A Study of Kruglanski's Need for Closure Construct and Its Implications for Judgment and Decision Making in Accounting and Auditing

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Abstract

The extent to which auditors seek and process information before forming a judgment can have important consequences. In this regard, psychology researchers have identified a personality characteristic, called Cognitive Need for Closure, concerning one's drive to terminate deliberations and reach conclusions. Although this construct, and Kruglanski's Need for Closure Scale (NFCS) to measure dispositional need for closure (DNFC), are well established in the psychology literature, we do not believe they have appeared in Accounting and Auditing literature. We investigated the construct and its implications first by administering the NFCS to a sample of Big-Four auditors. After finding significant differences across ranks, we carried out a series of exploratory experiments, using senior and graduate accounting majors, to investigate whether DNFC affects judgment and decision-making in relevant professional settings. We find differences in stereotyping behavior (impression formation) and in time spent on assigned tasks. Implications and directions for future research are discussed.

A Study of Kruglanski's Need for Closure Construct and Its Implications for Judgment and Decision Making in Accounting and Auditing

Much prior research in Accounting and Auditing has focused on the heuristics used in the decision-making process and the subsequent biases.[1] The current research focuses on the motivation for judgment and decision-making (JDM), called by Webster and Kruglanski (1994) the "need for closure." An auditor's motivation for judgment and decision-making determines the extent to which heuristics are used in the judgment and decision-making process and, therefore, the extent that judgments are affected by the associated biases (Tversky and Kahneman 1974; Hogarth 1981; Kruglanski and Ajzen 1983; Kruglanski and Freund 1983; Kruglanski 1989; Chaiken et al. 1989; Hogarth 1991; Tversky and Kahneman 1982; Taylor 1982).

THEORY OF LAY EPISTEMICS

Hypothesis Generation

(Kruglanski 1980) laid the foundation for the development of a theory on the process of knowledge acquisition. This theory (the theory of lay epistemics) has been further developed by Kruglanski and his collaborators (Kruglanski and Ajzen 1983; Kruglanski and Freund 1983). The theory of lay epistemics outlines the process by which individuals acquire knowledge in two steps—hypothesis-generation and hypothesis-validation (Kruglanski 1989; Kruglanski et al. 1991). The capacity of an individual to generate alternative hypotheses is dependent on their cognitive capability, situational factors, and relevant background information. In addition, the

[1] For reviews, see Smith and Kida (1991) and Bouwman and Bradley (1997).

validation of the hypothesis is accomplished through deductive logic—a person has confidence in the hypothesis if it is logically consistent with (or deducible from) known facts (Kruglanski and Ajzen 1983). However, the "acceptance of any hypothesis is potentially revocable" (Kruglanski and Freund 1983, 449). Evidence inconsistent with the hypothesis can result in the revision or modification of the hypothesis—or potentially a complete abandonment of the hypothesis.

The hypothesis-generation process is prompted by an interest in acquiring knowledge and is considered a motivated behavior (Kruglanski 1980). The motivational element associated with the acquisition of knowledge is the component that sets the knowledge acquisition process in motion and then terminates the process upon validating or invalidating the hypotheses. The individual's tendency to generate and validate or invalidate alternative hypotheses can be influenced by three relevant motivations: the need for specific conclusions, the fear of invalidity, and the need for closure. The need for specific conclusions exerts directional effects on the judgmental process while fear of invalidity and the need for closure are considered nondirectional motives with contrasting effects on the judgmental process (Kruglanski and Mayseless 1987).

Effects of Motivations

The need for specific conclusions can have the effect of either augmenting or inhibiting hypothesis generation. If the hypothesis is consistent with the needs or wishes of the individual, they will be more likely to accept the hypothesis and halt the generation of further alternative hypotheses. On the other hand, when the hypothesis is undesirable, the individual will be more likely to continue with hypothesis generation until a more plausible hypothesis is generated. This

need for specific conclusion can result in conclusional biases, often called “wishful thinking” by psychologists (Kruglanski and Freund 1983).

The fear of invalidity emanates from an individual’s perceived costs of making a judgmental error, reducing the need for closure. An individual with a heightened fear of invalidity would generate a greater number of hypotheses in the decision-making process and would be particularly sensitive to information inconsistent with current beliefs (Mayseless and Kruglanski 1987).

The need for closure is “the desire to possess some knowledge on a given topic, any definite knowledge as opposed to confusion and ambiguity” (Mayseless and Kruglanski 1987, 164). A heightened need for closure would inhibit the hypothesis-generation process because conflicting hypotheses would threaten an existing conclusion. Research has shown that the need for closure can be heightened under pressure to form a clear opinion, reach a definite conclusion or to act (because action requires knowledge) (Kruglanski and Freund 1983; Webster and Kruglanski 1994).

While need for closure and fear of invalidity are opposite in their effects on the hypothesis-generating process, they are assumed to be orthogonal; a person could be high on both, or low on both, or high on one and low on the other (Kruglanski and Ajzen 1983). Both need for closure and fear of invalidity can vary according to the situation. However, research has indicated that these are both dispositional constructs that influence the knowledge acquisition process in rather stable ways across various situations (Kruglanski and Ajzen 1983; Kruglanski 1989). The need for closure can be elevated under a variety of situations, such as pressure to make a decision or stressing the importance of order and coherence. Fear of invalidity can be

situationally elevated by instructions stressing the importance of accuracy, evaluation of judgments by significant others or other means of assigning a cost to incorrect judgments (Mayseless and Kruglanski 1987). Fear of invalidity has been found to be one of the major factors that can situationally abate the need for closure (Kruglanski and Freund 1983).

The Need For Closure Scale

Webster and Kruglanski (1994) developed an individual-difference measure of the need for cognitive closure. According to the authors, individuals with a high dispositional need for closure (DNFC):

1) desire "definite order and structure in their lives and abhor unconstrained chaos and disorder" *(preference for order);*
2) desire a knowledge that can be "relied on across circumstances and is unchallenged by exceptions or disagreements" *(preference for predictability);*
3) "experience an urgent desire to reach closure, reflected in a decisiveness of their judgments and choices" *(decisiveness);*
4) "would experience as aversive situations devoid of closure" *(discomfort with ambiguity);*
5) do not desire that their "knowledge (be) confronted by alternative opinions or inconsistent evidence" *(closed mindedness)* (Webster & Kruglanski 1994, 1050).

