]

If the receiver of a persuasive message is either not motivated or motivated but unable to process the message, then the receiver will attend to the message using peripheral cues as guiding heuristics about whether he likes the message or not. Additionally, if central route processing of the message information results in neither positive nor negative affect for the message, then that neutral feeling about the message will lead to the receiver's using peripheral cues as his guiding heuristics. Finally, if central route processing of information leads to either positive or negative feelings about the message but no cognitive structure change or new cognitions about the object of the message, then any

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[29] Petty and Cacioppo, op. cit. p. 24.

[30] Petty and Cacioppo, op. cit. p. 18.

judgments about the object will be based on the use of peripheral cues as guiding heuristics.

Any attitude shifts attributable to peripheral cues are posited to result in attitude change that is less predictive of behavior than is central route processing. [31]

The Elaboration Likelihood Model, then, posits that if a persuasive message is to have a lasting effect on attitude, any message processing should be done centrally rather than peripherally. Further, the model suggests that message attributes are among the determinants of whether the message will be centrally or peripherally processed.

Central Route Processing

One way of manipulating message attributes and, thus, enhancing the persuasive power of a message, is in strengthening a message's arguments. Cacioppo, Petty, and Morris defined strong arguments as those that generate "primarily favorable" thoughts while taking a position. [32] That is, when centrally processed, strong arguments are those that produce positive affect. In developing the Need for Cognition Scale, Cacioppo, Petty, and Morris generated what intuitively seemed strong, compelling arguments as well as weak, illogical arguments for the raising of tuition

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[31] Petty and Cacioppo, op. cit. p. 24.

[32] Cacioppo, Petty, and Morris, op. cit. p. 808.

at a state-supported university in the Midwest. They found that subjects who were rated as high in need for cognition reacted more favorably to the strong than to the weak arguments. [33] Judging their procedure using the reasoning of construct validity, Cacioppo and Petty claimed a degree of confidence in assessing their manipulation as, indeed, being one of argument strength. They used their validated measure of need for cognition to identify subjects high in need for cognition; they then intuitively created strong arguments. Strong arguments, they defined, are those that cause positive affect when elaborated upon. And, as the reasoning of confirmatory factor analysis asserts that a common loading of items is on the factor defined by the construct that had been identified a priori, Cacioppo, Petty, and Morris can assert that the positive affect created in the subjects, who had been identified a priori as high in need for cognition, is the result of the arguments', indeed, being strong rather than weak.

Petty and Cacioppo also defined arguments as persuasive messages that are credible. [34] That is, for arguments to be arguments in the sense of the Elaboration Likelihood Model, they must be believable. Some arguments, they said,

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[33] Cacioppo, Petty, and Morris, op. cit. p. 809.

[34] Cacioppo, Petty, and Morris, op. cit. p. 808.

can be outrageous and can, therefore, lose their ability to be either weak or strong. A strong message is one in which the arguments are strong and believable; a weak message is one in which the arguments are weak and believable.

Peripheral Route Processing

Another possible way of influencing attitudes in persuasive messages is by the absence or presence of peripheral cues. "The first type of persuasion was that which likely occurred as a result of a person's careful and thoughtful consideration of the true merits of the information presented in support of an advocacy. The other type of persuasion, however, was that which more likely occurred as a result of some simple cue in the persuasion context (e.g., an attractive source) that induced change without necessitating scrutiny of the central merits of the issue-relevant information presented (peripheral route)." [35]

Finally, Petty and Cacioppo reported that level of message elaboration is a determinant of persuasive power. [36] They also reported that need for cognition is a determinant of elaboration. Cacioppo, Petty, and Morris found that subjects high in need for cognition did, indeed, tend to

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[35] Petty and Cacioppo, op. cit. p. 8.

[36] Petty and Cacioppo. op. cit. pp. 1-24.

elaborate on message arguments more than did subjects low in need for cognition. [37]

Among the myriad of variables that can affect one's ability to cognitively process information are intelligence and the availability of information to process. And among the variables that can affect one's motivation to process information are interest and level of need for cognition.

Given Petty and Cacioppo's proposition that motivation is a determinant of one's likelihood of engaging in central route processing, level of the need for cognition is a variable of obvious interest in explaining the Elaboration Likelihood Model. Thus, an enhanced understanding of the construct need for cognition through investigations of interactions with message attributes would enhance the understanding of the Elaboration Likelihood Model. Further, a study of human communication implicitly assumes one is dealing with amounts and kinds of information transference. Thus, in addition to intelligence, the presence and/or absence of, as well as qualities and kinds of, message arguments seem of obvious importance in understanding human communication under the rubric of the Elaboration Likelihood Model. Finally, it seems a straight-forward assumption that interest levels vary across persons when dealing with a particular topic. Thus, the availability of

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[37] Cacioppo, Petty, and Morris, op. cit. p. 810.

information as a variable affecting the ability to centrally process information and levels of need for cognition as a variable affecting motivation to centrally process information seem to be among the obvious initial steps in investigating human communication in the environment outlined thus far.

In a persuasion context, the research reviewed thus far suggests:

-- Need for cognition is a predictor of elaboration.

-- Elaboration is a determinant of being persuaded.

Heuristic-Based Judgments

Despite Petty and Cacioppo's research with the need for cognition and their Elaboration Likelihood Model, Tversky and Kahneman found that people tend to make judgments based on heuristics and biases rather than upon available data. [38] That is, Tversky and Kahneman reported findings that people tend, in the terms of the Elaboration Likelihood Model, to process information through peripheral routes.

For example, Tversky and Kahneman reported people's holding a belief in "the law of small numbers" and "the gamblers fallacy." [39] The former "law" incorrectly states

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[38] A. Tversky and D. Kahneman, "Judgment Under Uncertainty: Heuristics and Biases," Science, 185:1124-31 (1974).

[39] A. Tversky and D. Kahneman, "Belief in the Law of Small Numbers," Psychological Bulletin, 67:105-10 (1971).

characteristics of samples drawn from a population will resemble the characteristics of the population (even with small samples) far better than sampling theory predicts. Adherents of the law of small numbers are both trained statisticians and lay persons. The gambler's fallacy, on the other hand, assumes the laws of chance are "fair." Given information about chance happenings, people tend to believe that occurrences that represent outliers of a population will be offset by one or more occurrences which alone or in combination are of equal magnitude in the opposite direction.

To illustrate, Tversky and Kahneman asked subjects which is more likely: a family of eight in which children are born in the order: boy, boy, boy, girl, girl, girl or in the order girl, boy, boy, girl, boy, girl. Although each sequence is equally likely according to probability theory (and assuming the probability of a baby's being male is .5), an overwhelming number of subjects said the latter sequence was more likely. [40] Similarly, subjects were given the following scenario:

> There are two programs in a high school. Boys are a majority (65 percent) in program A, and a minority (45 percent) in program B. There is an equal number of classes in each of the two programs. You enter a class

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[40] D. Kahneman and A. Tversky, "Subjective Probability" A Judgment of Representativeness," in Judgment Under Uncertainty: Heuristics and Biases, D. Kahneman, P. Slovic, and A. Tversky eds. (London: Cambridge University Press, 1982), p. 34.

at random, and observe that 55 percent of the students are boys. What is your best guess -- does the class belong to program A or to program B? [41]

Sixty-seven of the 89 subjects ($p < .01$) said the class belonged to program A despite its more likely being a class from program B. The latter is true because the variance for $p = .45$ is greater than the variance for $p = .65$. [42]

Tversky and Kahneman said the above examples are the result of subjects' making their judgments based on the apparent representativeness of the known population. Representativeness, they said, is a function of two criteria. First, the degree to which a sample is similar in essential properties to its parent population, and second, the degree to which it reflects the salient features of the parent population determine how likely it is a group of subjects will misinterpret its judgments of the sample. [43]

Tune [44] and Wagenaar [45] both found that the appearance of randomness enhances subjects' belief that a

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[41] Kahneman and Tversky, op. cit. p. 34.

[42] Kahneman and Tversky, op. cit. p. 34.

[43] Kahneman and Tversky, op. cit. pp. 35-6.

[44] G. Tune, "Response Preferences: A Review of Some Relevant Literature," Psychological Bulletin, 61:286-302 (1964).

[45] W. Wagenaar, "Subjective Randomness and the Capacity to Generate Information," in Attention and Performance, III, Acta Psychologica, A. Sanders ed. 33:233-42 (1970).

sample is of the appropriate population. In other words, the appearance of the sample must reflect the manner in which the sample was generated in order for subjects to believe the sample is, indeed, representative of the population. Tune and Wagenaar found that subjects tended to reject patterns of coin tosses of H T H T H T H T or T T H H T T H H as highly unlikely because of their regularity. Tversky and Kahneman explained the phenomenon saying "a representative sample is one in which the essential characteristics of the parent population are represented not only globally in the entire sample, but also locally in each of its parts. A sample that is locally representative, however, deviates systematically from chance expectations: it contains too many alternations and too few clusters." [46] People view chance as unpredictable, but essentially fair. Thus, they tend to believe a sample is representative if it approaches the expected distribution of units based on what is known about the population. If, however, the distribution is too orderly, then people tend to believe it is a less likely representative of the population than one which possess some perturbance of order. This is true despite an orderly distribution's being more probable than many disorderly distributions.

Further, Kahneman and Tversky found that students based

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[46] Kahneman and Tversky, op. cit. p. 36.

predictions of a hypothetical graduate student's major on representativeness rather than available data. [47] Three groups were used in the experiment. The first group, assigned as the base-rate group, was asked to estimate the percentage of graduate students enrolled in nine fields of study; the second group, assigned as the similarity group, was asked to rank the nine fields of study in terms of how similar a hypothetical person was after that hypothetical person had been described; the third group, assigned as the prediction group, was asked to predict by rank order the fields of study in which the hypothetical person was likely enrolled after being told the same description given to the similarity group was an evaluation by a psychologist done during the hypothetical person's senior year in high school. Product-moment correlations were computed for the three groups' rank orderings. The results were a high positive correlation between the similarity and prediction groups' rank orderings (.97), and a moderate negative correlation between the base-rate and prediction groups' rank orderings (-.65).

Kahneman and Tversky explained the results, saying "in general, three types of information are relevant to statistical prediction: (a) proper or background

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[47] D. Kahneman and A. Tversky, "On the Psychology of Prediction," in Judgment Under Uncertainty: Heuristics and Biases. D. Kahneman, P. Slovic, and A. Tversky eds. (London: Cambridge University Press, 1982), pp. 49-57.

information, (b) specific evidence concerning the individual case, (c) the expected accuracy of prediction. A fundamental rule of statistical prediction is that expected accuracy controls the relative weights assigned to specific evidence and to prior information. When expected accuracy decreases, predictions should become more regressive; that is, closer to the expectations based on prior information. In the case of Tom W. (the hypothetical person), expected accuracy was low, and prior probabilities should have been weighted heavily. Instead, our subjects predicted by representativeness; that is, they ordered outcomes by their similarity to the specific evidence, with no regard for prior probabilities." [48] Kahneman and Tversky reported that despite possessing base-rate information of probabilities and despite knowing their judgments based on representativeness were less accurate than judgments based on base-rate information would have been, their subjects used representativeness as a heuristic for making judgments rather than the base-rate information.

Kahneman and Tversky also reported that, when assigned to two treatment groups and told the accuracy of their judgments based on the heuristic of representativeness would result in being correct 55 percent of the time and 27 percent of the time respectively, the two treatment groups'

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[48] Kahneman and Tversky, op. cit. p. 51.

rank orderings did not differ significantly. That is, despite being told their chances of correct predictions was low, the 27-percent group based its predictions of the hypothetical person's major on the heuristic of representativeness just as the 55-percent group had. [49]

In all of the studies, the manifestation of representativeness has been in the similarity of essential properties with those of a parent population or in the reflection of the salient features of the process by which a sample was generated.

Bar-Hillel, however, pointed out another manifestation of representativeness's being used as a criterion of making judgments. [50] Two kinds of systematic error enter into one's judgment-making. First, there can be an undue influence of variables that affect the representativeness of an event, but not enough influence exerted by variables that affect probability. Second, there can be a reduction of the importance ascribed to variables that affect one's determining an event's probability and that are unrelated to the events' representativeness.

One must eventually ask, however, how is it that we know the previous studies have been dealing with the construct

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[49] Kahneman and Tversky, op. cit. pp. 52-3.

[50] M. Bar-Hillel, "Studies of Representativeness," in Judgment Under Uncertainty: Heuristics and Biases, D. Kahneman, P. Slovic, and A. Tversky eds. (London: Cambridge University Press, 1982), pp. 69-83.

"representativeness"? For the most part, researchers have presented subjects with stimuli, some of which are descriptions of persons or events that intuitively are "representative" of some population, and some of which are probabilities of various events' occurring. From those stimuli, subjects have judged the likelihood of the events' occurring or the likelihood that the described person or object is a member of a parent population. Over aggregates of people, the reported research has demonstrated almost universally positive results. Still, in the tradition of construct validity, one must consider the circular argument of the situation. The theory seems to be sound, because the measures used in the various studies perform as the theory predicts. The theory is then confirmed, by the measures that have, in essence, been validated by the theory. So, which is the bedrock, the theory or the measures? It is difficult to determine, of course, but in this case the theory has a number of attributes necessary for a sound theory. It predicts well; it explains well; it is parsimonious; and it is logically consistent. These, in addition to the consistency of the reported findings lend weight to the argument that the theory should be given the benefit of assuming it is relatively sound. It is understood, of course, that theories cannot be proven or disproven, but that their soundness must be assumed if one is to proceed.

Claiming that assumption for Tversky and Kahneman's theory, then, Bar-Hillel went about demonstrating a means of operationalizing representativeness. [51] The argument is based on the assumption that "judgments of representativeness and of likelihood are determined by the same essential characteristics." Given that the characteristics are the same, one can determine what the characteristics of representativeness are by asking subjects to render judgments of likelihood.

In a clever study, Bar-Hillel reversed the roles that representativeness and probability had assumed in previous studies and posited that, if representativeness is indeed a predictor of judging likelihood because the two (judgment of representativeness and judgment of likelihood) have essentially the same characteristics, then the judging of likelihood should be a good predictor of representativeness. [52] In other words, if presenting subjects with stimuli that intuitively are of varying degrees representative of a population leads one to make predictable probability judgments, then the making of probability judgments should also be a predictor of creating intuitively representative descriptions. In the terms of confirmatory factor analysis, a possible conceptualization

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[51] Bar-Hillel. op. cit. pp. 72-79.

[52] Bar-Hillel. op. cit. pp. 72-79.

would include a line connecting the constructs "representativeness" and "probability" with arrows pointing in both directions.

Bar-Hillel found what she set out to find. [53] Indeed, as predicted, asking subjects to judge the likelihood of various samples' coming from a parent population yielded a pattern of representativeness results that resembled the pattern of representativeness stimuli Tversky and Kahneman had used to generate predictable judgments of likelihood.

The characteristics of representativeness predicted by Bar-Hillel and generated by her subjects, and the characteristics intuitively used by Tversky and Kahneman dealt with the distribution of those characteristics in relation to the known population parameters. In short, representative samples are those that have a lack of identical observations, that have a lack of observations falling on one side of the population mean, that have a range that is close to an "ideal range" given the known range of the population values, and that have a mean that is close to the population mean. [54]

Bar-Hillel analyzed her findings saying, "had subjects been using a single cue, it would not have been necessary to label it representativeness. It is the fact that the

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[53] Bar-Hillel, op. cit. p. 82.

[54] Bar-Hillel, op. cit. p. 77.

subjects' judgments seem to be based on complex configurational considerations of the gestalt of samples that lends force to terming -- nay, conceptualizing -- their heuristic judgment by representativeness." [55]

Bar-Hillel's findings and conclusions coupled with the properties of cause and effect relationships leads to yet another informal hypothesis.

Tversky and Kahneman and others found that inducing subjects to make representativeness decisions also induced them to generate judgments of probability; Bar-Hillel found that inducing subjects to make judgments of probability also induced them to generate decisions of representativeness.

Thus, research findings are that there is concomitant variation between the variables representativeness and probability judgment. Temporal precedence, however, has not been established. The properties of cause and effect relationships are that variables must vary together, that variation in the posited independent variable must precede variation in the posited dependent variable, and that any possible intervening causes of the relationship between the two variables are accounted for.

Tversky and Kahneman demonstrated that representativeness can precede probability judgment and Bar-Hillel demonstrated that probability judgment can precede

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[55] Bar-Hillel, op. cit. p. 76.

representativeness. That lack of temporal precedence lends weight to concluding that, in the terms of causal links, not only can there be a line indicating mutual causality drawn between the constructs representativeness and probability judgments, but also lines between a third (or more) construct(s) and the constructs representativeness and probability judgment. In other words, because representativeness and probability judgments have predictive validity for one another, there must be at least one intervening variable accounting for their varying together.

Petty and Cacioppo, found that people tend to make decisions (accept or reject) about persuasive arguments based on interactions among message variables and receiver variables. Some messages are fraught with peripheral cues; others posses cogent arguments. Some people are able and motivated to process information; others are not.

In short, the Elaboration Likelihood Model explains how people make qualitative judgments of a persuasive message.

The work of Tversky and Kahneman, on the other hand, explored the results of people's being induced to make judgments about quantitative probabilities.

Petty and Cacioppo found people can use either heuristics or cognitive processes to make judgments about persuasive arguments; Tversky and Kahneman found people tend to use heuristics exclusively.

The question arises, therefore, can the findings of

Tversky and Kahneman be explained under the rubric of the Elaboration Likelihood Model or is the process through which judgments about persuasive messages are made different from the process through which judgments about probabilities are made?

Does the human mind work differently when making judgments about qualitative matters from the way it works when making judgments about quantitative matters?

The two decision processes are similar when considered in terms of the work completed by Miller with his "Magical Number Seven, Plus or Minus Two." [56] He concluded that human short-term memory can deal with approximately seven chunks of information at one time. When dealing with judgments about objects, he found that the human mind operates somewhat like a computer. Thus, it requires two bits of information storage space to hold the decision that an object is either good or bad, warm or hot, green or not green, or whatever the decision to be made is.

When an object like a persuasive message containing n individual arguments is being evaluated, therefore, two to the n^{th} power bytes of short-term memory storage space is required to make the combinations of judgments needed to

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[56] G. Miller, "The Magical Number Seven, Plus or Minus Two: Some Limits on our capacity for Processing Information," The Psychological Review, 63:81-95 (1956).

make an overall qualitative evaluation of the persuasive message. Making that series of either/or decision is analogous to assigning zeros and ones to the individual judgments. The analog to a zero is assigned if the object does not have the quality sought; the analog to a one is assigned if the object does have the quality sought.

If, as Miller has shown, human qualitative judgments are analogous to a computer's binary system of using zeros and ones to create and store information, then the making of qualitative judgments is quite similar to the making of probability judgments. For, the overall evaluation of an object containing several individual parts that must also be evaluated, requires compiling a running total of frequencies of the analogs to zeros and ones. Probability judgments require the keeping track of percentages. Percentages, in turn, are nothing more than converted raw frequencies.

Thus, qualitative and quantitative evaluations are similar in their common usage of frequencies.

Cacioppo and Petty's need for cognition is among the possible intervening variables that account for the covariation of representativeness and probability judgment. Arguing otherwise would require three things. First, one would have to embrace hypotheses that are not supported by anything beyond a realization that the findings of Tversky and Kahneman are not fully understood. Second, one would have to ignore the findings and implications of the work of

Bar-Hillel. Third, one would have to ignore the consistent findings of Petty and Cacioppo to embrace another, less-likely explanation.