Their need for closure scale (NFCS), a 47-item questionnaire (examples of scale items are presented in Table 1), was found to measure several different aspects of the dispositional construct. Results indicate that preference for order, preference for predictability, decisiveness,

discomfort with ambiguity, and closed mindedness are the five major facets which represent the construct.

Table 1
Examples of items from the Need for Closure Scale*

Need for Closure Facets	*Items*
Preference for order	I enjoy having a clear and structured mode of life.
	I find that a well-ordered life with regular hours suits my temperament.
Preference for predictability	I like to have friends who are unpredictable.
	I don't like to go into a situation without knowing what I can expect from it.
Decisiveness	When faced with a problem, I usually see the one best solution very quickly.
	I usually make important decisions quickly and confidently.
Discomfort with ambiguity	I don't like situations that are uncertain.
	I feel uncomfortable when someone's meaning or intention is unclear to me.
Closed mindedness	I feel irritated when one person disagrees with what everyone else in a group believes.
	I dislike questions that could be answered in many different ways.

*(http://www.wam.umd.edu/~hannahk/nfcscale.html)

Webster and Kruglanski (1994) found that the NFCS is reliable in assessing the single coherent construct with five facets. Webster and Kruglanski also determined "the high test-retest reliability observed over a 12–13-week period indicates that the personality construct tapped by the scale is relatively stable" (p. 1052). The five-facet NFCS has received confirmation and cross-cultural validation in a series of studies.

Studies of the Effects of Need for Closure

Individual differences in information seeking and knowledge acquisition processes can affect the way in which information is retrieved, interpreted, and ultimately the decision reached. Research has shown that an individual's dispositional need for closure will affect the decision-making process in predictable ways.

Earliest research in this area investigated hypothesis generation and subjective confidence. High (vs. low) need for closure individuals generated fewer hypotheses and had a higher level of confidence in the decision reached. Accordingly, the tendency to quickly terminate the hypothesis-generation phase of the decision-making process is referred to as cognitive "seizing" and the ultimate confidence in this early decision (and subsequently ceasing the search for relevant evidence) as "freezing" (Freund et al. 1985; Kruglanski and Freund 1983; Mayseless and Kruglanski 1987).

Three seemingly unrelated characteristics (primacy effects, anchoring, and ethnic stereotyping) were found to be related to the "seizing" and "freezing" phenomena (Kruglanski and Freund 1983). Individuals seize on early information (primacy effect) and freeze with that decision (anchoring) until they are motivated to continue the hypothesis-generation procedure. Ethnic stereotyping is simply epistemic freezing: "An individual's conception of a given group could be decided on the basis of early information, and be impervious to subsequent evidence inconsistent with this particular conception" (Kruglanski and Freund 1983, 454). Although individuals high in need for closure tend to exhibit primacy effects, when there is substantial delay between the early and late information, high need for closure individuals have been show to exhibit recency effects (Richer and Kruglanski 1998). According to Richter and Kruglanski,

high need for closure individuals assimilate their judgments to the most accessible information, which can result in recency effects when the later information is more accessible than the earlier information.

Further research has identified several other predictable characteristics for high (vs. low) need for closure individuals. Persons with high need for closure tend to compare with similar others, since similar others would support their existing belief, allowing them to maintain closure (Kruglanski and Mayseless 1987). However, Kruglanski (1989) was not able to conclusively determine whether an individual's accuracy or inaccuracy in their decisions is related to their motivation for judgment and decision-making. A study of introverts and extroverts suggests that introverts can be especially sensitive to situations requiring cognitive closure. The study found that in certain situations, introverts are more likely than extroverts to seek closure; they are more likely to base judgments on stereotypes and more likely to avoid others who disagree with them (Heaton and Kruglanski 1991). Initial confidence levels along with need for closure are found to affect the tendency to seek additional information. Specifically, individuals with a high need for closure and a relatively high initial confidence in a hypothesis are less likely to seek additional information than an individual with a high need for closure and low initial confidence in a hypothesis (Kruglanski et al. 1991). In fact, individuals with a high need for closure have been found to place more emphasis on pre-existing knowledge—presumably because of the high accessibility of the information and therefore the ability to achieve an early closure (Jamieson and Zanna 1989; Kruglanski and Freund 1983; Ford and Kruglanski 1995). In a Dutch study, high need for closure subjects recall more stereotype information in their perception and judgment of social groups (Dijksterhuis et al. 1996).

Further research has addressed the effect of need for closure on group interactions. Based on the tendency for persons high in need for closure to freeze on past judgments and opinions, it follows that high need for closure individuals will exhibit a bias toward knowledge less likely to require revisions. This in turns biases them towards knowledge unlikely to be challenged by one's reference group, such as abstract knowledge that "affords cross-situational consistency and obviates the need to reconsider one's knowledge from one context to the next" (Webster et al. 1997, 1123).

Another group study, conducted in Rome, Italy, uses an Italian translation of the NFCS to assess individuals' dispositional need for closure. This observational study contributes to the mounting evidence that need for closure can affect group interactions. Specifically, the researchers find that individuals high in need for closure experienced greater pressures to conform to others in the group as well as a gravitation towards an autocratic style of leadership and decision-making within the group (Grada et al. 1999).

The most recent studies of the need for closure have shown that the NFCS can be translated and reliably used in Italy, the Netherlands, Belgium and Hong Kong (Chiu et al 2000; Kenhove et al. 2001; Mannetti et al. 2002). Kenhove, Vermeir and Verniers (2001, 347) used a shorter (24 questions) Dutch version of the NFCS along with a consumer ethics scale and determined that "individuals with a high need for closure tend to have beliefs that are more ethical as regards possible consumer actions ...than those with a low need for closure." Also according to the authors, "High-NFC subjects are more likely to consider actively or passively benefiting from an illegal act or questionable behavior ...than low-NFC subjects are" (Kenhove,

et al. 2001, 354). However, they did not address whether the high NFC and low NFC individuals actually behave according to their ethical beliefs.

Implications for Auditors and Accountants

Auditors have the opportunity to use professional judgment throughout the conduct of the audit. According to Jennings, Kneer, and Reckers (1987, 105), "reliance upon professional judgment, while complementary to the accounting profession, provides little direction to auditors or to users who must interpret the work of auditors." A better understanding of that judgment process will increase audit efficiency and/or quality by reducing inconsistencies in the application of standards, procedures, and judgments (Estes and Reames 1988) and also improving interpretability of the results. Kruglanski's research into the motivation for judgment and decision-making should prove helpful in understanding the "how and why" of auditors' judgments and decisions.

In initial testing of the reliability of the NFCS, advanced accounting majors were compared to advanced studio-art majors (Webster and Kruglanski 1994). Based on a theory of careers proposed by Holland (1985) that certain personalities tend to gravitate towards certain careers, Webster and Kruglanski determined that the two types of personalities most relevant to the need for closure construct are the Conventional type and the Artistic type. Holland describes the Conventional type (accounting majors) as preferring explicit, ordered, and structured tasks with an aversion to ambiguous, unstructured tasks. Holland describes the Artistic type (studio-art majors) as preferring ambiguous, free, and unstructured tasks with an aversion to structured and

ordered tasks. As anticipated by the authors, accounting majors exhibited significantly higher scores than did studio-art majors.

In a review article, Choo (1989) identified differences between judgment and decision-making of expert and novice auditors. Selected differences taken from Choo's table on pp. 115-116 are summarized in Table 2.

Table 2
Characteristic Differences Between Expert and Novice Accountants and Auditors*

Experts	**Novices**
Relies on hypotheses, rules of thumb, structured checklists, or standard lists of questions to guide information search.	Relies on a simple, passive, undirected, sequential information search.
Builds an overall picture, or develops a "feeling" for the task based on prior knowledge.	Lacking among novices.
Searches for contradictory evidence and consistently focuses on potential contradictions.	Ignores contradictory evidence.
Integrates both supporting and contradicting evidence to zero in on underlying problems	Integrates supporting evidence only and ignores contradictory evidence
Responds to the deeper features of information as a result of well-developed schemas.	Responds to the surface features of information as a result of less well-developed schemas.
Recalls more information (cues).	Recalls less information (cues).

*Abstracted from Choo (1989, 115–116)

Characteristic similarities between expert individuals (who tend to be at higher ranks in a firm) and individuals with low DNFC, combined with Kruglanski's findings that accounting students are high in DNFC, lead us to conclude that an investigation of accountants' and auditors' need for closure may be fruitful.

EMPIRICAL INVESTIGATION

This empirical study progressed through two phases. The first assessed whether the DNFC measure differs systematically across auditors at different ranks. If so, then it may be importantly related to professional expertise in judgment and decision-making. Secondly, after finding significant differences across ranks, we designed a series of experiments to demonstrate that DNFC can affect judgment and decision-making in accounting and audit-related tasks. All of the studies were internet-based.

Phase I: Tests of Auditors' Dispositional Need for Closure

The first research question is implied by the discussion above, specifically:

> RQ1: Do auditors at higher firm ranks differ from those at lower ranks as to their dispositional need for closure?

Method

Subjects for this study are all members of the American Institute of Certified Public Accountants (AICPA). As of July 31, 2002, membership was approximately 350,000 (AICPA website). Members are self-classified as having an interest in a certain area. Subjects for this study are all members of the AICPA who had expressed a professional interest in auditing (74,019 members) and who worked for a Big Four accounting firm.[2] The list of individuals fitting these criteria includes 4,386 names. Email addresses that were returned as invalid are excluded, resulting in 2,635 successful email messages. The website records each individual that visits the website and

[2] At that time (June-July 2002), Andersen was active but troubled. Responses from members of that firm were few and were deleted.

submits at least one section of the data as a subject. Approximately 520 individuals visited the site. Those individuals that indicated an area of professional interest other than auditing were eliminated, resulting in 292 appropriate, complete responses.

Accountants from all of the Big Four accounting firms were sent an email requesting that they visit an interactive website designed to collect the necessary data for this study. They are informed that the website will be available for data collection for approximately two weeks. Approximately ten days after the first request, a reminder is sent. Participants are assured of their anonymity and reminded that participation is strictly voluntary.

The first part of the task required completion of demographic information and the second part of the task required completion of the "personality questionnaire" (NFCS).

Demographic Information

Table 3 lists the number of requests sent to members of each of the Big Four firms as well as the response rate of each firm. The highest response rate of 15.23% is from KPMG, while the lowest response rate is 10.09% from Deloitte & Touche.

Table 3
Responses Rates by Firm

Firm	Number of Requests	Number of Responses	Response Rate
Deloitte & Touche	783	79	10.09%
Ernst & Young	735	76	10.34%
KPMG	453	69	15.23%
PriceWaterhouse Coopers	664	68	10.24%

Seventy-eight percent of the participants are male and twenty-two percent of the participants are female. The youngest participant is 21 years of age while the oldest participant is 81 years of age. Forty-six percent are forty or older. Fifty-three percent have fifteen or fewer years of experience, while forty-seven percent have more than fifteen years. Approximately 72 percent indicate a bachelors degree as their highest level of education, and 28 percent indicate a master's degree.

Table 4 indicates the participants' ranks within the firm. Almost half (45.9%) are at the rank of partner. The smallest groups are supervisor and staff, with only four supervisors and six staff accountants responding to the study.

Table 4
Rank Within the Firm

Rank within the Firm	Number of Participants	Percent of Total
Staff	6	2.0%
Senior	43	14.7%
Supervisor	4	1.4%
Manager	105	36.0%
Partner	134	45.9%

The study represents a national sample, with thirty-eight of the fifty states and District of Columbia. California has the greatest number of participants (42, or 14.4% of the total). Texas has the second highest representation with twenty-seven respondents (representing 9.2% of the total). New York is represented by twenty-four participants.

Results

As seen in Table 4, less than twenty percent of the subjects indicate that their position is that of staff, manager or supervisor. One could theorize why fewer respondents were at these lower levels, but given that these levels within the firm are levels with less accountability, they have been grouped together for the purposes of this study (lower ranks). An examination of the subjects at the rank of manager indicates a variation in years of experience from five years to thirty-seven years.

After a certain period of time, if a manager has not made partner, it is most likely that that individual will not make partner. Therefore, to provide more information in the study, the manager group has been divided into two groups: (1) those with ten or fewer years of experience (most likely that this group will continue on to the rank of partner) and (2) those with more than ten years of experience (less likely that this group will continue on to the rank of partner). As a result, this study will specify rank at the firm at four levels: (1) partner, (2) managers with ten or fewer years of experience, (3) managers with more than ten years of experience, and (4) lower ranks.