The Elaboration Likelihood Model posits there are varying levels of elaboration one engages in when centrally processing information. The second postulate of the Elaboration Likelihood Model suggests there is an elaboration continuum. Whether one elaborates is dependent upon interactions among message variables, the message context, and the receiver variables. [57]

The divergence in findings of Petty and Cacioppo and Tversky and Kahneman suggests message's fall along a continuum of likelihood of being elaborated upon based on a quality inherent within the messages. That even "sophisticated" statisticians based their judgments of probability on the heuristic of representativeness rather than the laws of probability, suggests that the messages used by Tversky and Kahneman possessed a low degree of the quality that would lead to elaboration. That college students did elaborate upon a message dealing with raising tuition based upon the relevance of the tuition raise message (whether it was at their school or another,

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[57] Petty and Cacioppo, op. cit. p. 7.

fictitious university) suggests that messages using those concepts to convey information possessed a high degree of the quality that would lead to elaboration.

Thus, to this point research suggests that:

-- The need for cognition is a predictor of elaboration.

-- Degree of elaboration is a determinant of one's being persuaded.

-- There are contexts, however, in which elaboration is unlikely regardless of the receivers' level of need for cognition.

Channel Capacity

Atkinson and Shiffrin hypothesized that human memory is divided into long-term and short-term stores. [58] Information in the short-term store is information that is being used, manipulated by the human mind. It can be the result of stimuli from without the individual or information that has been retrieved from long-term store. In either case, Miller found that short-term store is capable of dealing with a limited number of bits of information. In a description that is analogous to bytes of computer memory, Miller suggested that human beings can deal with a "magical

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[58] R. Atkinson and R. Shiffrin, "Human Memory: A Proposed System and Its Control Process," in Advances in the Psychology of Learning and Motivation Research and Theory, K. Spence and J. Spence eds. (New York: Academic Press).

number seven plus or minus two" [59] chunks of information at one time. He found the phenomenon to be applicable to people of all kinds. Miller reviewed experiments that, in essence, asked subjects to immediately repeat series of random numbers that had been recited to them. The subjects tended to have little trouble, until the length of the random list of numbers reached approximately seven. At that point, the subjects tended to begin making mistakes.

Miller used the term "channel capacity," which usually is reserved for media characteristics in communications research, to describe the amount of information a human being is able to deal with in a communication situation.

"If the human observer is a reasonable kind of communication system," he said, "then when we increase the amount of input information the transmitted information will increase and will eventually level off at some asymptotic value. This asymptotic value we take to be the channel capacity of the observer: it represents the greatest amount of information that he can give us about the stimulus on the basis of an absolute judgment." [60]

Miller continued, explaining that, although the human mind can deal with approximately seven chunks of information at one time, dealing with those seven chunks requires

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[59] Miller, op. cit. p. 88.

[60] Miller, op. cit. p. 82.

approximately 2.5 bits of information. He defined a bit of information as the amount of information required to make a choice between two equally likely alternatives. Thus, two chunks of information require one bit; four chunks require two bits; and eight chunks require three bits.

Miller concluded that the amount of information a human being can deal with is represented by seven, plus or minus two, chunks of information, or, he offered as an alternative way of viewing the research, the human mind can deal with from two to three bits of information at one time.

Miller's conceptualization of the magical number seven provides a possible explanation for a finding by Tversky and Kahneman. Their discovery that trained statisticians tended to make judgments of probability based on heuristics is not cognitively pleasing. It is especially unpleasing when one considers Cacioppo and Petty's finding that some people tend to enjoy thinking while others do not. Additionally, Cacioppo and Petty, in part, validated their need for cognition scale by asking both college professors and blue collar workers to respond to the scale's items. Their reasoning was that college professors are more likely to be those high in need for cognition than are blue collar workers. Their findings supported their reasoning; the college professors did, indeed, score higher on the need for cognition scale, a scale that displayed other evidence of a

high degree of construct validity. [61] Using the same reasoning, then, one would expect that trained statisticians would be among those who enjoy thinking. Petty and Cacioppo were able to validate their need for cognition scale thanks, in part, to an intuitive understanding that college professors have a higher need for cognition than do assembly line workers. In a similar manner, it seems as intuitively obvious that trained statisticians, like college professors, are among those who are high in need for cognition. One would also expect that their being asked to not only think but also to think specifically about their field of expertise -- statistical probability -- statisticians would not base their judgments upon heuristics. That they did, is acutely problematic given their training and presumed level of need for cognition. Problematic as it is, Tversky and Kahneman, however, found that they did base probability judgments on heuristics.

A possible explanation is that the statisticians were placed in a situation where they had no choice but to use heuristics in making their judgments. That is, the exceeding of their channel capacity is posited to account for the statisticians' lack of cognition. A possible resolution to this intuitive dilemma is the proposition that

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[61] Cacioppo and Petty, op. cit. p. 122.

the judgments of probability Tversky and Kahneman required of their statistician subjects consumed more bits of human processing space than short-term store is able to accommodate. Given their limitations in processing the problem, the only alternative was their using the heuristic of representativeness.

That statisticians based their judgments of probability upon heuristics rather than upon the laws of probability suggests there is a threshold beyond which the human mind is unable to absorb and process information in snapshot fashion. That is, Miller's channel capacity may account for a ceiling above which people are not able to centrally process information. Certainly statisticians would be motivated (as is required by the Elaboration Likelihood Model) to centrally process information dealing with a judgment of probability. It is argued that what was missing from the requirements of the Elaboration Likelihood Model in the case of these statisticians was the ability to centrally process the information. That inability, it is further argued, was the result of the statisticians' exceeding the threshold established by Miller's two- to three-bit channel capacity. They, thus, relegated the information processing to their peripheral routes and made their judgments based on an available heuristic rather than on the available data. In the statisticians' case, the heuristic was representativeness.

The research completed thus far suggests:

-- Need for cognition is a predictor of elaboration.

-- Degree of elaboration is a determinant of one's being persuaded.

-- There are contexts in which elaboration is unlikely regardless of receivers' level of need for cognition.

-- An example of a context in which elaboration is unlikely regardless of receivers' level of need for cognition is that created when the human short-term store is required to deal with more bits of information than that represented by Miller's channel capacity.

Hypotheses

If channel capacity can explain statisticians' making probability judgments based on heuristics, then it is reasonable to argue that channel capacity can also predict behavior of subjects' judgments of persuasive messages. Judging probabilities and judging persuasive argument soundness both require information processing. If a two- to three-bit channel capacity can establish a limit on the short-term store's ability to process information for probability judgments, or any other mental tasks, then it can establish a similar limit for the short-term store's ability to deal with the information required for making judgments of persuasive messages.

In other words, the progression of the reviewed

literature indicates that:

-- Need for cognition is a predictor of elaboration. In this particular case, need for cognition is a predictor of making judgments of persuasive messages based on an available heuristic.

-- Degree of elaboration is a determinant of one's being persuaded. Consequently an understanding of when receivers are likely to engage in heuristic reasoning, that is, use an available heuristic rather than cognitively deal with the available information, will enhance the understanding of the persuasion process.

-- There are contexts in which elaboration is unlikely regardless of receivers' level of need for cognition. In this particular case, the context in which elaboration is unlikely regardless of receivers' need for cognition is that level of information required to make a judgment about a persuasive message that surpasses Miller's two- to three-bit channel capacity. Once that point is surpassed elaboration by any receivers is unlikely.

In the context of a written persuasive message, the number of bits of information required to make a judgment of the persuasive message is a message variable that will interact with the receiver variable need for cognition. That interaction will predict the likelihood of the receivers' engaging in heuristic reasoning.

Thus, conceptually, the constructs need for cognition and channel capacity interact to predict receivers' either engaging in heuristic reasoning or cognitive reasoning.

A distinction between the two proposed processes is parallel to the distinction between using the central and peripheral routes to persuasion.

Cognitive reasoning in this context is the effortful consideration of a body of information that is at hand. It is the consideration of the content and meaning of the message itself. Based on that consideration, persons engaged in cognitive reasoning determine their agreeing or disagreeing with a position espoused in the message.

Heuristic reasoning, on the other hand, is the dependence on any non-content cues to determine whether one agrees or disagrees with what is assumed to be the advocated position of a persuasive message. Based on their feelings about the non-content cues encountered, persons engaged in heuristic reasoning determine their agreeing or disagreeing with a position espoused in the message.

Need for cognition is conceptualized as one's proclivity for thinking. A person who enjoys and tends to engage in thinking is high in need for cognition; one who does not enjoy and who does not tend to engage in thinking is low in need for cognition.

Miller's two- to three-bit channel capacity is conceptualized as a number of bits of cognitive information

that must be analyzed simultaneously, individually, and within the confines of one's short-term store.

Heuristic reasoning is conceptualized as one's depending on an available heuristic, or rule of thumb, to make a decision. In the case of making judgments about an object such as a persuasive message, heuristic reasoning entails using heuristics as a guide for evaluation.

Cognitive reasoning is conceptualized as one's depending on information that must be analyzed in some manner to make a decision. In the case of making judgments about an object such as a persuasive message, cognitive reasoning entails using the product of information analysis as a guide for evaluation.

H_1: Strong arguments will be judged to be more sound than weak arguments.

H_2: Persuasive message arguments possessing a positively-valued characteristic that can be used as an available heuristic will be judged to be more sound than persuasive message arguments identical in content but possessing a negatively-valued characteristic that can be used as an available heuristic.

H_3: Level of need for cognition is negatively related to heuristic reasoning and is positively related to cognitive reasoning so that:

A. Persons low in need for cognition will and persons high in need for cognition will not judge persuasive message arguments possessing a positively-valued characteristic that can be used as an available heuristic to be more sound than persuasive message arguments identical in content but possessing a negatively-valued characteristic that can be used as an available heuristic regardless of the strength of the message arguments.

B. Persons high in need for cognition will and persons low in need for cognition will not judge strong persuasive message arguments to be more sound than weak persuasive message arguments regardless of the arguments' possession of either positively or negatively-valued characteristics that can be used as an available heuristic.

H_4: A two- to three-bit channel capacity exists in human short-term memory and represents the point at which heuristic reasoning will be undertaken so that, regardless of level of need for cognition, all subjects will judge persuasive message arguments possessing a positively-valued characteristic that can be used as an available heuristic to be more sound than persuasive message arguments possessing a negatively-valued characteristic that can be used as an available heuristic regardless of the strength of the message arguments.

CHAPTER III

METHODS

Operationalizations

Three constructs were operationalized experimentally in order to complete the study. The need for cognition, weak vs. strong argumentation, and available heuristic were operationalized.

The Need for Cognition

The need for cognition was operationalized using the scale developed by Cacioppo and Petty. [62] A high need for cognition was operationalized as a high scale score; a low need for cognition was operationalized as a low scale score.

Cacioppo and Petty used 527 undergraduate students at the University of Iowa to validate their 18-item scale. After creating an original 45-item scale, they pared it to 34 items in a test using subjects who, based on their occupations, were likely to display differing needs for cognition. They reasoned that college professors were likely to be high in need for cognition and that blue collar

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[62] J. Cacioppo and R. Petty, "The Need For Cognition," Journal of Personality and Social Psychology, 42:116-131 (1982).

workers were likely to be low in need for cognition. They tested their original 45-item scale using subjects from the two groups. A 34-item scale was adopted after the initial analysis; it was reduced to a final 18 items after further analysis of its psychometric properties. [63]

Cacioppo and Petty reported that the reliability of both the 34-item and 18-item versions of the scale were high -- .91 for the 34 items and .90 for the 18 items using Chronbach's Alpha. Both versions were analyzed using principal components analysis. Both showed that the first extracted factor explained a large proportion of the variance in the items; subsequent factors explained equal and decreasing proportions of the remaining variance; only one item failed to have a substantial loading on the first factor; and only one item failed to have a higher loading on the first than on subsequent factors.

Using principal components analysis, the scale also was analyzed in this study with students at the University of Tennessee. The scale's 18 items, the items' first factor loadings, and the eigenvalues generated by the principal components analysis for the first four factors are displayed in tables 1 and 2.

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[63] J. Cacioppo, R. Petty, and C. Kao, "The Efficient Assessment of Need for Cognition, Journal of Personality Assessment, 48:306 (1984).

Table 1

The 18-Item Need For Cognition Scale

And First Factor Loadings For Each Item

Item	Text	Loading
1	I would prefer complex to simple problems.	.71689
2	I like to have the responsibility of handling a situations that requires a lot of thinking.	.67492
3*	Thinking is not my idea of having fun.	.66270
4*	I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.	.66409
5*	I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.	.68333
6	I find satisfaction in deliberating hard and for long hours.	.49455
7*	I only think as hard as I have to.	.33921
8*	I prefer to think about small, daily projects to long-term ones.	.44390
9*	I like tasks that require little thought once I've learned them.	.71363
10	The idea of relying on thought to make my way to the top appeals to me.	.53174
11	I really enjoy a task that involves coming up with new solutions to problems.	.61849

Table 1 (Continued)

Item	Text	Loading
12*	Learning new ways to think doesn't excite me very much.	.53160
13	I prefer my life to be filled with puzzles that I must solve.	.72222
14	The notion of thinking abstractly is appealing to me.	.60630
15	I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.	.72394
16*	I feel relief rather than satisfaction after completing a task that required a lot of mental effort.	.54447
17*	It's enough for me that something gets the job done; I don't care how or why it works.	.42995
18	I usually end up deliberating about issues even when they do not affect me personally.	.38556

* Reverse scoring was employed.

Table 2

Eigenvalues For Each Of The First Four Factors Extracted From The Principal Components Analysis Of The Need For Cognition Scale

Factor	Eigenvalue
One	6.3736
Two	1.5720
Three	1.2321
Four	1.0708

Undergraduate students were used to validate the scale at the University of Iowa; undergraduate students at the University of Tennessee were used for this study. Nine-point Likert-type scales were used to measure the subjects' reactions to the scale's 18 statements. The subjects were instructed to read each of the scale's 18 items and to indicate the degree to which they either agreed or disagreed with each item. The possible responses to the Likert-type scale were: very strongly agree, strongly agree, moderately agree, slightly agree, neither agree nor disagree, slightly disagree, moderately disagree, strongly disagree, very strongly disagree. Nine of the 18 item statements were worded so that reverse scoring was needed to compile an accurate need for cognition score for each subject. Subjects' scores on each of the items were computed by assigning from -1 to -4 points for responses indicating a proclivity for not enjoying thinking, from 1 to 4 points for responses indicating a proclivity for enjoying thinking, and 0 points for the neutral response. In other words, the direction and magnitude of either agreeing or disagreeing with each of the 18 item statements resulted in scores from -4 to 4 points for each item depending on how the item was worded. Total need for cognition scores were computed for each subject by adding the points for each of the responses to the 18 item statements. Negative scores indicated a low

need for cognition; positive scores indicated a higher need for cognition.

Because the two sets of subjects are similar, there was little reason to believe the scale would fail to display similar psychometric properties. The Need For Cognition Scale was, nevertheless, analyzed using University of Tennessee students, and, as shown in Table 2, it displayed similar properties as it had at the University of Iowa.

Weak vs. Strong Argumentation

Operationalizing weak verses strong argumentation was a function of using an index developed and validated at the University of Tennessee specifically for this study. A strong argument is one that during the pretest scored high (5.2 points or more) on the seven-point index, and a weak argument is one that scored low on the index (3.8 or less points). [64]

In a focus group setting, sophomore communications students at the University of Tennessee were asked to list on a piece of paper qualities they use as a guide to decide if an argument is "strong." The 20 students generated a list of qualities, many of which dealt with source

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[64] The index scores were reversed from those used on the scale for reading ease. Originally, high scores on the index indicated weak argumentation, and a low index score was an indication of strong argumentation.

characteristics. Those dealing with source characteristics were discarded. Of the remaining, however, five qualities -- believable, sound, reasonable, logical, and convincing -- emerged as message characteristics the members of the group named more than once as those by which they would judge a persuasive argument. Those five characteristics were chosen, then, for use in subsequent analyses as a five-item index.

Immediately after they listed the characteristics of sound arguments, the members of the same focus group were exposed to a scenario in which one might seek to institute a task force for race relations at a state supported university. The focus group members then were asked to list five "strong" and five "weak" reasons for establishing such a task force. Many of the reasons generated by the focus group members were redundant, but the effort yielded a total of 31 unique reasons.

The data generated by the focus group were then compiled into a questionnaire and presented to a separate group of 20 sophomore communications students at the University of Tennessee. These students were asked to evaluate the 31 unique reasons generated by the focus group using the five-item index generated by the same focus group. Table 3 displays the 31 reasons, their mean scores, and their standard deviations.

Using these data, the five-item index was analyzed

Table 3

Mean Scores And Standard Deviations By Reason

Reason	Mean	SD
The task force should be reinstituted because it makes UT-K appear to be concerned about equality.	4.69	1.25
The task force should be reinstituted because it will improve the educational opportunities for all students regardless of their ethnic origins.	5.06	1.64
The task force should be reinstituted because it will improve the community's perceptions of the university.	5.30	1.08
The task force should be reinstituted because its recommendations will help make the university a more safe and pleasant place for students, faculty, and staff.	4.58	1.46
The task force should be reinstituted because it will give minority faculty members a feeling of contributing to the university.	4.76	1.48
The task force should be reinstituted[#] because it will eventually result in a grading system at the university that is based on performance rather than on students' ethnic origins.	3.69	2.05
The task force should be reinstituted because its existence will give minority students a feeling the university cares about their concerns even if the task force results in no substantive changes.	4.66	1.63

Table 3 (Continued)

Reason	Mean	SD
The task force should be reinstituted because it will help preclude making judgments about human beings based on their race.	4.46	1.75
The task force should be reinstituted because progressive universities are concerned with such matters, and this university seeks to be progressive.	4.54	1.69
The task force should be reinstituted* because black students have a right to the same educational opportunities as everyone else.	5.74	1.88
The task force should be reinstituted because the university will lose its federal funding if its race relations are not improved.	4.50	1.71
The task force should be reinstituted* because universities, of all places, should be somewhere where race is not a criterion by which people are judged.	5.58	1.58
The task force should be reinstituted# because we should make up for past black people in this country have suffered by overcompensating now.	3.49	2.18
The task force should be reinstituted# because it will help attract more top-notch athletes to the University of Tennessee.	3.55	1.82

Table 3 (Continued)

Reason	Mean	SD
The task force should be reinstituted[#] because it will help guarantee world peace.	2.13	1.69
The task force should be reinstituted because it will help ensure the basic rights guaranteed by the constitution will be safeguarded for all people.	4.99	1.52
The task force should be reinstituted[*] because its existence will help teach, by example, that concerns of racial harmony are important.	5.19	1.59
The task force should be reinstituted because it will help the University of Tennessee avoid criticism by groups like the NAACP.	4.35	1.67
The task force should be reinstituted because the University of Tennessee campus is still primarily segregated.	4.90	1.58
The task force should be reinstituted because minorities want it.	4.78	1.86
The task force should be reinstituted because it is a committee and committees are effective ways to get things done.	4.13	1.84
The task force should be reinstituted because the University of Tennessee has been getting complaints from major supporters about its racial problems.	4.35	1.80

Table 3 (Continued)

Reason	Mean	SD
The task force should be reinstituted because the university cannot separate all races, making it necessary for everyone to get along with one another.	4.87	1.25
The task force should be reinstituted because it is the right thing to do.	4.11	1.68
The task force should be reinstituted* because tolerance of racism in a subculture like the University of Tennessee campus lends itself to tolerance of racism in the overall culture.	5.29	1.45
The task force should be reinstituted* because people of different ethnic backgrounds have thing to offer one another.	5.91	1.09
The task force should be reinstituted because it will help prevent future riots on campus.	4.18	1.94
The task force should be reinstituted because racism is a symptom of ignorance and universities are in the business of eradicating ignorance.	5.10	2.00
The task force should be reinstituted because racism is rude.	4.20	2.00
The task force should be reinstituted because it will help the University of Tennessee attract more minority students.	5.21	1.52

Table 3 (Continued)

Reason	Mean	SD
The task force should be reinstituted# because it makes the university administration look good.	3.84	1.90

# Indicates one of the five weak reasons chosen.
* Indicates one of the five strong reasons chosen.

using principal components analysis. Using a minimum eigenvalue criterion of 1.00, the principal components analysis generated one factor. After constraining the program to generate two factors and by using a varimax rotation, the principal components analysis showed all items loading on the first factor and all but one (believable) with a higher loading on the first factor than on the second.