Further analysis of the data set revealed that responses are fairly evenly distributed among the firms, with PriceWaterhouseCoopers having the fewest respondents (sixty-eight) and Deloitte & Touche have the most respondents (seventy-nine). Table 5 shows the percentage of total responses per firm:

Table 5

Percentage of Responses per Firm

Firm	Number of responses	Percentage of Total
Deloitte & Touche	79	27.1%
Ernst & Young	76	26.0%
KPMG	69	23.6%
PriceWaterhouseCoopers	68	23.3%

An analysis of those who completed the survey shows that their dispositional need for closure score varies from a low of 114 to a high of 209 with an overall mean of 155.81 and standard deviation of 17.12. Kruglanski has not developed a national norm for need for closure. However, in one of his studies, he found that accounting majors at the University of Maryland scored higher (n= 63, mean = 173.3) than studio art majors (n = 51, mean = 139.22) (Webster and Kruglanski 1994). In the same study, another group of subjects not affiliated with the university and ranging in age from 24 to 56 years, scored in between these two averages (n=172, mean = 154.89). The mean for the data in this study is lower than the mean for accounting majors in Kruglanski's early research. Preliminary analysis indicating that partners may score lower in DNFC and the fact that almost half (46.6%) of the respondents are partners may explain this difference.

Initial results were analyzed using a one-way ANOVA[3], between-group design with DNFC as the dependent variable and rank in the firm as the factor with four levels. This analysis

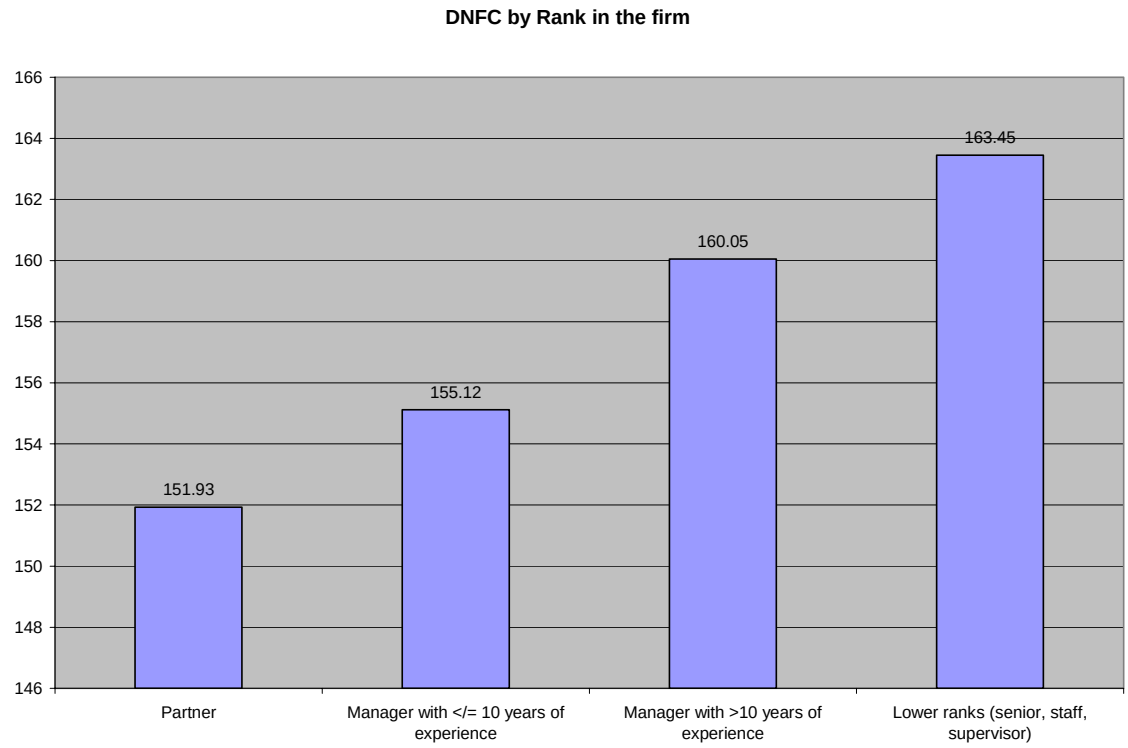
[3] The Kolmogorov-Smirnov statistic, with a Lilliefors significance correction indicates no deviation of the data set from normality (significance = 0.20). Levene's statistic (1.097, p = 0.35) indicates no violation of the homogeneity of variance assumption.

revealed a significant effect for rank in the firm, $F(3,288) = 7.046$; $p < .0001$. The means are displayed in Table 6 and pictured in Figure 1.

Table 6
Mean Dispositional Need for Closure Scores by Rank

Rank	Partner	Manager (with 10 or less years of experience)	Manager (with more than 10 years of experience)	Lower ranks (seniors, staff and supervisors)
N	134	67	38	53
Mean DNFC	151.93	155.12	160.05	163.45

Figure 1



Tukey's HSD test for pairwise comparison of means is used for the comparison of mean scores by rank because of the unequal sample sizes among the ranks. Pairwise comparisons of the mean scores by rank are presented in Table 7.

Table 7
Pairwise Comparisons of Mean Dispositional Need for Closure Scores by Rank

Pairwise Comparisons	Tukey's HSD Statistic
Partner and Managers with experience </= ten years	0.573
Partner and Managers with experience > ten years	0.039
Partner and lower ranks	0.000
Managers with experience </= ten years and lower ranks	0.032
Managers with experience > ten years and lower ranks	0.771
Managers with experience </= ten years and managers with experience > ten years	0.461

The tests revealed that subjects at the partner rank are significantly lower in DNFC than individuals at the lower ranks. Those managers with ten or fewer years of experience are also higher in DNFC than subjects at the lower ranks. The difference between the DNFC for partners and the DNFC for managers with more than ten years of experience is also significant. There was not a significant difference between subjects that were managers with more than ten years of experience and the lower ranks. There also is not a significant difference between subjects that were at the partner rank and subjects that were at the manager rank with ten or fewer years of experience. The two manager groups are not significantly different in their DNFC.

Analysis of Subscales

The second part of the statistical analysis will look to the MANOVA model to provide us with additional information about the differences according to rank within the firm. The appropriateness of a MANOVA model is first assessed by evaluating the Bartlett's test of

sphericity statistic and its significance level. The test results show an approximate Chi-Square of 360.131 with $p < .0001$.[4] The significance of this test indicates that there is indeed a relationship between at least some of the variables (Hair et al. 1995).

Results were analyzed using a one-way MANOVA, between-groups design with all five facets of the need for closure as dependent variables. This analysis revealed a significant multivariate effect for rank, Wilks' lambda = 0.838, $F = 3.448$; $p < 0.001$. These results indicate a relatively strong relationship between the predictor variable and the multiple criterion variables (taken as a group). The mean scores of each facet of NFC by rank are presented in Table 8.

[4] The MANOVA model with each of the five facets of the need for closure as dependant variables and rank in the firm as the factor has some deviations from the assumptions associated with the MANOVA technique. The Kolmogorov-Smirnov statistic, with a Lilliefors significance correction for each of the factors was significant at $\alpha = 0.05$, indicating a deviation from normality for these data. However, violations of this assumption in social science research have only a very small effect on the type I error rate and this condition can be relaxed by appealing to the multivariate central limit theorem when the sample sizes are large ($n>25$), as in this case (Johnson and Wichern, 1988). Box's Test indicates that the assumption of homogeneity of covariance matrices is not violated in this complete data set.

Table 8
Mean Facet Scores by Rank

	Partners	**Managers </= 10 years experience**	**Managers >10 years experience**	**Lower Ranks**	**Overall**
Facet of Need For Closure	**n=134**	**n=67**	**n=38**	**n=53**	**n=292**
Preference for Order	36.60	39.24	41.05	42.45	38.85
Preference for Predictability	27.49	27.91	28.03	29.84	28.08
Decisiveness	31.47	30.09	31.39	29.72	30.83
Discomfort with Ambiguity	33.43	33.90	34.82	35.94	34.17
Closed Mindedness	22.93	23.99	24.76	25.51	23.88

Given the significance of the MANOVA model, it is therefore appropriate to evaluate the five univariate ANOVAs and interpret them. The results of the ANOVAs are presented in Table 9.

Table 9
Univariate Statistics

Facet of Need for Closure	Mean Square	F	Significance
Preference for Order	519.376	9.746	.000
Preference for Predictability	70.603	2.806	.040
Decisiveness	56.472	2.288	.079
Discomfort with Ambiguity	86.796	2.771	.042
Closed Mindedness	97.103	5.891	.001

Since the *F* statistic for Decisiveness is not significant, it is not appropriate to interpret the pairwise comparisons for this specific criterion variable. Therefore, the Tukey's HSD test for pairwise comparison of means is used for the comparison of mean scores by rank for four of the five facets of need for closure (preference for order, preference for predictability, discomfort with ambiguity and closed mindedness) because of the unequal sample sizes among the ranks. Pairwise comparisons of the mean scores for each facet of need for closure by rank are presented in Table 10.

Table 10
Test of Significant Difference For Pairwise Comparisons

Pairwise Comparisons		Preference for Order	Preference for Predictability	Discomfort With Ambiguity	Closed Mindedness
	Test for Significance:	Tukey's HSD	Tukey's HSD	Tukey's HSD	Tukey's HSD
Partners and Managers (experience ≤ 10 yrs)		.075	.942	.946	.307
Partners and Managers (experience > 10yrs)		.005*	.936	.534	.068
Partners and lower ranks		.000*	.021*	.029*	.001*
Managers (experience ≤ 10 yrs) and lower ranks		.078	.159	.191	.173
Managers (experience > 10 yrs) and lower ranks		.804	.328	.779	.823
Managers (experience ≤ 10 yrs) and managers (experience > 10 yrs)		.612	.999	.850	.781

*indicates significance at $\alpha = 0.05$

For all of the other four facets except decisiveness, there is a significant difference between partners and the lower ranking individuals in the firm. For the facet "preference for order" there is a significant difference between partners and lower ranks, and between partner and managers with more than ten years of experience. The difference in preference for order between partners and manager with ten or fewer years of experience and managers with ten or fewer years of experience and the lower ranks is marginally significant with $p = 0.075$ and $p = 0.078$ respectively. The difference in closed mindedness between partners and managers with more than ten years of experience is marginally significant with $p = 0.068$.

Phase II: Effects on Judgment and Decision Making

Having identified systematic differences in DNFC across ranks of auditors in CPA firms, we proceeded in Spring 2005 to design and conduct a series of experiments to determine aspects

of auditing- or accounting-related judgments or decisions that might be affected by DNFC. These experiments, conducted in a series as a web-based study, addressed the following research questions:

RQ2: Can DNFC affect personnel judgments in a business setting, where sequential information is being received?

RQ3: Are Accounting students prone to stereotyping in evaluation of persons?

RQ4: Is Accounting students' acceptance of ethically questionable behavior in business settings moderated by their DNFC?

RQ5: Is sequential processing of financial information by accounting students affected by their DNFC?

RQ6: Do Accounting students with lower DNFC tend to spend time on tasks?

Subjects

For this exploratory, laboratory research, the use of advanced Accounting students seems appropriate. Thus we used Accounting majors who had achieved senior or graduate standing, referred to us from colleagues throughout the United States. They were paid an honorarium of $20 for participating in the complete study, or $10 for a reduced task, as explained below.

Experimental Materials and Procedures

Appendix A shows the complete web-based exercise in one of the sixteen versions representing manipulations in the experiments described below. Before being sent to this site, students had first been referred by faculty colleagues who responded to our request. The

interested students applied at another website address that collected basic contact data and administered Kruglanski's NFCS instrument.[5]

From a total applicant pool of 145, applicants were invited to go to specific website URLs containing the sixteen treatment combinations. Assignment was quasi-random, i.e., subjects were assigned to treatment combinations as they arrived, but taking care to maintain a consistent mixture of DNFC scores across treatment groups. In all, we accepted 82 subjects after purging data from seven paid subjects because of logical inconsistencies or errors due to carelessness or misunderstanding of instructions.

DNFC Scores of Students vs. Auditors

The mean DNFC score of the 82 student subjects was 162.29, very close to that of the lower ranks (seniors, staff and supervisors) shown in Table 6. Repeating the ANOVA and post-hoc (LSD) comparisons shows that the students also are significantly different from the partners and the managers with less than 10 years experience ($\alpha < 0.05$).

Below are brief descriptions of the experiments and the results of each.

The Case of the Two Employees (addressing RQ2)

The first experiment involved the sequential disclosure of information about two employees (an accounting clerk and a custodian) who might be involved in an accounting fraud. After each bit of information, the subject evaluated the perceived ethicality of the two employees. The sequence of information was as follows: similar background information on the two people; then highly incriminating information about one of these persons; then two pieces of

[5] Note that the NFCS also is included at the time of the actual experiment. This allowed validation and identified a few applicants who had not responded seriously, because their test-retest correlation was extremely low.

ambiguous information; and finally information that the other party was guilty and the accused was innocent. Thus there were five repeated measures.