Also from these data, mean scores were compiled for the 31 reasons. The means were the result of judgments using the five-item index that had been generated by the focus group. Each of the reasons was evaluated using the five, seven-point items of the index in five semantic differential scales.

Given the way the items were generated, using University of Tennessee undergraduates to create the original reasons and index items, and given the subjects used to evaluate the reasons, University of Tennessee undergraduates, it was with a significant degree of confidence that the two versions of the persuasive message were created.

Finally, the five-items were analyzed using principal components analysis with the data gathered during the actual experiment. Each of the 100 subjects' evaluations of arguments was measured 10 times yielding 10 iterations in a repeated measures design. Those 10 iterations offered 10

opportunities to conduct principal components analyses on the index and to compute reliability coefficients. In each of the 10 iterations the index items loaded on the first factor with that factor accounting for more than 90 percent of the total variance. Additionally, the reliability of the index was greater than .98 in each of the iterations. Table 4 displays the results of the principal components analysis.

Available Heuristic

Operationalization of an available heuristic included using Flesch's formula for human interest and the difference between active and passive voice. [65] Manipulating human interest, according to the Flesch formula, is a function of including personal pronouns into a passage. A passage having a low degree of human interest, then, is one lacking sentences with personal pronouns, and one high in human interest is one having sentences with personal pronouns. The label used to describe the operationalized available heuristic is "readability." The "readable" version of the persuasive message was the version written with personal pronouns and in active voice; the "unreadable" version of the persuasive message was the version written without personal pronouns and in passive voice.

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[65] R. Flesch, "A New Readability Yardstick," Journal of Applied Psychology, 32:221-233 (1948).

Table 4

Factor Loadings By Item By Iteration

And Reliability Coefficients* By Iteration

Iter.	Bel.	Logic	Reason	Sound	Cred.	Rel.
One	.9486	.9467	.9481	.9464	.9264	.9845
Two	.9416	.9542	.9534	.9533	.9471	.9847
Three	.9272	.9539	.9494	.9504	.9579	.9846
Four	.9129	.9618	.9671	.9661	.9579	.9855
Five	.9553	.9682	.9623	.9706	.9615	.9852
Six	.9468	.9479	.9545	.9779	.9599	.9857
Seven	.9436	.9676	.9676	.9695	.9740	.9862
Eight	.9719	.9709	.9638	.9785	.9620	.9869
Nine	.9728	.9716	.9732	.9821	.9775	.9874
Ten	.9568	.9739	.9674	.9698	.9658	.9866

* The index items were analyzed using principal components analysis. The reliability of the index was computed using the following formula:

$$\text{Reliability} = \frac{N}{N-1}\sqrt{1 - \frac{1}{\text{Lambda}^2}}$$

Although, the absence or presence of personal pronouns has a potentially confounding effect on the message receivers' (the subjects in the study) ability to deal with the content of the message versions, the degree of the confounding was considered negligible because virtually all literate college students have a command of both personal and impersonal pronouns. To increase the effect size of the difference between the versions high and low in the available heuristic "readability," the passages were also written in active and passive voice. That is, the version having a low degree of human interest was written in passive voice and the version with a high degree of human interest was written in active voice. Again, the difference in voice introduced a potential confounding variable into the study. The manipulation of voice involves including or deleting a form of the verb to be and rearranging the subject/object order of sentences. Again, however, it is argued that any confounding was minimal because virtually all literate college students have a command of the subject/object order and of the various forms of the verb to be. In other words, to create two versions of a persuasive message that are identical in content but different in the available heuristic readability is impossible in an absolute sense. What is possible, however, is creating two message versions that accomplish the goal with as little confounding as possible. The latter, it is argued was accomplished.

To test the content of the two message versions, three graduate students majoring in communications at the University of Tennessee were asked to judge them for meaning. All three made suggestions, and after implementation of the suggestions, all three judged the versions to be identical in meaning. (See Appendix A for the versions of the persuasive message.)

Since Flesch's human interest score is a function of the number of "personal" words a written communication contains, two versions of the persuasive message were created. One version contained at least one personal word in each sentence and, thus, scored high on Flesch's human interest scale. This version was written in active voice. The other had no personal words at all and, thus, scored low on Flesch's human interest scale; it was written in passive voice. The presence or absence of personal words combined with active or passive voice was used as the operationalization of the available heuristic readability.

Instrument Creation

In order to complete the study, an instrument had to be created. The instrument consisted of a persuasive message that included a point that was analogous to Miller's two- to three-bit channel capacity.

Persuasive Message

At this point, the objection can be raised that even if a subject's short-term memory were filled beyond its channel capacity, what difference would that make in his judgment of a message if the individual arguments leading up to that channel capacity were all strong or all weak? In other words, won't subjects simply remember their last overall judgment and add to that as they go through the message? To counter that, one persuasive message was operationalized. Consisting of five strong and five weak arguments, the message was constructed to fall in the sequence:

Iteration One -- Strong argument
Iteration Two -- Weak argument
Iteration Three -- Weak argument
Iteration Four -- Strong argument
Iteration Five -- Strong argument
Iteration Six -- Weak argument
Iteration Seven -- Weak argument
Iteration Eight -- Strong argument
Iteration Nine -- Strong argument
Iteration Ten -- Weak argument

The use of a message thus configured should have yielded an overall evaluation of the message based on the information read through the first iteration of "strong," an overall evaluation based on the information read through the third iteration of "weak," and an overall evaluation based on the information read through the seventh iteration of "neutral" if the subjects were using their judgments of the actual content of the individual arguments to make their cumulative evaluations. In other words, it is argued that if subjects' base their cumulative evaluations of the

message on a composite of the ratings of the individual arguments, their cumulative evaluations should follow a pattern of going from strong to weak back toward strong until neutral is reached; the neutral evaluations should be consistent from about the seventh iteration through the tenth. The logic here is one of simple addition. A single strong argument should be evaluated as strong; adding the first weak argument to the strong argument should yield a neutral evaluation; the second weak argument should at that point make the cumulative evaluation become weak; the addition of the second and third strong arguments should attenuate the weak cumulative evaluation back toward neutral; and the weight of the first seven cumulative evaluations should attenuate any influence an individual evaluation of the eighth, ninth, or tenth iterations could introduce. Thus, the neutral cumulative evaluation should be maintained. The individual arguments were arranged in order of decreasing absolute value as judged in the study's pretest. That is, the most extremely strong argument was used in the first iteration; the most extremely weak argument followed in the second iteration; the second most extremely weak argument followed in the third iteration; and the process thus continued through the tenth iteration.

Channel Capacity

Miller's two- to three-bit channel capacity was

operationalized by first considering what a logical connection within a persuasive message is. Petty and Cacioppo asked subjects to consider persuasive messages based on what they believed were weak and strong arguments for raising tuition at a Midwestern university. They constructed messages containing what they considered to be series of weak and strong arguments for the tuition raise. The assumption was that the subjects would consider the arguments as they were read and then make an overall judgment of the entire message.

They did not explicitly state, but, implicitly, they suggested their subjects read and made individual judgments about the strength or weakness of the individual arguments and then based their overall judgment of the message on some composite of the individual evaluations.

To test that, persuasive messages constructed for this study were written as a series of arguments -- weak or strong -- for instituting a task force for race relations at the University of Tennessee. The task force was a topic of interest in and around the university community at the time of the study. The individual arguments were constructed and judged as either weak or strong based respectively on input from a focus group and the results of a pretest of the arguments using a different group of subjects who were like those that were used in the actual study.

To partial out evaluations of each individual argument,

versions of the persuasive messages were presented to the subjects one argument at a time. The messages were presented in the form of booklets; the booklets contained one argument per page. As each argument was read, subjects were asked to judge the overall message based on the content they had read to that point. Thus, after reading the first argument, subjects responded to the message's soundness based on that one argument. Then, as the second argument was added on a subsequent page, subjects were required to recall their first evaluation, make a second judgment -- a judgment of the second argument, and to combine the two into a second cumulative evaluation of the message based on what they had read to that point. The procedure continued for 10 iterations. In this procedure, the judgments of individual arguments corresponded to Miller's bits of information. Thus, as subjects approached the third page containing the third individual argument, they should have begun to approach their channel capacities. Mathematically, the operationalization of channel capacity was a test of subjects' ability to maintain a running average of ratings; verbally, it was a test of subjects' ability to keep track of their feelings for the previous individual arguments and then to combine them with the argument they were reading at the time.

Experimental Design

The study is a laboratory experiment employing a repeated measures design. One hundred undergraduate students at the University of Tennessee were the experimental subjects.

Two versions (one designed to be high in readability and another designed to be low in that quality) of a persuasive message arguing for the reinstitution of a task force for race relations were developed. Race relations, as the topic of the persuasive message made a plausible cover story and allowed for the disguising of the study's actual intent.

Additionally, a scale for evaluating the persuasive argument was created and validated.

Thus, two versions of a persuasive communication were created. The versions were alike in substance but different in the style with which they were written. One version was written in a style designed to be readable, the other to be unreadable.

The 100 subjects were assigned to the two versions of the persuasive message after being randomly selected. The random selection consisted of asking for the final digit of the subjects' local residence telephone numbers. Subjects having an even final digit received one version; subjects having an odd final digit received the other. All of the experimental subjects reported having telephones at their

local residence and were, therefore included in the study. The random assignment of subjects to their treatment groups was employed as a control of confounding variables.

After random assignment, a measure of subjects' level of need for cognition was completed using the 18-item scale developed by Cacioppo and Petty. During the same session, and prior to completing the Need for Cognition Scale, subjects were exposed to the two treatment messages predicated upon which treatment group they were assigned to. Group assignment could have accounted for subjects' need for cognition score; analysis of variance was conducted testing that possibility. The resulting F ratio was nonsignificant. Table 5 depicts the ANOVA results.

Because the experiment occurred shortly after a significant amount of local media coverage dealt with an actual campus race relations task force, a cover story was developed telling the subjects they were being asked to help a fictitious university choose among the many recommendations made by that university's task force. The recommendations were offered as reasons for continuing to study campus race relations.

The subjects also were told a grant is being sought to pay for the task force's future work. Further, they were told the grant proposal requires a one-page defense describing reasons for the task force's continued work. Finally, the subjects were told they each were reading one

Table 5

ANOVA Results Of

Need For Cognition Score By Group Assignment

Source	DF	SS	F	Prob > F
Group Assignment	1	790.90	2.29	0.1338

The subjects also were told a grant is being sought to pay for the task force's future work. Further, they were told the grant proposal requires a one-page defense describing reasons for the task force's continued work. Finally, the subjects were told they each were reading one of many permutations of the basic defense, and that they were being asked to judge the defense they were reading for soundness of reasoning. [66]

The subjects' task included judging the message, all 10 arguments, in its entirety. They made this overall evaluation as the first step of the experiment and on Page 1 of an experimental booklet that had been prepared for each subject.

Subjects also were asked to judge each of the 10 message arguments individually. They made these individual evaluations on subsequent pages of the experimental booklet.

Finally, the subjects were asked to judge the 10 individual arguments in an iterative process that required their reading the first individual argument and evaluating it. The iterative process next required the subjects to

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[66] The instructions read as follows:

Following you will find a portion of a sample proposal of the kind fund-granting agencies sometimes require. The portion you will be reading is a documentation of reasons why the task force should be funded. You are being asked to help judge the quality of this part of the proposal. In other words, if you were representing an agency or fund, would the following be a good or poor proposal?

read the second individual argument, consider their judgment of it, and combine that judgment with their judgment of the first individual argument creating a cumulative evaluation of the first two arguments. Next, the iterative process required evaluating the third individual argument and combining that judgment with the first two judgments creating a third cumulative evaluation. The process continued through ten iterations, yielding ten cumulative evaluations. Because creating the cumulative evaluations entailed making individual evaluations, the cumulative evaluations and the individual evaluations were continued on pages 2 through 11 of the experimental booklet (See Appendix B for the experimental booklet). And, of course, the first cumulative and first individual evaluations were identical for each subject.

For example, the directions for the evaluation of the second individual argument and for the making of the second cumulative evaluation were:

> "DIRECTIONS: As you did with the first individual argument, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.
>
> ARGUMENT
>
> INDEX ITEMS
>
> "DIRECTIONS: Now, without looking back at any previous pages, remember as well as you

can the first individual argument. Combine your feelings about the first argument with your feelings about the second argument and respond to the following statements using the same key you used before."

INDEX ITEMS

Identical directions were provided on the subsequent pages of the experimental booklet. The subjects were instructed not to turn back to any previous pages during the iterative process requiring their remembering each previous individual evaluation as well as they could. Each individual evaluation, then, was analogous to Miller's bits of information that remained (or did not remain) in the subjects' short-term store.

The experiment was designed so that differences between using argument strengths and/or weaknesses and in using the message's readability could be detected.

Within each subject, it would have been a relatively simple task to discern if he used cognitive or heuristic reasoning. If the average of the individual evaluations was similar to the cumulative evaluations, then the subject was using cognitive reasoning. If the individual evaluation average was not similar to the cumulative evaluations then he was using some other means of evaluation. If the dissimilar cumulative evaluations were in the direction of the available heuristic (more positive for the readable version and less positive for the unreadable version) then heuristic reasoning was being employed.

Of interest in the study, however, was not individual performances, but rather the effect need for cognition would have on argument evaluation. The unit of analysis, then, became the 1,000 evaluations that the 100 subjects made. Given that, interactions between need for cognition and group assignment and between need for cognition and argument strength were sought out.

The pattern of ratings predicted by the pretest ratings of the individual arguments -- strong, weak, weak, strong, strong, weak, weak, strong, strong, weak -- should have prevailed if the subjects used their cognitive judgments of the individual ratings to create their cumulative evaluations. If, however, the subjects failed to make judgments following the predicted pattern, there is evidence to suggest some other criterion such as a heuristic is being used to make the cumulative evaluations of the message. Further, providing a heuristic and being able to predict the direction heuristic-induced cumulative evaluations take will lend additional support to concluding heuristic reasoning is being conducted in the place of cognitive reasoning.

At this point, an objection can be raised questioning the naturalness of asking subjects to judge and report their judgments of a persuasive message argument by argument. To answer that, the experiment was designed so that each subject judged his version of the persuasive message in its entirety, yielding an overall evaluation; each subject also

judged the individual arguments as individual arguments without respect to any of the other arguments, yielding the ten individual evaluations; finally each subject judged the arguments using the iterative process described, yielding the ten cumulative evaluations. Thus, it was possible to compare any cumulative evaluation with the average of the individual evaluations that made up that iteration. And it was possible to compare the average of all the individual evaluations with the tenth cumulative evaluation and to compare both of those with the overall message evaluation. In other words, the design allowed for the measurement of subjects' proclivity for maintaining an accurate average through the iterative process, and the comparison of the tenth cumulative evaluation with the overall evaluation allowed for a determination of whether the maintaining of an accurate average is a product of the artificiality of the experimental setting or a representation of what happens in a natural setting. Results of an analysis of variance showed no significant difference between the average overall evaluation and the average tenth cumulative evaluation, a finding of non-significance one would expect if the iterative process were not unnatural. That the two averages were not significantly different does not prove the experiment was natural, of course, but the lack of a significant finding lends support to the contention there is no reason to argue the experimental setting was unnatural.

Additionally, both the average overall and average tenth cumulative evaluations were significantly different from the average of the average individual evaluations, a finding of statistical significance one would expect if the study's hypotheses are to be supported in subsequent tests. Table 6 displays these ANOVA results.

The experiment, then, consisted of subjects' being exposed to a written persuasive message. The information contained in the message was identical for all subjects. The subjects, however, were randomly assigned to two groups. One group received its message written in a readable style; the other received its message written in an unreadable style. All subjects were asked to make overall evaluations, individual evaluations, and cumulative evaluations in the process described.

The study's hypotheses state strong arguments will be evaluated more highly than weak arguments; arguments written in a readable style will be evaluated more highly than arguments written in an unreadable style; subjects high in need for cognition will be less likely to base their judgments of a message's quality on the heuristic of readability than will subjects low in need for cognition; and Miller's channel capacity will account for all subjects' eventually using readability to evaluate a message.

Table 6

ANOVA Results Of

Overall Evaluation By Tenth Cumulative Evaluation,

Overall Evaluation By Average Individual Evaluation,

Tenth Cumulative Evaluation By Average Individual Evaluation,

And Overall Evaluation By Tenth Cumulative Evaluation

By Average Individual Evaluation

Source	DF	SS	F	Prob > F
Overall vs. Tenth	1	259.92	2.73	0.0997
Overall vs. Average	1	570.21	5.98	0.0150
Tenth vs. Average	1	1600.08	16.79	0.0001
Overall/Tenth vs. Av.	1	1360.22	14.27	0.0002

To test the first two of the hypotheses, analysis of variance seeking differences between evaluations given to strong and weak arguments and between evaluations given to readable and unreadable writing styles were conducted. H_1 and H_2 state that strong arguments will be judged to be more sound than weak arguments and that message arguments having a positively-valued characteristic will be judged to be more sound than messages, identical in content, but having a negatively-valued characteristic. They were posed and tested as manipulation checks of the experiment and its design. If the experimental subjects did not tend to evaluate strong arguments more highly than weak arguments, then the study's pretesting of the weak vs. strong arguments was faulty and there was no hope of supporting the study's more substantive propositions. Additionally, if a readable style of writing was not evaluated more highly than an unreadable style of writing, then identical consequences were to be realized.

Testing H_1 entailed an analysis of variance in which the average evaluation of the five arguments pretested to be strong was compared with the average evaluation of the five arguments pretested to be weak. A significant F ratio with the mean for the strong arguments being higher than the mean for the weak arguments was considered support for H_1; a non-significant F ratio was considered non-support for the proposition.

Testing H_2 entailed an analysis of variance in which the average evaluation of the arguments written in the readable style was compared with the average evaluation of the arguments written in the unreadable style. A significant F ratio with the mean for the readable style being higher than the mean for the unreadable style was considered support for H_2; a non-significant F ratio was considered non-support for the proposition.

Because H_1 dealt with argument strength and because argument strength is a message quality that is independent of the context in which it appears, the analysis for the data for H_1 used as its dependent variable scores generated from the individual evaluations. The individual evaluations were those the subjects made of each argument without any consideration of the other message arguments. Using the individual evaluations, then, allowed for a pure test of the difference in the average ratings between the strong and weak arguments.

Unlike H_1, H_2 dealt with the difference between styles of writing -- a readable style vs. an unreadable style. And, unlike argument strength, writing style is a contextual matter. In other words, any differences in evaluations induced by differing styles of writing will be enhanced by considering the cumulative effect of subjects' being exposed to one or the other of the styles over the course of reading all 10 message arguments. In the terms of power analysis,

the effect size will be greater if the analysis is based on differences between the cumulative evaluations rather than on differences between individual evaluations. The cumulative evaluations were those that required subjects to consider all the arguments they had been exposed to in making each cumulative evaluation. That consideration, in turn, enhanced the effect differences in writing style had on the evaluations. Cumulative evaluations, then, were used as the dependent variable for the analysis of data testing H_2.

To test H_{3a} and H_{3b} multivariate analysis of variance and analysis of variance tests were conducted seeking need for cognition by readability and need for cognition by argument strength two-way interactions.

Finding the appropriately significant F statistics associated with the MANOVA and ANOVA tests was the first step in the process of seeking support for H_{3a} and H_{3b}. Interpretation of the F statistics was the completion of the process. The MANOVA was the more elegant of the analyses; the analysis of variance was conducted, however, in order to produce cell mean estimates that aided in the interpretation of the two tests' F ratios.

As with H_2, the conceptually interesting question involved in H_{3a} and H_{3b} concerned whether the posited interactions existed in the context of the message arguments being considered as a unit. Consequently the analyses for

this hypothesis used as the dependent variables the cumulative evaluations.

In the MANOVA, need for cognition score was treated as a continuous variable. Teasing out the cell means using ANOVA and treating need for cognition score as a continuous variable, however, required estimating cell means using analysis of covariance procedures. ANCOVA allowed for specifying cell mean estimates at various points along the continuum of the range of need for cognition scores. Three points were selected for the cell mean estimates -- the mean need for cognition score, one standard deviation above the mean need for cognition score, and one standard deviation below the mean need for cognition score. The procedure allowed for estimating means of evaluations made by subjects "high," "average," and "low" in need for cognition for the cells representing strong by readable arguments, strong by unreadable arguments, weak by readable arguments, and weak by unreadable arguments.

To test H_4 multiple analysis of variance and analysis of variance tests were conducted seeking a need for cognition by readability by argument strength three-way interaction.

Seeking the appropriately significant F statistics associated with the MANOVA and ANOVA tests was the first step in the process of seeking support for H_4. Interpretation of the F statistics was the completion of the

process of testing the hypothesis.

The MANOVA was the more elegant of the analyses; the analysis of variance was conducted, however, in order to produce cell mean estimates that aided in the interpretation of the two tests' F ratios.

As with H_2, H_{3a}, and H_{3b} the conceptually interesting question involved in H_4 concerned whether the posited interactions existed in the context of the message arguments being considered as a unit. Consequently the analyses for this hypothesis used as the dependent variables the cumulative evaluations.

In the MANOVA, need for cognition score was treated as a continuous variable. Teasing out the cell mean estimates using ANOVA, however, required the process used in the interpretation of the F ratios generated in the tests of H_3.

CHAPTER IV

RESULTS

Tests of Hypotheses

The study's more substantive hypotheses, H_3 and H_4, were those dealing with the relationship between need for cognition and heuristic reasoning. Support was found for H_3 but not for H_4. The study's first two hypotheses were those it was felt were necessary conditions in order to find support for the latter two propositions. Both H_1 and H_2 were proposed as manipulation checks, both were supported.

Analysis of variance was conducted to test the first two hypotheses, and analysis of variance and multivariate analysis of variance were conducted to test the final two hypotheses.

Evaluations of message arguments were gathered in three different manners -- first, as entire persuasive messages consisting of all 10 individual arguments; second, as the individual arguments without any contextual considerations; and third, in an iterative manner with an evaluation depending in part on the evaluations of previously read arguments. A decision, therefore, had to be made regarding which manner of evaluation to use as an independent variable in the tests of the four hypotheses.

Because H_1 dealt solely with argument strength and because argument strength is a message quality that is

independent of the context in which it appears, the analysis for the data for H_1 used as its dependent variable scores generated from the individual evaluations. The individual evaluations were those the subjects made of each argument without any consideration of the other message arguments. Using the individual evaluations, then, allowed for a pure test of the difference in the average evaluations between the strong and weak arguments.

Unlike H_1, however, H_2, H_{3a}, H_{3b}, and H_4 included analyzing the difference styles of writing -- a readable style vs. an unreadable style -- makes in the evaluation of message soundness. And, unlike argument strength, writing style is a contextual matter. In other words, any differences in evaluations induced by differing styles of writing can be more readily found by considering the cumulative effect of subjects' being exposed to one or the other of the styles over the course of reading an entire message. In the terms of power analysis, the effect size will be greater if the analysis is based on differences between the cumulative evaluations rather than on differences between individual evaluations because the cumulative evaluations included the cumulative effect of writing style, and individual evaluations did not. Cumulative evaluations, then, were used as the dependent variable for the analysis of data testing H_2, H_{3a}, H_{3b}, and H_4, and individual evaluations were used as the dependent

variable for the analysis of data testing H_1.

H_1 states that strong arguments will be judged to be more sound than weak arguments. In terms of analysis of variance, a test of this hypothesis is a test of the argument strength main effect with other variables controlled for. The evaluations of the message arguments as individuals provided that test of the desired main effect. Additionally, the random assignment of subjects to their treatment group ensured the control of other variables.

Each of the 100 subjects used in the study evaluated five arguments pretested to be strong and five arguments pretested to be weak, yielding 1,000 observations.

Because H_1 was a test of differences in evaluations elicited by arguments of differing degrees of soundness (either weak or strong) and because those differing degrees of soundness were defined as the results of a pretest, a test of the first hypothesis was little more than a validation of the study's pretest results. As noted, five arguments used in the study were pretested to be strong, and five arguments were pretested to be weak. The pretests began with subjects and generated arguments; the test of H_1 began with arguments and generated argument evaluations made by a different, but similar, group of subjects. Table 7 shows a highly significant difference in the average evaluations of the arguments pretested to be strong and the arguments pretested to be weak. The range of possible

Table 7

ANOVA Results Of

Argument Evaluation By Argument Strength

F	df	Sums of Squares	prob > F	Marginal
373.58	1	49371.145	.0001	Strong = 6.74 Weak = 3.90

scores for the evaluations was 1-9 points. Higher point totals indicate an evaluation of argument strength; lower point totals indicate an evaluation of argument weakness.

H_2 states that message arguments written in a readable style will be judged to be more sound than persuasive message arguments identical in content but written in a less readable style. In a manner similar to that used in testing the proposition espoused in H_1, an analysis of variance was conducted testing the proposition of H_2. The sole difference in the two analyses was in the dependent variable chosen.

Table 8 shows the test of H_2 to be statistically significant.

Because H_2 was a test of differences in evaluations elicited by arguments written with differing degrees of readability (either readable or unreadable) and because those differing degrees of readability were defined as the results of using Flesch's formula for human interest and of attempting to increase effect size by including differences in active and passive voice, a test of the second hypothesis was little more than a validation of the study's operationalization of the construct readability. H_3 states a relationship exists between need for cognition and evaluations of persuasive message arguments.

In the terms of the Elaboration Likelihood Model, persuasive message variables that require central route

Table 8

ANOVA Results Of

Argument Evaluation By Readability Style

F	df	Sums of Squares	prob > F	Marginal
3.86	1	405.640	.0498	Read. = 4.77 Unread. = 4.51

processing should be those that persons high in need for cognition will respond to in their evaluations of the message. Evaluating message argument strength is a cognitive activity. It follows, then, that persons high in need for cognition should primarily make their evaluations of the message arguments based on differences in argument strength. Also in the terms of the Elaboration Likelihood Model, persuasive message variables that act as peripheral cues should be those that persons low in need for cognition will respond to in their evaluations of the message. Responding to the difference in readable and less readable styles of writing is a peripheral route activity. It follows, then, that persons low in need for cognition should primarily make their evaluations of the message arguments based on differences in the readability of the two message versions.

The test of H_3 included an analysis of the data using multivariate analysis of variance. Each subject's ten cumulative evaluations were the dependent variables in the MANOVA. Need for cognition score and treatment group assignment were the independent variables.

In MANOVA terms, H_{3a} states that an interaction exists between need for cognition score and treatment group assignment; this interaction was found to be statistically significant. With df = 1 and Type III Sums of Squares = 2,679.2120, F = 3.99 (p = .0486).

H_{3b} states an interaction exists between need for cognition score and argument strength; this interaction was found to be non-significant. With df = 9 and Type III Sums of Squares = 725.5396, F = 1.01 (p = .4331).

Thus, the significant F ratio in conjunction with the appropriate cell means for the need for cognition by readability interaction provides support for H_{3a}. The non-significant F ratio for the need for cognition by argument strength interaction, however, does not support H_{3b}.

While the MANOVA procedures provided an elegant test of H_{3a} and H_{3b}, interpretation of the significant F statistic was somewhat difficult. To aid in the interpretation, the data were reanalyzed using analysis of variance procedures. And ANCOVA procedures made it possible to generate cell mean estimates for differing levels of need for cognition and to then compare differences in cells mean estimates to determine if the significant F ratio associated with H_{3a} was, indeed, in support of the hypothesis. The cell mean estimates were generated for need for cognition scores at their mean, one standard deviation above the mean, and one standard deviation below the mean. Thus, cell means were generated for levels of need for cognition estimated to be "high" (one standard deviation above the mean), "average" (the mean), and "low" (one standard deviation below the mean). In MANOVA, need for cognition score was treated as a continuous variable.

Table 9 depicts the ANOVA results associated with the tests of H_{3a} and H_{3b}. Tables 10-12 depict the cell mean estimates associated with the tests of H_{3a} and H_{3b}.

As predicted by the Elaboration Likelihood Model and then by the conceptualization of need for cognition, subjects high in need for cognition tended to evaluate higher the arguments that were in the unreadable version, and subjects low in need for cognition tended to evaluate higher the arguments that were in the readable version. By collapsing Table 10 over the column "Argument Strength," Table 11 was created showing that the relationships found in this study are the relationships that are predicted by the work of Cacioppo and Petty.

Table 11 shows that subjects high in need for cognition not only tended to evaluate the unreadable argument presentation higher than they did the readable presentation, they also evaluated the unreadable argument presentation higher than did subjects low in need for cognition. Additionally, Table 11 shows that subjects low in need for cognition not only tended to evaluate the readable argument presentation higher than they did the unreadable presentation, they also evaluated the readable presentation higher than did subjects high in need for cognition.

Those results are exactly the results Cacioppo and Petty's work with the construct need for cognition predicts.

Table 9#

Argument Strength By Readability Style

By Need For Cognition Score

Source	DF	Sums of Squares	F
Readability	1	15.0766	3.81*
NFC	2	39.6464	5.02**
Argument	1	157.5999	39.87**
Read. x NFC	2	222.2255	28.11**
Read. x Argument	1	1.9766	.50
NFC x Argument	2	0.2802	.04
Read. x NFC x Arg.	2	0.9085	.11

* Significant at the .10 level.
** Significant at the .01 level.
@ The table is based on analysis of iterative evaluations.
# The test of interest in Table 9 is that of the Readability by need for cognition interaction. That is the interaction posited by H_{3a}.

Table 10

Argument Strength By Readability Style

By Need For Cognition Score

		Argument Strength				
		Strong		Weak		
NFC	Readability	Read.	UnR.	Read.	UnR.	Mar.
High		4.60	5.06	3.70	4.29	4.41
Average		5.14	4.83	4.25	4.80	4.76
Low		5.69	4.59	4.80	3.95	4.76
Marginals		5.14	4.83	4.25	4.35	4.64

Table 11

Readability Style

By Need For Cognition Score

	Readability		
NFC	Readable	Unreadable	Mar.
High	4.15	4.68	4.41
Average	4.70	4.82	4.76
Low	5.25	4.27	4.76
Marginals	4.70	4.59	4.64

For, the construct defines persons high in need for cognition as those who enjoy thinking. That is, they have a proclivity for figuring things out for themselves. The unreadable version of the argument presentation was specifically designed to be difficult to figure out. In essence, it was a verbal puzzle that required a great deal of cognitive activity to work out. The readable version of the argument presentation, on the other hand, was designed to be relatively easy to figure out. This verbal puzzle required little cognitive activity to work out. As predicted by Cacioppo and Petty's work, then, the difficult verbal puzzle was relatively appealing to those subjects high in need for cognition, and the simple verbal puzzle was relatively appealing to those subjects low in need for cognition.

H_3, however, states a relationship between need for cognition and a proclivity for engaging in either heuristic or cognitive reasoning exists. Collapsing Table 10 over the column "Argument Strength" allowed for taking the first step in teasing out the marginals that demonstrate the relationship more clearly. In addition to showing the relationship expected from considering the definition of need for cognition, Table 11 also shows the significant interaction between need for cognition and readability more clearly than does Table 10.

Table 12 is the result of collapsing Table 10 over the

Table 12

Argument Strength

By Need For Cognition Score

	Argument Strength		
NFC	Strong	Weak	Mar.
High	4.83	3.99	4.41
Average	4.99	4.53	4.76
Low	5.14	4.38	4.76
Marginals	4.99	4.30	4.64

column "Readability." It shows that subjects high in need for cognition preferred strong arguments to weak arguments as did subjects low in need for cognition. Table 12 also shows the non-significant interaction between need for cognition and argument strength more clearly than does Table 10.

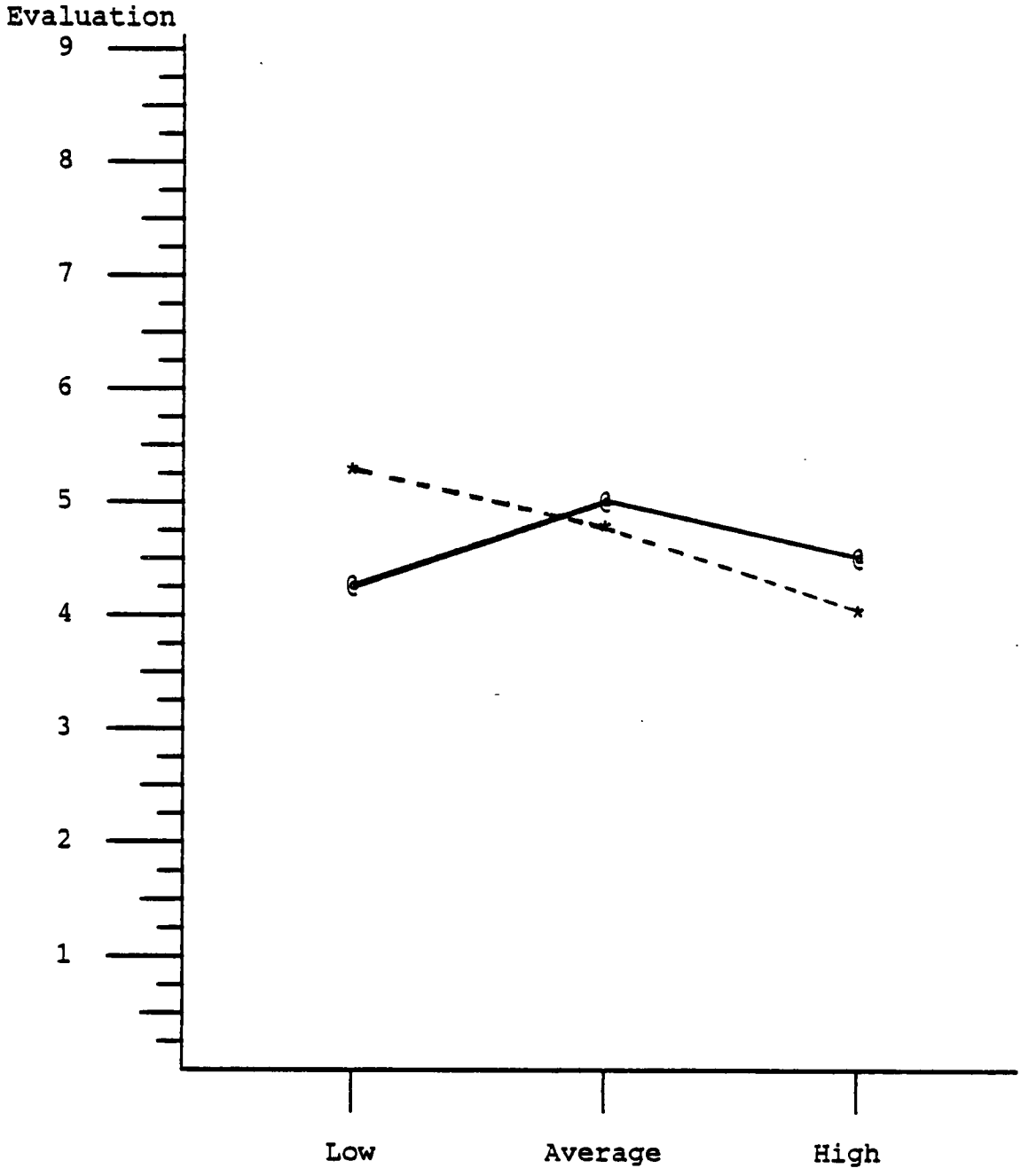
Finally, the significant interaction between need for cognition and readability and the non-significant interaction between need for cognition and argument strength are graphically depicted in Figure 1 and Figure 2 respectively. As can be seen in Figure 1, the readability style by need for cognition interaction clearly is significant, and as can be seen in Figure 2, the argument strength by need for cognition interaction is non-significant.

As noted, the data do not support H_4. In the terms of the MANOVA test dictated by the repeated measures design, support of H_4 required a three-way within subject effect among need for cognition, readability, and cumulative evaluation. The interaction was not significant.

The MANOVA results for the test of the three-way effect were as follows:

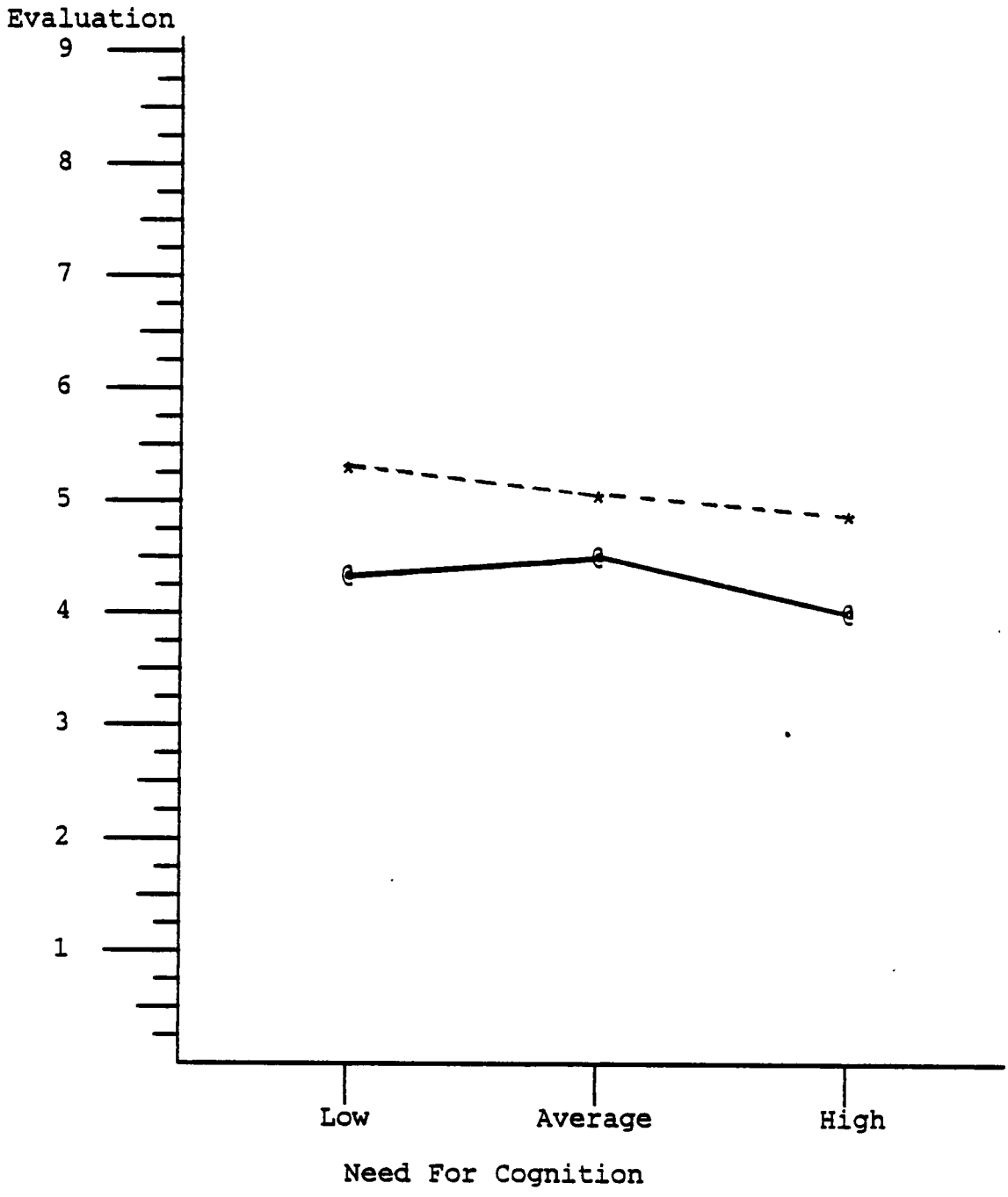
DF	SS	F	Prob.
9	144.48	.62	.7780

The analogous analysis of variance results are included with Table 9.