We expected that subjects higher in need for closure would tend to change their evaluations less with receipt of new information. We also expected that the two ambiguous pieces of information (the accused person vigorously denying guilt and the apparent motive of helping a sick friend) would allow the subjects to consolidate their opinions, so that higher-DNFC subjects would become increasingly resistant to change, as compared to lower-DNFC subjects.

Results. As shown in Figure 2, subjects responded to the sequential information in a pattern that follows a definite polynomial curve ($R^2 > 0.98$ for all levels of DNFC). The pattern does not, however, differ significantly between levels of DNFC. Table 99 shows the results of a repeated-measures ANOVA. The interaction between Rating and DNFC is not significant, and so the hypothesized difference between persons of higher and lower DNFC is not supported.

Figure 2

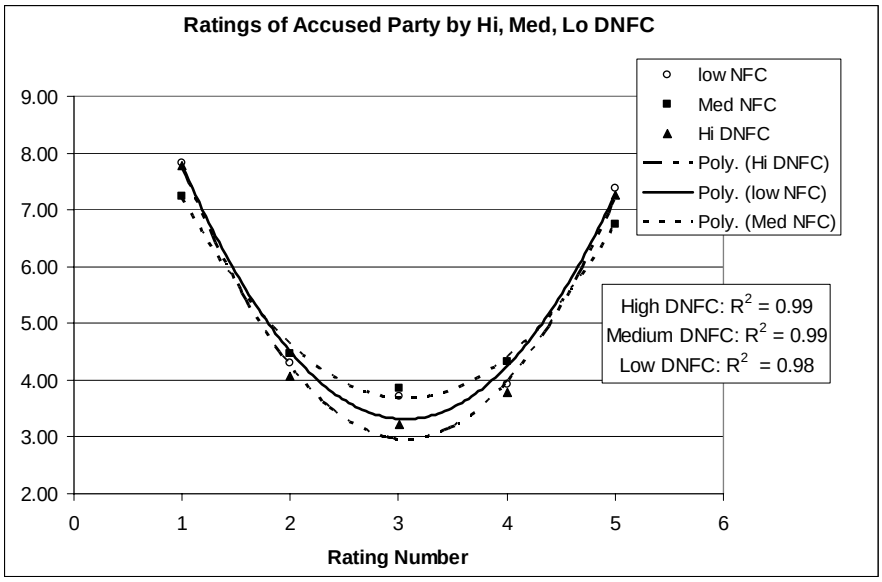


Table 11
Repeated-measures ANOVA, Rating of Accused Party by Trichotomized Dispositional Need for Closure

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
RATING	Sphericity Assumed	1173.104	4	293.276	174.082	.000	.688
	Greenhouse-Geisser	1173.104	1.878	624.616	174.082	.000	.688
	Huynh-Feldt	1173.104	1.971	595.187	174.082	.000	.688
	Lower-bound	1173.104	1.000	1173.104	174.082	.000	.688
RATING * DNFC	Sphericity Assumed	21.327	8	2.666	1.582	.129	.039
	Greenhouse-Geisser	21.327	3.756	5.678	1.582	.185	.039
Note: Sphericity cannot be assumed.	Huynh-Feldt	21.327	3.942	5.410	1.582	.182	.039
	Lower-bound	21.327	2.000	10.663	1.582	.212	.039
Error(RATING)	Sphericity Assumed	532.366	316	1.685			
	Greenhouse-Geisser	532.366	148.372	3.588			
	Huynh-Feldt	532.366	155.708	3.419			
	Lower-bound	532.366	79.000	6.739			

Stereotyping Experiment (addressing RQ3)

At the end of the above case, we asked the following question: *The case you have just read concerned two specific individuals working for an organization. In general, however, how ethical and trustworthy do you consider custodial workers [or accounting clerks] to be?* In the experiment, half of the subjects had just seen the custodian be guilty, and the other half the clerk. We expected that subjects higher in DNFC would be more prone to stereotyping, i.e., to rate the target individual differently if the target belonged to the same class of worker found guilty in the scenario they had just seen.

Results The results here are a bit surprising, so we begin with an observation about the design of the experiment. While we had anticipated that finding the person guilty would induce stereotyping, *both* figures in the "Two Employees" case were possible objects of stereotyping. In both versions, one employee is the predominant subject of attention and discussion throughout the case, allowing time for opinion formation. Then, in the *denouement*, the other party is found

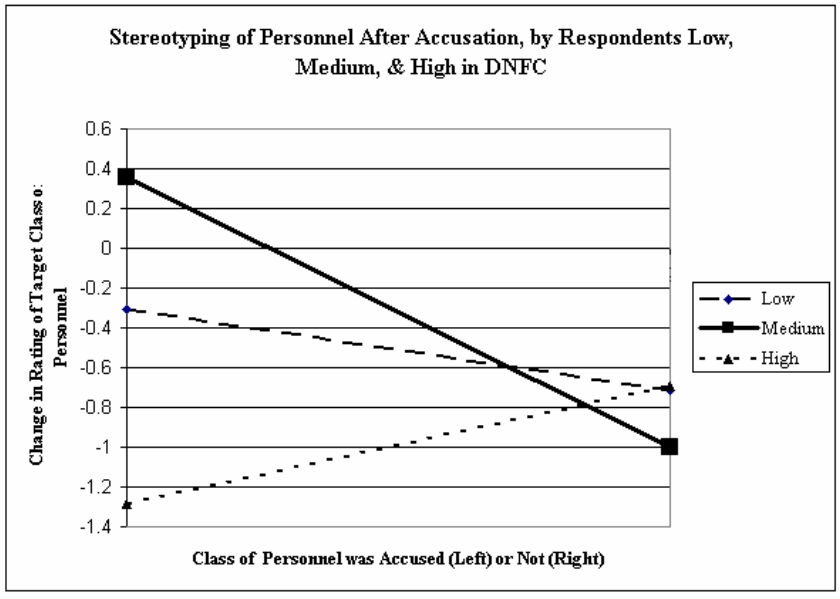
guilty. Thus to view the treatments as stereotype-inducing versus *not* stereotype-inducing was simplistic.

To adjust for subjects' base ratings before possible stereotyping, we took the difference in ratings, on the 10-point scale, of the target of the stereotyping question and the original evaluation of that type of personnel in the Case of the Two Employees, i.e.:

CHANGE = (response to "In general, however, *how ethical and trustworthy do you consider* ***custodial workers[accounting clerks]*** *to be*?")
- (initial rating given to the same class of worker in the Case of the Two Employees).

Thus a negative score indicates a relative decrease in the perceived ethicality of a certain class of workers, indicating stereotyping.[6]

Figure 3



[6] This presumes no preexisting differences across DNFC levels as to how in the subjects perceive Agnes and Doris versus a "typical" employee. Since the initial evaluations did not differ across DNFC levels this assumption seems tenable.

Figure 3 shows this CHANGE score according to whether the target has been of the accused class later found innocent (left side of chart) or of the class of worker found guilty (right). Table 12 shows a two-factor ANOVA using DNFC (low, medium, high) and a factor indicating whether the target of the stereotyping question had also been the accused party (subsequently found innocent) in the case.

Table 12
ANOVA, Change in Rating as a Function of Accusation in Prior Case Study

Dependent Variable: CHANGE

Source	Type III Sum of Squares	d.f.	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	23.045*	5	4.609	3.557	.006	.190
Intercept	30.190	1	30.190	23.302	.000	.235
NDNFC	6.466	2	3.233	2.495	.089	.062
Accused Target	3.116	1	3.116	2.405	.125	.031
NDNFC * Accused	13.065	2	6.533	5.042	.009	.117
Error	98.467	76	1.296			
Total	152.000	82				
Corrected Total	121.512	81				

* R^2 = 0.190 (Adjusted R^2 = 0.136)

The interaction effect is significant, indicating that the differences in ratings among DNFC groups are not the same when the target is similar to the accused employee (left side of Figure 3) as when they are not similar. When the target is like the accused person who got exonerated, persons high in DNFC show the most negative (stereotype) responses. The behavior of the middle DNFC group is problematic, however, and the difference between high- and low-DNFC groups is only marginally significant ($p = 0.12$) in post-hoc (LSD) comparisons. Conversely, when the target was like the "guilty" party, all three DNFC groups' responses do not differ significantly (but display stereotyping as indicated by the negative difference score).

Thus, in summary, it appears that the intentional manipulation (proclaiming the party guilty in the end) may have been strong enough to induce stereotyping in all three groups, but that the other, perhaps more subtle manipulation of thoroughly implicating the person before finally exonerating them affected most strongly the subjects with high need for closure. That is, high-DNFC subjects may not have been as capable of discounting information when it was proven to be false. Psychological studies have established that false beliefs, such as those induced in lab experiments, tend to persist even after a thorough debriefing.

Ethical Dilemmas (addressing RQ4)

Subjects responded to twelve ethical dilemmas in which a person committed an act that was not illegal but ethically ambiguous. Approximately half of the subjects were asked their own level of approval/disapproval of the acts. The other half were asked their beliefs about how the typical accountant would approve or disapprove. Subjects also completed the Defining Issues Test of Moral Judgment, DIT-2 (www.centerforthestudyofethicaldevelopment.net/).

Propensity to approve of an act that is questionable in *principle* but follows the *rules* may vary as follows:

	High *P* Score	Low DIT *P* Score
Low DNFC	Lowest	Moderate
High DNFC	Moderate	Highest

Closed mindedness, a characteristic of high need for closure, is not consistent with considering subtle principles. If the rule says it is OK, then so be it. Another component,

i*ntolerance of ambiguity,* seems to have the same effect. *Preference for order* also seems incompatible with making exceptions or difficult decisions based on principle.

The *P* Score (or new *N2* score) from the DIT2 has well established relevance, as it represents the percentage of reasoning that is at the highest, principled level. Thus, approval of the acts described in the twelve dilemmas was expected to vary directly with DNFC and inversely with the DIT-2 measure of principled thinking, N2.

Results. In simple regressions, only approval in the dilemma #1 was significantly correlated with DNFC ($r^2 = 0.05$, $p = 0.02$, $n = 82$). Considering the 41 subjects[7] for whom we have DIT scores, only dilemmas #2 ($r^2 = 0.08$, $p = 0.03$) and #7 ($r^2 = 0.09$, $p = 0.02$) showed significant correlations.

Sequential Effects (Fishtailing) Experiment (addressing RQ5)

Subjects received background and financial information about a hypothetical company, Keaton Inc. After expressing their initial evaluation and confidence level concerning the company's ability to continue as a going concern, they received two more relevant pieces of information and expressed additional evaluations and confidence after each step. This is based on Einhorn & Hogarth's theory (e.g., Hogarth, R. and H. Einhorn, 1992, "Order effects in belief updating: the belief adjustment model," *Cognitive Psychology* 24, 1-55), which has prompted several studies of accountants' decision processes. The theory posits that a person holding strong priors (based on an initial data set) will react strongly (revise their belief more) based on disconfirming than on confirming evidence, followed by another large upward revision after a dose of positive evidence. The opposite sequence leads to a weak initial increase and a large later decrease, with the characteristic fishtail pattern--a recency effect.

[7] After collecting half the data, we discontinued the DIT to reduce costs, in view of the limited results.

Although we would not necessarily expect a fishtail pattern, since subjects may not have formed strong prior beliefs based on the initial data, we would expect to see differences between the patterns from high and low DNFC subjects. The most likely result seems to be that higher DNFC subjects would show smaller changes in response to the additional data. Because this model has appeared in the Accounting literature, it cried out to be part of our study.

Results. This analysis requires a repeated-measures ANOVA of the rating of Keaton, Inc.'s likelihood of survival as a going concern by two factors: Sequence of Information (good or bad news first) and trichotomized DNFC.

The results in Table 13 do not support the hypothesis that reaction to new information differs according to DNFC. The SURVIVE by SEQUENCE interaction is strongly significant, which reflects normative responses by subjects to receipt of bad or good information. However, this pattern does not differ by DNFC level (the three-way interaction is not significant). Incidentally, no groups displayed the "fishtailing" characteristic of the recency phenomenon found elsewhere.