Estimated cell means of cumulative evaluations for subjects high, average, and low in need for cognition:
(*-----*) represents readable version
(@———@) represents unreadable version

Figure 1. Message Evaluation By Readability Style By Need For Cognition



Cell means of cumulative evaluations for subjects high, average, and low in need for cognition:
(*-----*) represents strong arguments
(@———@) represents weak arguments

Figure 2. Message Evaluation By Argument Strength By Need For Cognition

Additional Analyses

In the analysis of the data for H_4, an additional and unexpected phenomenon was discovered. H_4 posited a significant three-way interaction between need for cognition, readability, and cumulative evaluation. Although that three-way effect was not found to be significant, a significant two-way interaction between need for cognition and cumulative evaluation was found. The MANOVA results generated by the interaction were:

DF	SS	F	Prob.
9	1422.47	6.13	.0001

Tables 13 and 14 show respectively the results of the analysis of variance test that was analogous to the MANOVA and the cell means associated with the need for cognition by cumulative evaluation interaction.

As can be seen from Figure 3, the need for cognition by cumulative evaluation interaction is the result of subjects high in need for cognition reacting more strongly to the effects of the second and third iterative arguments. The sequence of arguments was:

Iteration One -- Strong argument
Iteration Two -- Weak argument
Iteration Three -- Weak argument
Iteration Four -- Strong argument
Iteration Five -- Strong argument
Iteration Six -- Weak argument

Table 13

ANOVA Results Of

Need For Cognition By Cumulative Evaluation

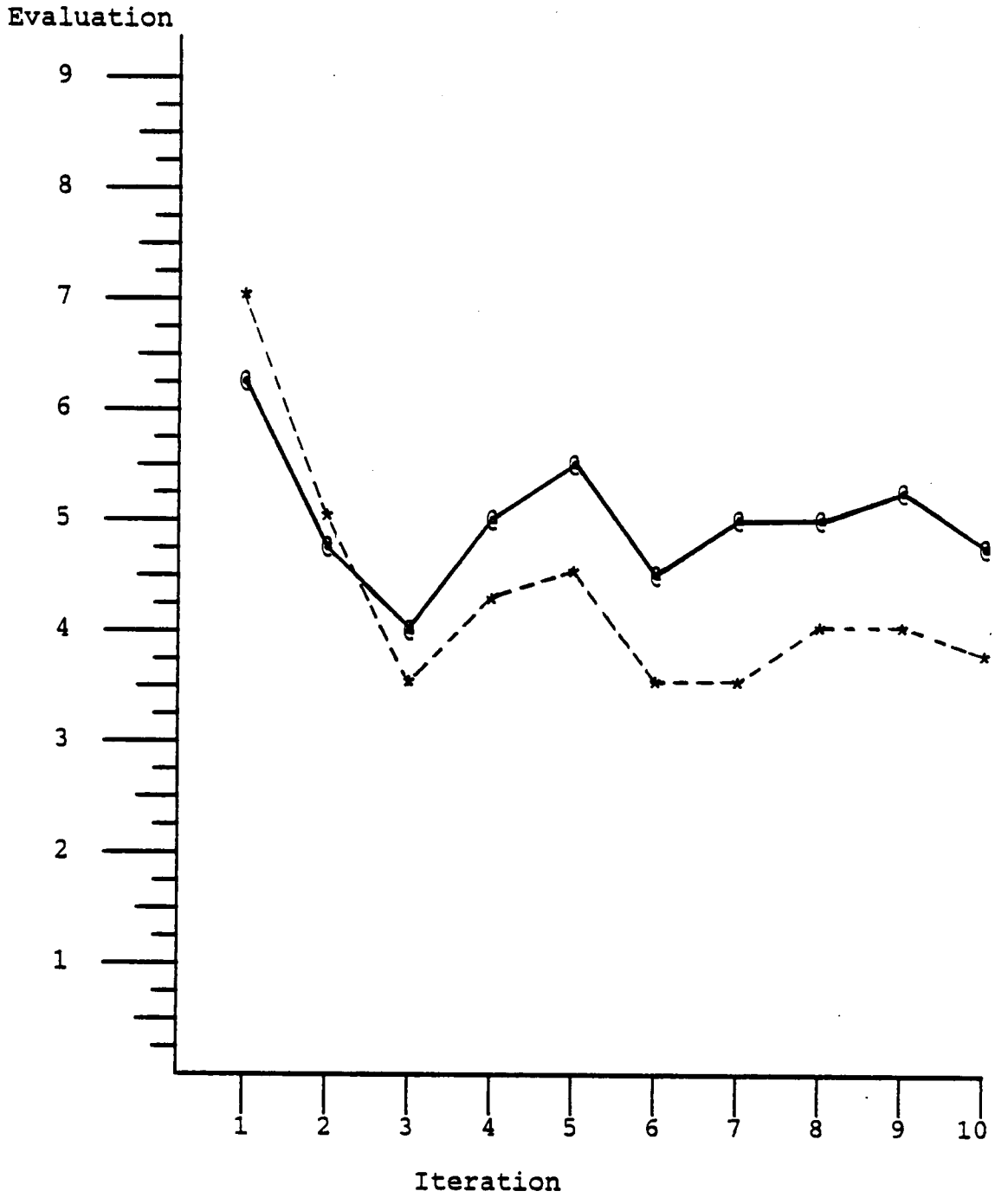
Source	DF	Sums of Squares	F
NFC	1	127.8487	34.74**
Iteration	9	149.7282	4.52**
NFC x Iteration	9	81.4768	2.46**

** Significant at the .01 level.

Table 14

Need For Cognition Means By Cumulative Evaluation

	Iteration									
NFC	1	2	3	4	5	6	7	8	9	10
High	6.87	5.02	3.41	4.27	4.57	3.59	3.47	3.93	3.94	3.66
Avg.	6.59	4.99	3.68	4.64	4.99	4.05	4.33	4.49	4.63	4.19
Low	6.31	4.96	3.95	5.00	5.41	4.51	4.92	5.05	5.32	4.73



Cell means of cumulative evaluations for subjects high and low in need for cognition:
(*-----*) represents high need for cognition
(@———@) represents low need for cognition

Figure 3. Message Evaluation By Need For Cognition By Iteration

Iteration Seven -- Weak argument
Iteration Eight -- Strong argument
Iteration Nine -- Strong argument
Iteration Ten -- Weak argument

Because the pattern of arguments was as it was, it appears subjects high in need for cognition made their third cumulative evaluation more negative than did subjects low in need for cognition based on the negative strength of the weak arguments of the second and third iterations. Thus, subjects high in need for cognition made first and second cumulative evaluations higher, and third cumulative evaluations lower than did subjects low in need for cognition.

The significant portion of this post hoc analysis, however, is in the consideration of the differences between subjects high and low in need for cognition and their respective cumulative evaluations after the fourth through tenth iterations. As Figure 3 clearly shows, the evaluations made by subjects high in need for cognition in the final seven iterations did not recover from the effects of the experiment's first two weak arguments. Subjects low in need for cognition, however, did make cumulative evaluations more closely reflecting the predicted pattern of cumulative evaluations that was based on the pretest results of the individual arguments. That is, according to the pretest of the individual arguments, the cumulative evaluations should have oscillated above and below a neutral evaluation (five points) through the first six or seven

iterations and then leveled out at approximately a neutral evaluation at or about the seventh iteration. That is exactly the pattern of evaluations provided by the subjects low in need for cognition.

As shown in Figure 3, a similar pattern of cumulative evaluations was provided by the subjects high in need for cognition, but their fourth through tenth cumulative evaluations tended to average approximately 11 percent (one point on the nine point scale) lower than the same cumulative iterative evaluations of those low in need for cognition.

Realizing the limitations of post hoc analyses, it, nevertheless, seems the subjects high in need for cognition were reacting to something of a "rotten apple effect" weak argumentation has on a strong persuasive message regardless of the relative weakness or strength of any following argumentation. As with all post hoc analyses, there are a number of possible explanations for the interaction. One such explanation is the suggestion that subjects high in need for cognition are not as adept at maintaining the running average required by the cumulative evaluation process as were the subjects low in need for cognition. That arguably is unlikely, however, given the definition of need for cognition, the success Cacioppo and Petty have reported using the scale, and the support that has been found for this study's first three hypotheses.

A second question, one of more substance arises, however. It asks whether the proposed rotten apple effect changes the perceptions subjects high in need for cognition have of subsequent individual arguments or whether the proposed rotten apple effect changes the perception subjects high in need for cognition have of the entire persuasive message.

To aid in answering the question, tables 15-16 and Figure 4 were prepared.

Table 15 provides ANOVA results similar to those presented in Table 13; the dependent variable in the analysis, however, was independent evaluation rather than the cumulative evaluations previously used. Table 16 provides the analogous cell mean estimates used in the preparation of Figure 4.

The need for cognition by individual evaluation is not statistically significant. Further, Figure 4 clearly shows there should be no interaction expected. The cell mean estimates for the individual evaluations made by subjects both high and low in need for cognition are virtually identical.

Thus, it is concluded that the rotten apple effect changes the perception subjects high in need for cognition have of the entire persuasive message and does not affect the perception subjects high in need for cognition have of individual arguments within a persuasive message.

Table 15

ANOVA Results Of

Need For Cognition By Individual Evaluation

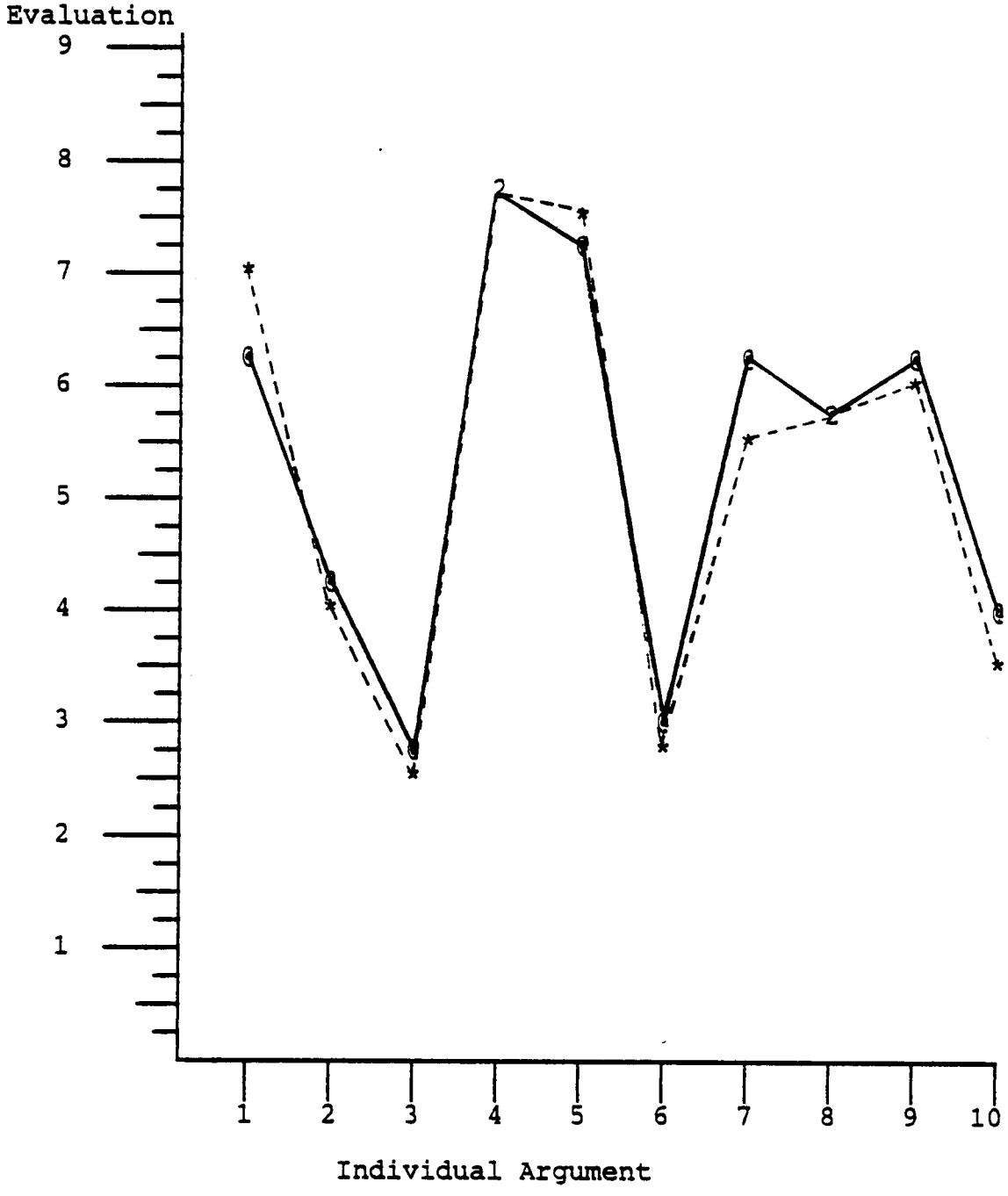
Source	DF	Sums of Squares	F
NFC	1	9.2664	2.13
Iteration	9	1209.6732	30.89**
NFC x Iteration	9	31.4772	.80

** Significant at the .01 level.

Table 16

Need For Cognition By Individual Evaluation

	Iteration									
NFC	1	2	3	4	5	6	7	8	9	10
High	6.87	4.12	2.42	7.67	7.63	2.69	5.66	5.62	6.05	3.58
Avg.	6.59	4.21	2.59	7.74	7.47	2.96	5.90	5.67	6.30	3.84
Low	6.31	4.30	2.76	7.80	7.33	3.23	6.14	5.71	6.56	4.10



Cell means of individual evaluations for subjects high and low in need for cognition:
(*-----*) represents high need for cognition
(@———@) represents low need for cognition
(2) represents two data points

Figure 4. Message Evaluation By Need For Cognition By Individual Argument

That is, persons high in need for cognition appear to be able to evaluate individual arguments on the arguments' own merit. At the same time, however, persons high in need for cognition appear to be unwilling to forgive the presence of two (in this case) or more weak arguments. These data appear to indicate that the presence of weak argumentation spoils an entire persuasive message for persons high in need for cognition.

As noted, in addition to the statistically significant need for cognition by iteration two-way interaction, the analysis used in the testing of the study's third hypothesis found a statistically significant need for cognition by readability two-way interaction. It seemed reasonable, therefore, to continue the post hoc analysis one step further by breaking the data down into readability style groups and then by iteration.

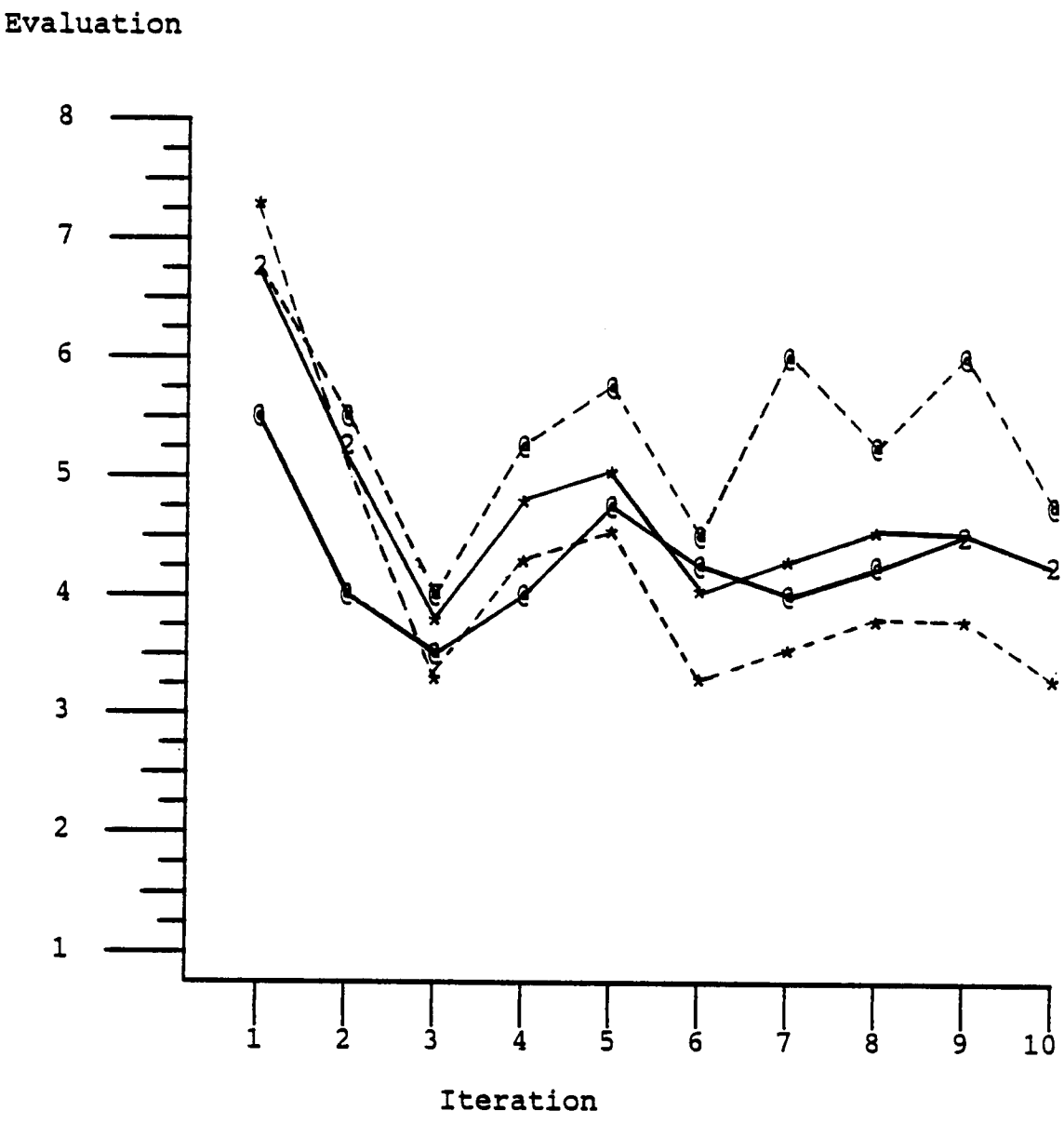
Table 17 displays the cumulative evaluations made by subjects high, average, and low in need for cognition and as they were assigned to their treatment groups. Table 18 displays the same data but with the cumulative evaluations depicted as standard scores. Figures 5 and 6 are the graphic displays of the data in tables 17 and 18. Z scores were used to more dramatically display the interactions between need for cognition and cumulative evaluation and between need for cognition and readability style.

Table 17

Cumulative Evaluation By Need For Cognition

By Readability Style

	Iteration									
NFC	1	2	3	4	5	6	7	8	9	10
	Readable Style									
High	7.10	5.11	3.18	4.14	4.41	3.30	3.57	3.62	3.74	3.30
Avg.	6.87	5.21	3.63	4.72	5.02	3.94	4.38	4.47	4.67	4.09
Low	6.65	5.31	4.08	5.25	5.63	4.57	5.98	5.25	5.60	4.88
	Unreadable Style									
High	6.76	5.11	3.83	4.68	4.94	4.04	4.17	4.51	4.45	4.28
Avg.	6.14	4.59	3.63	4.36	4.83	4.10	4.12	4.40	4.46	4.18
Low	5.52	4.06	3.43	4.05	4.71	4.16	4.07	4.29	4.47	4.07



Cell means of cumulative evaluations for subjects high and low in need for cognition by readability style:
(*-----*) represents high NFC by readable
(*———*) represents high NFC by unreadable
(@-----@) represents low NFC by readable
(@———@) represents low NFC by unreadable
(2) represents two data points

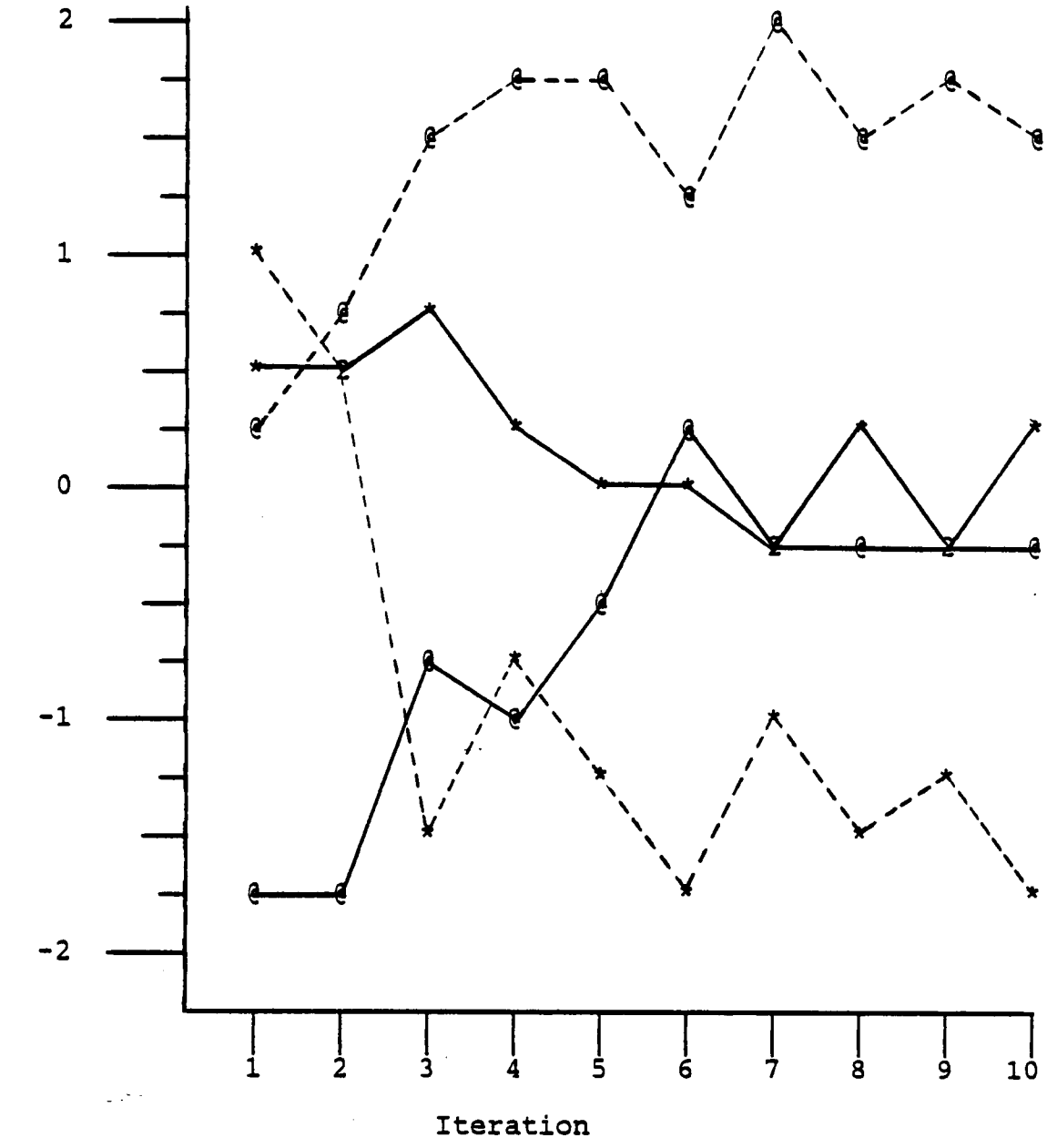
Figure 5. Message Evaluation By Need For Cognition By Readability Style.

Table 18

Standardized Cumulative Evaluation By Need For Cognition

By Readability Style

NFC	Iteration 1	2	3	4	5	6	7	8	9	10
Readable Style										
H	1.02	0.44	-1.44	-0.88	-1.26	-1.74	-0.98	-1.54	-1.38	-1.64
A	0.63	0.65	0.00	0.42	0.24	-0.19	0.00	0.09	0.18	-0.09
L	0.25	0.86	1.44	1.61	1.74	1.34	1.93	1.59	1.73	1.47
Unreadable Style										
H	0.44	0.44	0.64	0.33	0.04	0.05	-0.26	0.17	-0.19	0.29
A	-0.63	-0.64	0.00	-0.39	-0.23	0.20	-0.32	-0.04	-0.18	0.09
L	-1.70	-1.74	-0.64	-1.09	-0.52	0.34	-0.38	-0.26	-0.16	-0.13



Cell means of standardized cumulative evaluations for subjects high and low in need for cognition by readability style:

(*-----*) represents high NFC by readable
(*———*) represents high NFC by unreadable
(@-----@) represents low NFC by readable
(@———@) represents low NFC by unreadable

Figure 6. Standardized Evaluations By Need For Cognition By Readability Style By Iteration.

As Figure 5 shows, subjects high in need for cognition tended to evaluate more lowly the message as they got past the second iteration. Conversely, subjects low in need for cognition tended to evaluate more highly the message as they got past the second iteration. The standardized evaluations used to construct Figure 6 more clearly show the relationship. The subjects who received the readable version were those who had the greatest influence in making the interaction statistically significant, while those who received the unreadable version reported evaluation scores that tended to converge as the iterations progressed.

Why the differences between the evaluations assigned to the readable and unreadable message versions exist is, of course, undiscernible using these data. What is somewhat more discernable, however, is that subjects both high and low in need for cognition used heuristics to make their evaluations of the persuasive message.

That subjects low in need for cognition evaluated the readable version of the persuasive message more highly than the unreadable version was hypothesized, and the data do, indeed, show that relationship to exist. That subjects high in need for cognition evaluated the unreadable version of the persuasive message more highly than the readable version was neither expected nor hypothesized; the data, however, do show that relationship to exist as well. Indeed, the predictions one makes after reading the work of Cacioppo and

Petty leads one to expect no difference between the evaluations made by subjects high in need for cognition when exposed to the two message versions. And, even if one were to predict a difference between the evaluations given to the two message versions by those high in need for cognition, it would be expected that, if anything, readability would be used as the heuristic. If they were going to use readability as their heuristic, the readable version should have been the version that was more highly valued by the subjects high in need for cognition. It wasn't, however. The data seem to indicate, then, that the relationship among need for cognition, readability, and argument strength is more complex than is assumed by hypotheses 3 and 4.

It appears that subjects high in need for cognition as well as those low in need for cognition used a heuristic to evaluate the message to which they were exposed; that both groups made a differentiation between the two message versions points toward that. It also appears, however, that there was a difference between the ways subjects high and low in need for cognition reached their respective heuristic-based evaluations; that the groups preferred the two different readability types points toward that.

As predicted by H_3, subjects low in need for cognition directly employed peripheral route processing to make their distinctions between the two versions. Subjects high in need for cognition, however, reached their peripheral routes

in a circuitous manner. For, had the subjects high in need for cognition immediately employed peripheral route processing, they, like the subjects low in need for cognition, would have evaluated the readable version of the message more highly than the unreadable version. Subjects high in need for cognition, then, use something different -- either a heuristic or some other evaluative mechanism -- from the heuristic used by the subjects low in need for cognition.

If they did not initially use peripheral route processing, it must have been that the subjects high in need for cognition initially used the only alternative available to them -- central route processing.

The data support that interpretation.

Subjects high in need for cognition evaluated the unreadable version more highly than the readable version. The unreadable version was the more difficult to read and required the most cognitive effort to understand. Possessing a high need for cognition is defined as enjoying expending cognitive effort. Thus, as a group, the subjects high in need for cognition read the two versions of the persuasive message, found the unreadable version to be more pleasing, and judged it to be the better message. It follows that they valued the unreadable version more highly because they liked it more; they liked it more because it induced them to engage in an activity they enjoy.

Initially, central route processing was used to evaluate the message, but once it was found by each subject high in need for cognition how much pleasure he would receive from reading his particular version of the message, that determination became a heuristic that was used from that point on, and the peripheral route was employed to evaluate the message.

Additionally, evidence for concluding subjects high in need for cognition used central route processing to reach an available heuristic that could then be used for peripheral route processing is provided by a consideration of the practical significance of the rotten apple effect.

Regardless of the message version they received, subjects high in need for cognition tended to evaluate the message more lowly after passing the second iteration than did the subjects low in need for cognition, leading to the rotten apple effect. That phenomenon and the data as depicted in Table 16 and in Figure 4 indicate that subjects high in need for cognition considered the message arguments individually in a manner almost identical to the manner in which subjects low in need for cognition did. When judging the message as a compilation of the individual message arguments, however, that phenomenon and the data as depicted in Figure 5 indicate that subjects high in need for cognition discounted the value of the overall message in a manner that was disproportionally low considering the

average of the individual evaluations that had been assigned by all subjects. In other words, based on a comparison of their tenth cumulative evaluations with the average of the individual evaluations, subjects low in need for cognition did a better job of keeping a running average of their individual evaluations than did subjects high in need for cognition. Tables 19 and 20 lend support to the reaching of that conclusion. Based on a trichotomization of need for cognition scores, [67] subjects were divided into three categories -- high, average, and low in need for cognition. T-tests were conducted comparing the average of the average of the individual evaluations with the average of the tenth cumulative evaluation for the groups trichotomized to be high and low in need for cognition. As can be seen in Table 19, there was no significant difference ($p = 0.0623$) between the average average individual evaluation and the average tenth cumulative evaluation for subjects low in need for cognition.

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[67] The trichotomization of need for cognition score was accomplished by first analyzing the need for cognition scale using the data gathered from the 100 experimental subjects. That principal components analysis yielded factor scores for each of the 18 scale items. Each item was weighted by its factor score, and need for cognition scores were recomputed for each subject using the weighted items. The subjects with the highest recomputed need for cognition scores were defined as high; those with the middle 33 scores were defined as average; and those with the lowest 33 scores were defined as low in need for cognition.

Table 19

T-Test Results Of

Average Individual Evaluations

VS.

Average Tenth Cumulative Evaluations

Made By Subjects Low In Need For Cognition

Gp	N	Mean	SD	SE	Min	Max	t	DF	p
Ave.	33	26.84	5.54	0.96	14.4	36.5	1.91	49.2	0.06
10th	33	22.97	10.26	1.79	5.0	40.0			

Table 20

T-Test Results Of

Average Individual Evaluations

VS.

Average Tenth Cumulative Evaluations

Made By Subjects High In Need For Cognition

Gp	N	Mean	SD	SE	Min	Max	t	DF	p
Ave.	34	26.34	5.59	0.96	14.6	39.5	3.713	47.7	0.01
10th.	34	18.18	11.54	1.98	5.0	40.0			

As can been seen in Table 20, however, there was a highly significant difference in the average average individual evaluation and the average tenth cumulative evaluation for the subjects high in need for cognition. In a practical sense, the results displayed in tables 19 and 20 indicate subjects high in need for cognition were less accurate in maintaining a running average of their individual evaluations than were subjects low in need for cognition.

Their more poorly maintaining a running average of their individual evaluations led to the suggested rotten apple effect. That same finding leads to the conclusion that subjects high in need for cognition used the existence of the rotten apple as a heuristic to discount the entire persuasive message. It is suggested that the rotten apple effect became the heuristic subjects high in need for cognition used to judge the entire persuasive message. The difference between the subjects high in need for cognition and those low in need for cognition was in how they reached their respective heuristics.

In other words, subjects high in need for cognition seem to have concluded that any overall message that contains weak individual arguments cannot be a strong overall message. If it were a strong message, it would not contain the weak arguments. This circular reasoning became the heuristic used by subjects high in need for cognition.

Subjects low in need for cognition used first the route they have a proclivity for using; that is, the peripheral route. Subjects high in need for cognition used first the route they have a proclivity for using; that is, the central route.

Having begun with the peripheral route, subjects low in need for cognition found themselves in the proper environment for making decisions based on heuristics; and that they did, choosing the readable version as the most sound version of the persuasive message.

Having begun with the central route, however, subjects high in need for cognition found themselves in an environment that is not conducive to making heuristic-based decisions. They, thus, made a decision based on central route processing and then used that decision as a heuristic with which to judge the entire message.

It follows, then, that subjects high in need for cognition were every bit as much cognitive misers as were the subjects low in need for cognition. The difference between them was in their use of processing routes that matched their proclivities. Subjects low in need for cognition used peripheral route processing to reach their heuristic; subjects high in need for cognition used central route processing to reach their heuristic.

CHAPTER V

DISCUSSION

Implications

The most significant findings of this research are not those that were found to support the study's hypotheses, but rather those that disconfirmed the it's fourth hypothesis.

The study was begun in an effort to combine the works of Petty and Cacioppo dealing with the Elaboration Likelihood Model and their construct need for cognition with the work of Tversky and Kahneman dealing with subjects' seeming proclivity for making probability estimates based on heuristics (most notably representativeness) rather than on the laws of probability. It was felt that, if subjects could be divided not necessarily by their level of intelligence but rather by their proclivity for thinking, it would be possible using that discrimination between subject types to discover a relationship between subjects' liking of thinking and subjects' likelihood of engaging in heuristic-based reasoning. Additionally, Miller's magical number seven plus or minus two, conceptualized for this study as channel capacity, was hypothesized as an answer to a foreseeable difficulty of the study -- persons' who like to think ultimate use of heuristic-based reasoning.

To achieve its stated ends, the study explored previous research and established ties between the kind of reasoning

one uses to make probability judgments and the kind of reasoning one uses in working through the evaluative process when dealing with persuasive messages. The study then sought to establish a relationship between peoples' liking of thought and their proclivity to use the actual content of the message (cognitive reasoning) instead of a non-content characteristic of the message (heuristic reasoning).

If it were possible to use the work leading to the development of the Elaboration Likelihood Model and the construct need for cognition to explain the findings Tversky and Kahneman reported about peoples' proclivity for making judgments using heuristics, then one would think that people who like to think would be less likely to engage in heuristic reasoning and more likely to engage in cognitive reasoning than people who do not like to think.

Partial support was found for that hypothesis. Subjects having a proclivity for thinking were less likely to engage in heuristic reasoning than were subjects lacking a proclivity for thinking. Subjects having a proclivity for thinking, however, were no more likely to engage in cognitive reasoning than were subjects lacking that proclivity.

That failure leads to some difficulty. The theoretic perspective developed for this study implies there are two ways for people to deal with the arguments contained in a persuasive message. One is to engage in heuristic

reasoning, and the other is to engage in cognitive reasoning, and the theoretic perspective also implies that it is an either/or proposition. People either use heuristic reasoning or they use cognitive reasoning. In retrospect, that appears to be incorrect. It is, however, an assumption inherent in the design of this study.

The data used to test this study's third hypothesis showed that people who like to think were less likely to engage in heuristic reasoning but not more likely to engage in cognitive reasoning than were people who do not like to think. That being the case, the question must be asked: What do people who like to think do if they are not engaged in heuristic reasoning?

There are three possible answers to the question.

First, it is possible that the research design used in this study and the consequent data collection were faulty.

Second, it is possible that there is a third (or more) way(s) for people to deal with the information contained in a persuasive message.

Third, it is possible that the study's third hypothesis was overly simplistic and that a test of it was not a complete exploration of the process people who like to think go thorough when dealing with the content of persuasive messages.

Dealing with the first possibility first, it is unlikely that the research design and the consequent data

collection were faulty. The results of testing the study's first two hypotheses preclude this possibility. Those hypotheses were posed as manipulation checks. They posited that the message arguments designed and pretested to be sound arguments would be evaluated to be more sound than the message arguments designed and pretested to be unsound arguments and that the message style that was designed and pretested to have a positively-valued characteristic would be evaluated to be more sound than the message style that was designed and pretested to posses a negatively-valued characteristic. Both hypotheses were supported.

The remaining area that could be suspect in searching for a research design flaw is the scale used to measure subjects' need for cognition. Cacioppo and Petty reported the scale's possession of impressive psychometric characteristics when used in a study of University of Iowa undergraduates; the scale displayed similar psychometric properties when used in this study of University of Tennessee undergraduates. Although construct validity is impossible to establish as an absolute, the scale used to measure subjects' need for cognition displayed psychometric properties as convincing as one is likely to find.

Thus, it is unlikely that the research design and collected data are the answer to the posed question.

Adopting the second possibility would require ignoring too much previous research. Among the most recent reported

works is the Elaboration Likelihood Model itself. The model posits that there are two ways people deal with information. One is by using central route processing (thinking) and the other is by using peripheral route processing (feeling). The central and peripheral routes are analogous to the dichotomy of cognition and affect that has been explored and widely accepted.

Wide acceptance, of course, does not establish truth, but wide acceptance does suggest one would be wise to consider other routes for the resolution of research findings dilemmas before suggesting an entire scholarly community has been wrong.

The alternative suggested here is the third possibility.

The study's third hypothesis was overly simplistic, and a test of it alone was not a complete exploration of the process people who like to think go thorough when dealing with the content of persuasive messages.

Fortunately, the study had a fourth hypothesis. And, although it was not supported as posed, the testing of it did lend insight into understanding what the people who like to think do while they are not engaging in heuristic reasoning.

Hypothesis 3b was posed requiring the testing of whether subjects who like to think would be more likely to judge strong arguments to be strong and weak arguments to be

weak than would subjects who do not like to think. Given that goal and controlling all other variables except the readability group manipulation revealed that subjects who do not like to think were every bit as able and every bit as likely to discriminate between weak and strong arguments. Weak arguments were judged to be weak by both the subjects who do and who do not like to think, and strong arguments were judged to be strong by both groups regardless of the style in which they were written.

Hypothesis 3b was posed suggesting that subjects who do not like to think would make no discrimination between weak and strong arguments and that subjects who do like to think would. Failing that, it was anticipated that it would be found that, although people who do not like to think do, indeed, discriminate between weak and strong arguments, those who do like to think make a greater discrimination.

Even the latter, however, was not found to be true. There was no difference in the groups' discrimination.

It became apparent, then, that any differences between the message evaluations made by subjects who do and who do not like to think would become evident in how each group dealt with the overall message, and not in how they dealt with the message's individual arguments.

And, although there was no difference in the manner with which each group of subjects evaluated the individual message arguments, there was a difference found in how they

dealt with the overall message. In other words, the sum of the parts added up to different wholes for the two groups.

Hypothesis 4 suggested that subjects who do not like to think would be less likely to maintain an accurate average of their evaluations of the message's individual arguments than would subjects who like to think when the assigned task was to consider the message, argument by argument, and then to make overall cumulative message evaluations, iteration by iteration, until all ten individual arguments had been considered and entered into the subjects' mental equation. The opposite, however, was found to be true. On their surface, the data appeared to indicate that people who do not like to think have mental calculators that are in better operating condition than do people who like to think. The ultimate overall evaluation (tenth cumulative evaluation) of the subjects who do not like to think was not significantly different from the average of their individual evaluations; the ultimate overall evaluation made by the subjects who do like to think, however, was significantly different from the average of their individual evaluations.

Given the findings of previous research, it was hypothesized that subjects who do not like to think, those who were likely to engage in heuristic reasoning, would be influenced by a superficial characteristic of the message that, in this case, was defined as readability style. Additionally, it was hypothesized that their evaluations of

the overall message would be skewed in the direction of the superficial characteristic. It also was hypothesized that subjects who like to think would not be influenced by the superficial characteristic and would, thus, maintain a more accurate average of their individual argument evaluations when reaching their ultimate overall message evaluation.

That did not occur. In other words, support of this study's hypotheses was not fully realized.

What did occur, however, was a melding of the work of Petty and Cacioppo and Tversky and Kahneman. It was found that people who do not like to think were more likely than those who do like to think to evaluate a persuasive message using an available heuristic (readability) like the heuristic (representativeness) examined by Tversky and Kahneman in their studies of probability judgments.

Subjects who like to think were found to be unforgiving in their evaluation of the overall message. That is, they tended to denigrate the entire persuasive message based on its including at least two weak individual arguments. No matter what followed, the entire message was deemed relatively weak by subjects who like to think after the first weak arguments were found. This phenomenon has been labeled the rotten apple effect. And it appears to have obscured the effect Miller's channel capacity would otherwise have had on the experiment's outcome. Hypothesis 4 predicted that even subjects who like to think would be

susceptible to the channel capacity described by Miller. That susceptibility was hypothesized to become evident in the subjects' who like to think using the heuristic of readability at or about the third iteration. That did not occur. What did occur was the subjects' who like to think using a different available heuristic -- the rotten apple effect -- at or about the third iteration. The failure of Hypothesis 4 was not in its prediction of an effect induced by Miller's channel capacity; it was in predicting the wrong effect. Hypothesis 4 predicted people who like to think would use the experimentally-manipulated readability heuristic upon reaching their channel capacities; those people, however, appear to have used the rotten apple effect. Miller's channel capacity appears to have had its predicted effect, nevertheless.

A body of research dealing with the effect of negative information on people's dealing with information can lend some insight into the proposed rotten apple effect.

Haray and Batell considered the concept of negative information, finding that negative information is that information that introduces confusion into a person's process of dealing with information. [68] When asking a

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[68] F. Haray and M. Batell, "The Concept of Negative Information," Behavioral Science, 23:264-70 (1978).

question of someone, for example, as in a game of "Twenty Questions" negative responses add little to the questioner's base of usable information needed to solve the puzzle.

In the realm of cognitive therapy, the introduction of negative information has been found to increase the instances of negative self-evaluations made by depressed persons.

Ward, Friedlander, and Silverman found a relationship between depressed children's moods and their being given negative information about their failing to successfully accomplishing a task. [69] Newmann and Goldfried found a relationship between negative feedback in a social situation and the strength of their efficacy rating for predicted future performance in similar situations. [70] In other words, negative feedback from a female confederate who negatively evaluated male subjects' performance in a social situation negatively biased those subjects' expectations for their performance in similar future encounters. Finally, Kratz and Liu found that students who were presented with

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[69] L. Ward, M. Friedlander, and W. Silverman, "Children's Depressive Symptoms, Negative Self-Statements, and Causal Attributions for Success and Failure," Cognitive Therapy and Research, 11:215-27 (1987).

[70] C. Newman and M. Goldfried, "Disabusing Negative Self-Efficacy Expectations via Experience, Feedback, and Discrediting," Cognitive Therapy and Research, 11:401-17 (1987).

negative information tended to endorse depressive cognitions more frequently than students who were presented with either neutral or positive information. [71]

In each of the studies negative information tended to bias the mood states of the subjects exposed to the negative information, or the negative information, in the form of inaccurate information, introduced confusion into a problem-solving situation. In any event, negative information tended to bias the responses of persons exposed to the negative information.

In a like manner, the rotten apple affect, is a negative bias introduced into the subjects' high in need for cognition evaluations of the persuasive message. In the above studies, subjects were instructed to think about the information with which they were presented and were thus motivated to think about that information. In this study, subjects high in need for cognition held an intrinsic motivation for thinking about the information contained in the message. When they encountered the negative information inherent in the weak argumentation in the second and third iterations, they behaved as did subjects who held an experimentally manipulated motivation to think about negative information.

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[71] S. Krantz and C. Liu, "The Effect of Mood and Information Valence on Depressive Cognition," Cognitive Therapy and Research, 11:185-96 (1987).

The rotten apple effect also has practical significance in the understanding of the Elaboration Likelihood Model as well as the body of research under the rubric of uses and gratifications.

The Elaboration Likelihood Model postulates that attitude change resulting from the central-route processing of a persuasive message will be more temporally persistent, more predictable, and more resistant to counterpersuasion attempts than will attitude change that results from the peripheral route processing of the same persuasive message. The model further postulates that central route processing is determined, in part, by receivers' motivation to engage in central route processing. An implication of the construct need for cognition (proclivity for thinking) is that those high in that need are inherently more motivated to process information using the central route than are those low in that need. A measure of one's proclivity for thinking is indirectly a measure of one's motivation to engage in the central route processing of information. An inherent motivation to engage in central route processing should be among the strongest of motivations. In other words, persons having a natural proclivity to think also have a natural proclivity to engage in central route processing. Additionally, that motivation to engage in central route processing is one that does not change. It, therefore, cannot be decreased or increased.

Assuming the ability to control for all intervening and moderating variables (as is assumed when the random assignment of experimental subjects is accomplished), leads one to conclude that the subjects who like to think should have engaged in central route processing throughout their encounter with the persuasive message and that the subjects who do not like to think should have engaged in peripheral route processing throughout their encounter with the persuasive message. The subjects who do not like to think behaved as predicted; the subjects who like to think, however, did not.

Upon encountering the first two weak arguments included in the persuasive message, the subjects who like to think, in essence, made up their minds about the entire message. Mentally, they told themselves "this is a weak persuasive message because it contains weak arguments." In other words, it is apparent that the subjects who like to think felt that strong overall messages, if they really are strong messages, do not contain any weak arguments at all. That phenomenon was labeled the rotten apple effect.

It becomes apparent, then, that the Elaboration Likelihood Model needs to be modified somewhat. For, what must be considered to be among the strongest of motivations to engage in central route processing, a natural proclivity to think, did not result in an even level of central route processing. In this study the subjects who like to think

centrally processed the message's first three arguments; they peripherally processed the remaining seven.

The Elaboration Likelihood Model's difficulty arises when one considers its sixth postulate which states that "as motivation and/or ability to process arguments is decreased, peripheral cues become relatively more important determinants of persuasion." [72] Since there is no reason not to, it must be assumed that the experimental subjects' ability to process the study's persuasive message remained constant throughout the experiment. It must be concluded, therefore, that, based on the Elaboration Likelihood Model's sixth postulate and this study's finding that peripheral cues did become more important determinants of persuasion after the first three individual arguments had been encountered, something happened with the subjects' motivation to centrally process the information. But as noted, the subjects' motivation in this case was not a variable. It was a constant inherent proclivity for thinking that determined their motivation to centrally process the provided information. And unless it is

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[72] R. Petty and J. Cacioppo, "The Elaboration Likelihood Model of Persuasion," in Communication and Persuasion: Central and Peripheral Routes to Attitude Change, R. Petty and J. Cacioppo eds. (New York: Springer-Verlag, 1986), pp. 1-24.

concluded that proclivity for thinking, one's need for cognition, is variable within subjects, one must accept that, in this case, the motivation for engaging in central route processing was also constant. The motivation, therefore, did not decrease; peripheral cues, nevertheless, became more important determinants of persuasion.

These data suggest that the Elaboration Likelihood Model's sixth postulate is, while not necessarily incorrect, incomplete.

In an applied context, the existence of the rotten apple effect and of heuristic reasoning have implications for communicators because these data indicate that persuasive messages received by those with needs for cognition ranging from high to low lead to the dependance of heuristics to evaluate the messages' content. Those heuristics, in turn, provide a means for receivers to learn what to expect from certain sources of persuasive communications, especially if those sources tend to be predictable in either the style or the content of the persuasive messages they send. Decisions about a communicator and his message tend to be made without the receivers' actually attending to the content of the message in cases that involve receivers' who do not like to think as well as cases in which receivers' who do like to think receive messages that contain weak individual arguments. These data indicate that the only case in which the content

of a persuasive message is likely to have an effect is the case in which receivers who like to think receive persuasive messages containing exclusively strong individual arguments.

In a basic research context, learning what to expect from a communicator has a direct link to the understanding of human communication through uses and gratifications research. Depending on receivers' level of need for cognition and the style and/or content of the message being received, any of the four -- positive approach, true avoidance, seeking alternatives, and negative approach -- methods of dealing with a message described by the rubric of uses and gratifications can come into play. That becomes possible because both the rotten apple effect that affects judgments made by persons high in need for cognition and heuristic reasoning that is employed by persons low in need for cognition are means to the prejudging of a persuasive message.

Also, the rotten apple effect has implications for communications researchers because it suggests that receivers having a strong motivation to engage in central route processing can become as cognitively miserly as those lacking a strong motivation to engage in central route processing. It also suggests that receivers of all kinds engage in heuristic reasoning; a difference between receivers with and without a proclivity for thinking is in how they find their heuristics.

First, the rotten apple effect demonstrates that a single motivation to centrally process information is not enough to ensure that receivers will engage in central route processing throughout their encounter with a message. If anything at all, the rotten apple effect demonstrates that people having even a strong internal motivation to engage in central route processing do, indeed, eventually use rules of thumb to judge persuasive messages. Determining that an entire persuasive message is weak after encountering the message's first weak points is nothing more than using a heuristic to evaluate the message. Thus, like their counterparts who lack a strong motivation to engage in central route processing, those having that strong motivation ultimately use the peripheral route to evaluate the message. And, like their counterparts, those with the strong internal motivation become cognitive misers.

Second, unlike those lacking the strong motivation to centrally process the information, those having the strong internal motivation reach their heuristic using a two-step process.

Initially, those having the internal motivation to engage in central route processing, those having a proclivity for thinking, follow their natural inclination by evaluating the message based on its content. Upon encountering what, to them, is a peripheral cue, however, those same receivers suddenly disregard their natural

inclination and begin to evaluate the overall message based on the heuristic rather than on the content of the individual arguments. Further, both the people with and without a motivation to engage in central route processing are able to evaluate the individual message arguments based on the arguments' own merit. When given the freedom to combine the individual arguments and to consider the context in which the arguments are found, however, their evaluations of the overall messages diverge. That divergence is an indication of differences in how the two groups deal with the overall message.

The data indicate that people who do not like to think will tend to use the heuristic of readability as their peripheral cue for evaluating the message. The data also indicate that people who do like to think will use the heuristic of the rotten apple effect as their peripheral cue.

The difference between the two groups and in their reaching their respective heuristics is evident in the data.

Those subjects lacking a motivation to engage in central route processing immediately went to the readily available heuristic to evaluate the message. Those subjects having a motivation to engage in central route processing immediately followed their inclination to think about the individual arguments and their respective soundnesses when forming an evaluation of the overall message. When their

consideration led them to their heuristic, the rotten apple, however, they used that rotten apple as a heuristic and engaged in peripheral route processing from that point forward.

Each group followed their natural inclinations. It was their natural inclinations that led each group to begin using peripheral cues at different points in the message evaluation process.

An obvious implication for researchers using the Elaboration Likelihood Model is that even people who are naturally motivated to engage in central route processing, nevertheless, may not be so inclined for the duration of their encounter with a persuasive message.

It appears that a motivation to engage in central route processing must not necessarily decrease in order for peripheral cues to become relatively important determinants of persuasion as is suggested by the Elaboration Likelihood Model's sixth postulate.

It appears that motivated central route processors can and do continue to be motivated to engage in central route processing even after they begin using peripheral cues.

It appears that a natural proclivity for thinking will ensure central route processing up until the point when the receivers who are so inclined reach what they consider to be a reliable heuristic. At that point, and unless an additional motivation for continuing to engage in central

route processing is provided, the previously motivated receivers will switch to peripheral route processing.

It appears that peripheral cues can be as important to receivers who are motivated to engage in central processing as they are for those who are not so motivated. For, even those who initially engage in central route processing, may ultimately judge a message based on peripheral cues rather than on the content of the message.

Suggestions For Further Research

Given the conclusions derived from the results of this study, three suggestions for further research become evident. If the rotten apple effect really does exist, an answer to the question of how many rotten apples does it take to ruin an entire persuasive message should be found. How many weak arguments will be tolerated by subjects high in need for cognition?

Second, an answer to the question of whether placement of the weak arguments makes any difference in the emergence of the rotten apple effect also should be found. Does it make a difference whether weak arguments appear early or late in a persuasive message? Will the rotten apple effect emerge in either case?

Third, an answer to the question of whether central route processing can be induced once a receiver has begun to engage in peripheral route processing should be found.

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APPENDIXES

Appendix A

DIRECTIONS: After reading the following arguments, please indicate the degree to which you either agree or disagree with the five statements at the bottom of this page. Use the key provided just before the statements to choose the number that corresponds to how you feel about the statements.

. . . As task force members, our work should begin because members of differing races have things to offer one another. Additionally, we can work toward world peace; we can make up for past abuses black people in this country have suffered by overcompensating now; and black students have the same right to educational opportunities as the rest of us. When you consider that a university, of all places, is somewhere where we should not use race as a criterion to judge people, and that we will attract more top-notch athletes, you can see we should begin our work.

Within the context of our campus alone, we will eventually create a grading system based on performance rather than on students' ethnic origins. Also, we encourage tolerating racism in the overall culture if we tolerate racism in a subculture like a university, and our example will teach that concerns of racial harmony are important. Finally, we will make the university's administration look good. . . .

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate Disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

1. As a group, the arguments I just read were believable. _____

2. As a group, the arguments I just read were logical. _____

3. As a group, the arguments I just read were reasonable. _____

4. As a group, the arguments I just read were sound. _____

5. As a group, the arguments I just read were convincing. _____

DIRECTIONS: After reading the following arguments, please indicate the degree to which you either agree or disagree with the five statements at the bottom of this page. Use the key provided just before the statements to choose the number that corresponds to how you feel about the statements.

. . . The work of the task force should begin because things can be offered to one another by members of differing races. Additionally, world peace can be enhanced by the work of the task force; past abuses black people in this country have suffered can be made up for by the overcompensating now of the task force; and a right to the same educational opportunities as others at the university is had by black students. When it is considered that a university, of all places, is somewhere where race should not be a criterion by which people are judged, and that more top-notch athletes will be attracted to attend the university by the work of the task force,..it can be seen that the work of the task force should begin.

Within the context of the campus alone, a grading system based on performance rather than on students' ethnic origins will eventually result from the work of the task force. Also, that the tolerance of racism in the overall culture will be encouraged by the tolerance of racism in a subculture like a university, and that concerns of racial harmony are important will be taught by the continuing example of the task force. Finally, the university's administration will be made to look good by the task force. . . .

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate Disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

1. As a group, the arguments I just read were believable. _____

2. As a group, the arguments I just read were logical. _____

3. As a group, the arguments I just read were reasonable. _____

4. As a group, the arguments I just read were sound. _____

5. As a group, the arguments I just read were convincing. _____

Appendix B

The University of Tennessee recently completed a study of race relations that was conducted by a Task Force For Race Relations. The task force consisted of university professors and other experts in the field, and its inception was inspired by recent racial incidents on campus.

Suppose you were a member of the board of directors for a fund granting agency. And further suppose that another university, one very much like the University of Tennessee, were seeking funding for conducting its own Task Force For Race Relations. It would be your job to evaluate the reasons that university gave for such a task force to be in existence.

Following you will find a portion of a sample proposal of the kind fund-granting agencies sometimes require. The portion you will be reading is a documentation of reasons why the task force should be funded. You are being asked to help judge the quality of this part of the proposal. In other words, if you were representing an agency or fund, would the following be a good or poor proposal?

Because different funds and different agencies have various amounts of money to give, the amount being asked for is unimportant for this study. You are simply asked to judge the quality of the proposal.

The proposal consists of 10 arguments or reasons for having a task force for race relations. First, you will be asked to judge the reasons in their entirety, and then you will be asked to judge each of them individually.

Please read the directions as you proceed through the arguments. The person passing out the study materials will answer any questions you may have.

Finally, participation in this study is entirely voluntary. YOU DO NOT HAVE TO PARTICIPATE. And you will not be penalized in any way for declining to participate. If you do choose to participate, however, your identity will be kept strictly confidential. Neither your name nor any other identifying information is being sought. PLEASE DO NOT PLACE YOUR NAME OR ANY OTHER IDENTIFYING INFORMATION ON THE QUESTIONNAIRE THAT WOULD ALLOW YOU TO BE IDENTIFIED.

DIRECTIONS: After reading the following arguments, please indicate the degree to which you either agree or disagree with the five statements at the bottom of this page. Use the key provided just before the statements to choose the number that corresponds to how you feel about the statements.

. . . As task force members, our work should begin because members of differing races have things to offer one another. Additionally, we can work toward world peace; we can make up for past abuses black people in this country have suffered by overcompensating now; and black students have the same right to educational opportunities as the rest of us. When you consider that a university, of all places, is somewhere where we should not use race as a criterion to judge people, and that we will attract more top-notch athletes, you can see we should begin our work.

Within the context of our campus alone, we will eventually create a grading system based on performance rather than on students' ethnic origins. Also, we encourage tolerating racism in the overall culture if we tolerate racism in a subculture like a university, and our example will teach that concerns of racial harmony are important. Finally, we will make the university's administration look good. . . .

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate Disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

1. As a group, the arguments I just read were believable. _____

2. As a group, the arguments I just read were logical. _____

3. As a group, the arguments I just read were reasonable. _____

4. As a group, the arguments I just read were sound. _____

5. As a group, the arguments I just read were convincing. _____

PLEASE WAIT UNTIL YOU ARE TOLD TO GO ON TO THE NEXT PAGE.
For the next part of the study, you will be asked to judge the arguments by themselves, AND as they build into the overall group of arguments you just judged. It is important that we know how the individual arguments stand up by themselves and how well they combine to become paragraphs.

DIRECTIONS: After reading the following individual argument, respond to the statements that follow. Indicate how much you either agree or disagree using the same key as you used before.

". . . As task force members, our work should begin because members of differing races have things to offer one another."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

6. By itself, the argument I just read is believable. _____

7. By itself, the argument I just read is logical. _____

8. By itself, the argument I just read is reasonable. _____

9. By itself, the argument I just read is sound. _____

10. By itself, the argument I just read is convincing _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first individual argument, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Additionally, we can work toward world peace;"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

11. By itself, the argument I just read is believable _____

12. By itself, the argument I just read is logical _____

13. By itself, the argument I just read is reasonable. _____

14. By itself, the argument I just read is sound. _____

15. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first individual argument. Combine your feelings about the first argument with your feelings about the second argument and respond to the following statements using the same key you used before.

16. As a pair, the 2 arguments I've read are believable. _____

17. As a pair, the 2 arguments I've read are logical. _____

18. As a pair, the 2 arguments I've read are reasonable. _____

19. As a pair, the 2 arguments I've read are sound. _____

20. As a pair, the 2 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with first two individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"we can make up for past abuses black people in this country have suffered by overcompensating now;"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

21. By itself, the argument I just read is believable. _____

22. By itself, the argument I just read is logical. _____

23. By itself, the argument I just read is reasonable. _____

24. By itself, the argument I just read is sound. _____

25. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first two individual arguments. Combine your feelings about the first two arguments with your feelings about this third argument and respond to the following statements using the same key you used before.

26. As a group, the 3 arguments I've read are believable. _____

27. As a group, the 3 arguments I've read are logical. _____

28. As a group, the 3 arguments I've read are reasonable. _____

29. As a group, the 3 arguments I've read are sound. _____

30. As a group, the 3 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first three individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and black students have the same right to educational opportunities as the rest of us."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

31. By itself, the argument I just read is believable. _____

32. By itself, the argument I just read is logical. _____

33. By itself, the argument I just read is reasonable. _____

34. By itself, the argument I just read is sound. _____

35. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first three individual arguments. Combine your feelings about the first three arguments with your feelings about this fourth argument and respond to the following statements using the same key you used before.

36. As a group, the 4 arguments I've read are believable. _____

37. As a group, the 4 arguments I've read are logical. _____

38. As a group, the 4 arguments I've read are reasonable. _____

39. As a group, the 4 arguments I've read are sound. _____

40. As a group, the 4 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first four individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"When you consider that a university, of all places, is somewhere where we should not use race as a criterion to judge people,"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

41. By itself, the argument I just read is believable. _____

42. By itself, the argument I just read is logical. _____

43. By itself, the argument I just read is reasonable. _____

44. By itself, the argument I just read is sound. _____

45. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, without looking back at any previous pages, remember as well as you can the first four individual arguments. Combine your feelings about the first four arguments with your feelings about this fifth argument and respond to the following statements using the same key you used before.

46. As a group, the 5 arguments I've read are believable. _____

47. As a group, the 5 arguments I've read are logical. _____

48. As a group, the 5 arguments I've read are reasonable. _____

49. As a group, the 5 arguments I've read are sound. _____

50. As a group, the 5 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first five individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and that we will attract more top-notch athletes, you can see we should begin our work."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

51. By itself, the argument I just read is believable. _____

52. By itself, the argument I just read is logical. _____

53. By itself, the argument I just read is reasonable. _____

54. By itself, the argument I just read is sound. _____

55. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first five individual arguments. Combine your feelings about the first five arguments with your feelings about this sixth argument and respond to the following statements using the same key you used before.

56. As a group, the 6 arguments I've read are believable. _____

57. As a group, the 6 arguments I've read are logical. _____

58. As a group, the 6 arguments I've read are reasonable. _____

59. As a group, the 6 arguments I've read are sound. _____

60. As a group, the 6 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with first six individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Within the context of our campus alone, we will eventually create a grading system based on performance rather than on students' ethnic origins."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

61. By itself, the argument I just read is believable. _____

62. By itself, the argument I just read is logical. _____

63. By itself, the argument I just read is reasonable. _____

64. By itself, the argument I just read is sound. _____

65. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first six individual arguments. Combine your feelings about the first six arguments with your feelings about this seventh argument and respond to the following statements using the same key you used before.

66. As a group, the 7 arguments I've read are believable. _____

67. As a group, the 7 arguments I've read are logical. _____

68. As a group, the 7 arguments I've read are reasonable. _____

69. As a group, the 7 arguments I've read are sound. _____

70. As a group, the 7 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first seven individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Also, we encourage tolerating racism in the overall culture if we tolerate racism in a subculture like a university,"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

71. By itself, the argument I just read is believable. _____

72. By itself, the argument I just read is logical. _____

73. By itself, the argument I just read is reasonable. _____

74. By itself, the argument I just read is sound. _____

75. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first seven individual arguments. Combine your feelings about the first seven arguments with your feelings about this eighth argument and respond to the following statements using the same key you used before.

76. As a group, the 8 arguments I've read are believable. _____

77. As a group, the 8 arguments I've read are logical. _____

78. As a group, the 8 arguments I've read are reasonable. _____

79. As a group, the 8 arguments I've read are sound. _____

80. As a group, the 8 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first eight individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and our example will teach that concerns of racial harmony are important."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

81. By itself, the argument I just read is believable. _____

82. By itself, the argument I just read is logical. _____

83. By itself, the argument I just read is reasonable. _____

84. By itself, the argument I just read is sound. _____

85. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, without looking back at any previous pages, remember as well as you can the first eight individual arguments. Combine your feelings about the first eight arguments with your feelings about this ninth argument and respond to the following statements using the same key you used before.

86. As a group, the 9 arguments I've read are believable. _____

87. As a group, the 9 arguments I've read are logical. _____

88. As a group, the 9 arguments I've read are reasonable. _____

89. As a group, the 9 arguments I've read are sound. _____

90. As a group, the 9 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first nine individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Finally, we will make the university's administration look good."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

91. By itself, the argument I just read is believable. _____

92. By itself, the argument I just read is logical. _____

93. By itself, the argument I just read is reasonable. _____

94. By itself, the argument I just read is sound. _____

95. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first nine individual arguments. Combine your feelings about the first nine arguments with your feelings about this tenth argument and respond to the following statements using the same key you used before.

96. As a group, the 10 arguments I've read are believable. _____

97. As a group, the 10 arguments I've read are logical. _____

98. As a group, the 10 arguments I've read are reasonable. _____

99. As a group, the 10 arguments I've read are sound. _____

100. As a group, the 10 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

For each of the following statements, please indicate by marking the appropriate space whether you very strongly agree, strongly agree, moderately agree, slightly agree, neither agree nor disagree, slightly disagree, moderately disagree, strongly disagree, or very strongly disagree.

	Very Strongly Agree	Strongly Agree	Moderately Agree	Slightly Agree	Neither Agree Nor Disagree	Slightly Disagree	Moderately Disagree	Strongly Disagree	Very Strongly Disagree
1. I would prefer complex to simple problems.	—	—	—	—	—	—	—	—	—
2. I like to have the responsibility of handling a situation that requires a lot of thinking.	—	—	—	—	—	—	—	—	—
3. Thinking is not my idea of having fun.	—	—	—	—	—	—	—	—	—
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.	—	—	—	—	—	—	—	—	—
5. I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.	—	—	—	—	—	—	—	—	—
6. I find satisfaction in deliberating hard and for long hours.	—	—	—	—	—	—	—	—	—
7. I only think as hard as I have to.	—	—	—	—	—	—	—	—	—
8. I prefer to think about small, daily projects to long-term ones.	—	—	—	—	—	—	—	—	—

GO ON TO THE NEXT PAGE

	Very Strongly Disagree	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree Nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree	Very Strongly Agree
9. I like tasks that require little thought once I've learned them.	—	—	—	—	—	—	—	—	—
10. The idea of relying on thought to make my way to the top appeals to me.	—	—	—	—	—	—	—	—	—
11. I really enjoy a task that involves coming up with new solutions to problems.	—	—	—	—	—	—	—	—	—
12. Learning new ways to think doesn't excite me very much.	—	—	—	—	—	—	—	—	—
13. I prefer my life to be filled with puzzles that I must solve.	—	—	—	—	—	—	—	—	—
14. The notion of thinking abstractly is appealing to me.	—	—	—	—	—	—	—	—	—
15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.	—	—	—	—	—	—	—	—	—
16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.	—	—	—	—	—	—	—	—	—
17. It's enough for me that something gets the job done; I don't care how or why it works.	—	—	—	—	—	—	—	—	—
18. I usually end up deliberating about issues even when they do not affect me personally.	—	—	—	—	—	—	—	—	—

GO ON TO THE NEXT PAGE

1. Please indicate your sex. M _____ F _____

2. What is your major? _____

3. Are you a Freshman ___ Sophomore ___ Junior ___ Senior ___ or Graduate Student ___ ?

4. Where would you say you get most of your news? Would you say you get most of your news from:

Newspapers ___

Magazines ___

Television ___

Radio ___

Friends ___

Somewhere else ___

The University of Tennessee recently completed a study of race relations that was conducted by a Task Force For Race Relations. The task force consisted of university professors and other experts in the field, and its inception was inspired by recent racial incidents on campus.

Suppose you were a member of the board of directors for a fund granting agency. And further suppose that another university, one very much like the University of Tennessee, were seeking funding for conducting its own Task Force For Race Relations. It would be your job to evaluate the reasons that university gave for such a task force to be in existence.

Following you will find a portion of a sample proposal of the kind fund-granting agencies sometimes require. The portion you will be reading is a documentation of reasons why the task force should be funded. You are being asked to help judge the quality of this part of the proposal. In other words, if you were representing an agency or fund, would the following be a good or poor proposal?

Because different funds and different agencies have various amounts of money to give, the amount being asked for is unimportant for this study. You are simply asked to judge the quality of the proposal.

The proposal consists of 10 arguments or reasons for having a task force for race relations. First, you will be asked to judge the reasons in their entirety, and then you will be asked to judge each of them individually.

Please read the directions as you proceed through the arguments. The person passing out the study materials will answer any questions you may have.

Finally, participation in this study is entirely voluntary. YOU DO NOT HAVE TO PARTICIPATE. And you will not be penalized in any way for declining to participate. If you do choose to participate, however, your identity will be kept strictly confidential. Neither you name nor any other identifying information is being sought. PLEASE DO NOT PLACE YOUR NAME OR ANY OTHER IDENTIFYING INFORMATION ON THE QUESTIONNAIRE THAT WOULD ALLOW YOU TO BE IDENTIFIED.

DIRECTIONS: After reading the following arguments, please indicate the degree to which you either agree or disagree with the five statements at the bottom of this page. Use the key provided just before the statements to choose the number that corresponds to how you feel about the statements.

. . . The work of the task force should begin because things can be offered to one another by members of differing races. Additionally, world peace can be enhanced by the work of the task force; past abuses black people in this country have suffered can be made up for by the overcompensating now of the task force; and a right to the same educational opportunities as others at the university is had by black students. When it is considered that a university, of all places, is somewhere where race should not be a criterion by which people are judged, and that more top-notch athletes will be attracted to attend the university by the work of the task force, it can be seen that the work of the task force should begin.

Within the context of the campus alone, a grading system based on performance rather than on students' ethnic origins will eventually result from the work of the task force. Also, that the tolerance of racism in the overall culture will be encouraged by the tolerance of racism in a subculture like a university, and that concerns of racial harmony are important will be taught by the continuing example of the task force. Finally, the university's administration will be made to look good by the task force. . . .

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate Disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

1. As a group, the arguments I just read were believable. _____

2. As a group, the arguments I just read were logical. _____

3. As a group, the arguments I just read were reasonable. _____

4. As a group, the arguments I just read were sound. _____

5. As a group, the arguments I just read were convincing. _____

PLEASE WAIT UNTIL YOU ARE TOLD TO GO ON TO THE NEXT PAGE.

For the next part of the study, you will be asked to judge the arguments by themselves, AND as they build into the overall group of arguments you just judged. It is important that we know how the individual arguments stand up by themselves and how well they combine to become paragraphs.

DIRECTIONS: After reading the following individual argument, respond to the statements that follow. Indicate how much you either agree or disagree using the same key as you used before.

". . . The work of the task force should begin because things can be offered to one another by members of differing races."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

6. By itself, the argument I just read is believable. _____
7. By itself, the argument I just read is logical. _____
8. By itself, the argument I just read is reasonable. _____
9. By itself, the argument I just read is sound. _____
10. By itself, the argument I just read is convincing _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first individual argument, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Additionally, world peace can be enhanced by the work of the task force;"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

11. By itself, the argument I just read is believable _____
12. By itself, the argument I just read is logical _____
13. By itself, the argument I just read is reasonable. _____
14. By itself, the argument I just read is sound. _____
15. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first individual argument. Combine your feelings about the first argument with your feelings about the second argument and respond to the following statements using the same key you used before.

16. As a pair, the 2 arguments I've read are believable. _____
17. As a pair, the 2 arguments I've read are logical. _____
18. As a pair, the 2 arguments I've read are reasonable. _____
19. As a pair, the 2 arguments I've read are sound. _____
20. As a pair, the 2 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with first two individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"past abuses black people in this country have suffered can be made up for by the overcompensating now of the task force;"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

21. By itself, the argument I just read is believable. _____

22. By itself, the argument I just read is logical. _____

23. By itself, the argument I just read is reasonable. _____

24. By itself, the argument I just read is sound. _____

25. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first two individual arguments. Combine your feelings about the first two arguments with your feelings about this third argument and respond to the following statements using the same key you used before.

26. As a group, the 3 arguments I've read are believable. _____

27. As a group, the 3 arguments I've read are logical. _____

28. As a group, the 3 arguments I've read are reasonable. _____

29. As a group, the 3 arguments I've read are sound. _____

30. As a group, the 3 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first three individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and a right to the same educational opportunities as others at the university is had by black students."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

31. By itself, the argument I just read is believable. _____

32. By itself, the argument I just read is logical. _____

33. By itself, the argument I just read is reasonable. _____

34. By itself, the argument I just read is sound. _____

35. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first three individual arguments. Combine your feelings about the first three arguments with your feelings about this fourth argument and respond to the following statements using the same key you used before.

36. As a group, the 4 arguments I've read are believable. _____

37. As a group, the 4 arguments I've read are logical. _____

38. As a group, the 4 arguments I've read are reasonable. _____

39. As a group, the 4 arguments I've read are sound. _____

40. As a group, the 4 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first four individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"When it is considered that a university, of all places, is somewhere where race should not be a criterion by which people are judged,"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

41. By itself, the argument I just read is believable. _____

42. By itself, the argument I just read is logical. _____

43. By itself, the argument I just read is reasonable. _____

44. By itself, the argument I just read is sound. _____

45. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, without looking back at any previous pages, remember as well as you can the first four individual arguments. Combine your feelings about the first four arguments with your feelings about this fifth argument and respond to the following statements using the same key you used before.

46. As a group, the 5 arguments I've read are believable. _____

47. As a group, the 5 arguments I've read are logical. _____

48. As a group, the 5 arguments I've read are reasonable. _____

49. As a group, the 5 arguments I've read are sound. _____

50. As a group, the 5 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first five individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and that more top-notch athletes will be attracted to attend the university by the work of the task force, it can be seen that the work of the task force should begin."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

51. By itself, the argument I just read is believable. _____

52. By itself, the argument I just read is logical. _____

53. By itself, the argument I just read is reasonable. _____

54. By itself, the argument I just read is sound. _____

55. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first five individual arguments. Combine your feelings about the first five arguments with your feelings about this sixth argument and respond to the following statements using the same key you used before.

56. As a group, the 6 arguments I've read are believable. _____

57. As a group, the 6 arguments I've read are logical. _____

58. As a group, the 6 arguments I've read are reasonable. _____

59. As a group, the 6 arguments I've read are sound. _____

60. As a group, the 6 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with first six individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Within the context of the campus alone, a grading system based on performance rather than on students' ethnic origins will eventually result from the work of the task force."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

61. By itself, the argument I just read is believable. _____

62. By itself, the argument I just read is logical. _____

63. By itself, the argument I just read is reasonable. _____

64. By itself, the argument I just read is sound. _____

65. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first six individual arguments. Combine your feelings about the first six arguments with your feelings about this seventh argument and respond to the following statements using the same key you used before.

66. As a group, the 7 arguments I've read are believable. _____

67. As a group, the 7 arguments I've read are logical. _____

68. As a group, the 7 arguments I've read are reasonable. _____

69. As a group, the 7 arguments I've read are sound. _____

70. As a group, the 7 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first seven individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Also, that the tolerance of racism in the overall culture will be encouraged by the tolerance of racism in a subculture like a university,"

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

71. By itself, the argument I just read is believable. _____

72. By itself, the argument I just read is logical. _____

73. By itself, the argument I just read is reasonable. _____

74. By itself, the argument I just read is sound. _____

75. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first seven individual arguments. Combine your feelings about the first seven arguments with you feelings about this eighth argument and respond to the following statements using the same key you used before.

76. As a group, the 8 arguments I've read are believable. _____

77. As a group, the 8 arguments I've read are logical. _____

78. As a group, the 8 arguments I've read are reasonable. _____

79. As a group, the 8 arguments I've read are sound. _____

80. As a group, the 8 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first eight individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"and that concerns of racial harmony are important will be taught by the continuing example of the task force."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

81. By itself, the argument I just read is believable. _____

82. By itself, the argument I just read is logical. _____

83. By itself, the argument I just read is reasonable. _____

84. By itself, the argument I just read is sound. _____

85. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, without looking back at any previous pages, remember as well as you can the first eight individual arguments. Combine your feelings about the first eight arguments with your feelings about this ninth argument and respond to the following statements using the same key you used before.

86. As a group, the 9 arguments I've read are believable. _____

87. As a group, the 9 arguments I've read are logical. _____

88. As a group, the 9 arguments I've read are reasonable. _____

89. As a group, the 9 arguments I've read are sound. _____

90. As a group, the 9 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

DO NOT TURN BACK TO ANY PREVIOUS PAGES.

DIRECTIONS: As you did with the first nine individual arguments, read the following argument and indicate the degree to which you either agree or disagree with the statements following it.

"Finally, the university's administration will be made to look good by the task force. . . ."

1 = Very strong disagreement
2 = Strong disagreement
3 = Moderate disagreement
4 = Slight disagreement
5 = Neither agree nor disagree
6 = Slight agreement
7 = Moderate agreement
8 = Strong agreement
9 = Very strong agreement

91. By itself, the argument I just read is believable. _____

92. By itself, the argument I just read is logical. _____

93. By itself, the argument I just read is reasonable. _____

94. By itself, the argument I just read is sound. _____

95. By itself, the argument I just read is convincing. _____

DIRECTIONS: Now, WITHOUT looking back at any previous pages, remember as well as you can the first nine individual arguments. Combine your feelings about the first nine arguments with your feelings about this tenth argument and respond to the following statements using the same key you used before.

96. As a group, the 10 arguments I've read are believable. _____

97. As a group, the 10 arguments I've read are logical. _____

98. As a group, the 10 arguments I've read are reasonable. _____

99. As a group, the 10 arguments I've read are sound. _____

100. As a group, the 10 arguments I've read are convincing. _____

GO ON TO THE NEXT PAGE.

For each of the following statements, please indicate by marking the appropriate space whether you very strongly agree, strongly agree, moderately agree, slightly agree, neither agree nor disagree, slightly disagree, moderately disagree, strongly disagree, or very strongly disagree.

	Very Strongly Agree	Strongly Agree	Moderately Agree	Slightly Agree	Neither Agree Nor Disagree	Slightly Disagree	Moderately Disagree	Strongly Disagree	Very Strongly Disagree
1. I would prefer complex to simple problems.	—	—	—	—	—	—	—	—	—
2. I like to have the responsibility of handling a situation that requires a lot of thinking.	—	—	—	—	—	—	—	—	—
3. Thinking is not my idea of having fun.	—	—	—	—	—	—	—	—	—
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.	—	—	—	—	—	—	—	—	—
5. I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.	—	—	—	—	—	—	—	—	—
6. I find satisfaction in deliberating hard and for long hours.	—	—	—	—	—	—	—	—	—
7. I only think as hard as I have to.	—	—	—	—	—	—	—	—	—
8. I prefer to think about small, daily projects to long-term ones.	—	—	—	—	—	—	—	—	—

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	Very Strongly Disagree	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree Nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree	Very Strongly Agree
9. I like tasks that require little thought once I've learned them.	—	—	—	—	—	—	—	—	—
10. The idea of relying on thought to make my way to the top appeals to me.	—	—	—	—	—	—	—	—	—
11. I really enjoy a task that involves coming up with new solutions to problems.	—	—	—	—	—	—	—	—	—
12. Learning new ways to think doesn't excite me very much.	—	—	—	—	—	—	—	—	—
13. I prefer my life to be filled with puzzles that I must solve.	—	—	—	—	—	—	—	—	—
14. The notion of thinking abstractly is appealing to me.	—	—	—	—	—	—	—	—	—
15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.	—	—	—	—	—	—	—	—	—
16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.	—	—	—	—	—	—	—	—	—
17. It's enough for me that something gets the job done; I don't care how or why it works.	—	—	—	—	—	—	—	—	—
18. I usually end up deliberating about issues even when they do not affect me personally.	—	—	—	—	—	—	—	—	—

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1. Please indicate your sex. M _____ F _____

2. What is your major? _____

3. Are you a Freshman ___ Sophomore ___ Junior ___ Senior ___ or Graduate Student ___ ?

4. Where would you say you get most of your news? Would you say you get most of your news from:

Newspapers ___

Magazines ___

Television ___

Radio ___

Friends ___

Somewhere else ___

VITA

Henry Allen White was born in Harlan, Kentucky, on January 19, 1953. He attended elementary school in San Diego, California, and was graduated from Santana High School in June 1971. The following September he entered college and in August 1976 received a Bachelor of Science degree in Journalism and English from Murray State University.

After graduation, he was commissioned an ensign in the United States Navy. After fulfilling his active duty obligation, he entered graduate school, completing his master's degree in communications at Murray State University in 1985. The following August he entered the doctoral program at the University of Tennessee. He received the Doctor of Philosophy degree with a major in communications and a minor in applied statistics in May 1989.

The author is a member of Sigma Delta Chi and the Association for Education in Journalism and Mass Communications. Upon graduation, he will be appointed an assistant professor at Kansas State University in Manhattan, Kansas.