Table 13
Repeated-Measures ANOVA, Survival prospects by DNFC and Information Sequence

Source		Type III Sum of Squares	d.f.	Mean Square	F	Sig.	Partial Eta Squared
SURVIVE	Sphericity Assumed	25.780	2	12.890	13.763	.000	.155
	Greenhouse-Geisser	25.780	1.840	14.014	13.763	.000	.155
	Huynh-Feldt	25.780	2.000	12.890	13.763	.000	.155
	Lower-bound	25.780	1.000	25.780	13.763	.000	.155
SURVIVE * DNFC	Sphericity Assumed	3.340	4	.835	.892	.471	.023
	Greenhouse-Geisser	3.340	3.679	.908	.892	.464	.023
	Huynh-Feldt	3.340	4.000	.835	.892	.471	.023
	Lower-bound	3.340	2.000	1.670	.892	.414	.023
SURVIVE * SEQUENCE	Sphericity Assumed	127.329	2	63.664	67.974	.000	.475
	Greenhouse-Geisser	127.329	1.840	69.216	67.974	.000	.475
	Huynh-Feldt	127.329	2.000	63.664	67.974	.000	.475
	Lower-bound	127.329	1.000	127.329	67.974	.000	.475
SURVIVE * DNFC * SEQUENCE	Sphericity Assumed	3.740	4	.935	.998	.411	.026
	Greenhouse-Geisser	3.740	3.679	1.016	.998	.407	.026
	Huynh-Feldt	3.740	4.000	.935	.998	.411	.026
	Lower-bound	3.740	2.000	1.870	.998	.373	.026
Error(SURVIVE)	Sphericity Assumed	140.490	150	.937			
	Greenhouse-Geisser	140.490	137.969	1.018			
	Huynh-Feldt	140.490	150.000	.937			
	Lower-bound	140.490	75.000	1.873			

Note: Sphericity is violated, so Greenhouse-Geisser or Huynh-Feldt adjustments are necessary.

Time Taken for Task (addressing RQ6)

Using time data from the web server, we calculated times taken by each subject to complete the main components of the study, to the nearest second. Subjects had been instructed to avoid interruptions, but we investigated outliers in the amounts of time taken. In two instances, this examination alerted us to participants who had taken so little time that they clearly were not serious, and we deleted them. In other instances of very high times, we made inquiries and confirmed that the times were not representative, and deleted those times.

Table 14
Regressions, Time Taken on Tasks vs. DNFC

Dependent Variable: Time spent on:	R^2	*d.f.*	*F*	*Sig.*
DNFC Questionnaire#	0.033	75	2.52	0.116
Initial Evaluation of Employees#	0.004	79	0.35	0.554
Revisions of Employee Evaluations	0.008	80	.66	0.421
Dilemmas#	0.056	78	4.60	*0.035
Initial Financial Eval. (Keaton)#	0.082	69	6.19	*0.015
Revisions of Financial Evaluation	0.091	68	6.78	*0.011
Total "Straightforward" (denoted #)	0.283	64	5.58	*0.021
Total Revisions	0.100	68	7.53	*0.008
Total Time Spent	0.086	62	5.84	*0.019

*Significant negative relationship at alpha = 0.05. All slopes are negative.

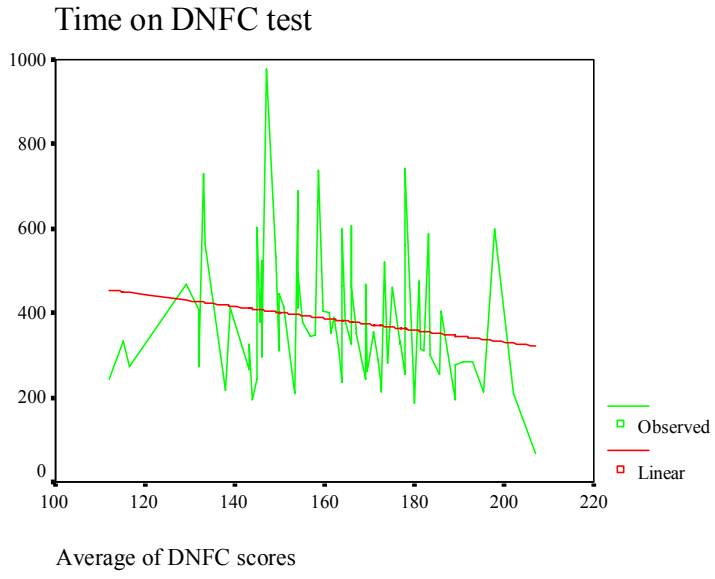
Table 14 summarizes the regressions for all components of main tasks in the experiment.[8] For most tasks, times spent were greater for subjects having a lower need for closure. Exceptions appear to be tasks that did not require much deliberation or decisional effort: the DNFC

[8] Degrees of freedom differ because of missing or clearly unrealistic time measurements. Missing data resulted from collection of data during a pilot phase when time measurements were not collected. Participants were instructed to avoid interruptions during their session online, but interruptions clearly occurred. In several instances, e-mail inquiries confirmed this, and the other omitted data points were quite extreme. Their retention would not have affected the conclusions, in any event.

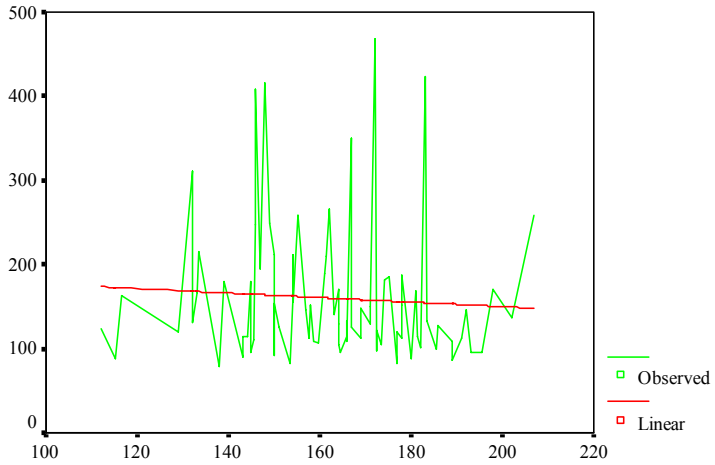
Questionnaire and the "Case of the Two Employees." Of these two, the DNFC Questionnaire shows a marginally significant relationship. This instrument calls for slight introspection and recollection about oneself. The personnel case, however seems to allow almost immediate impression formation and seems to allow little opportunity for purposeful decision-making activity. In contrast, the Keaton financial-analysis case allows much opportunity to make comparisons and weigh evidence. It is here—where cognitive effort might be most productive—that we see a difference across DNFC levels.

Figure 4 shows graphically the time relationships to DNFC. The trends seem rather clear despite the presence of additional observations that we might have deleted as extreme, but these observations do not drive the relationships.

Figure 4
Graphical Presentations of Time Spent on Tasks vs. DNFC

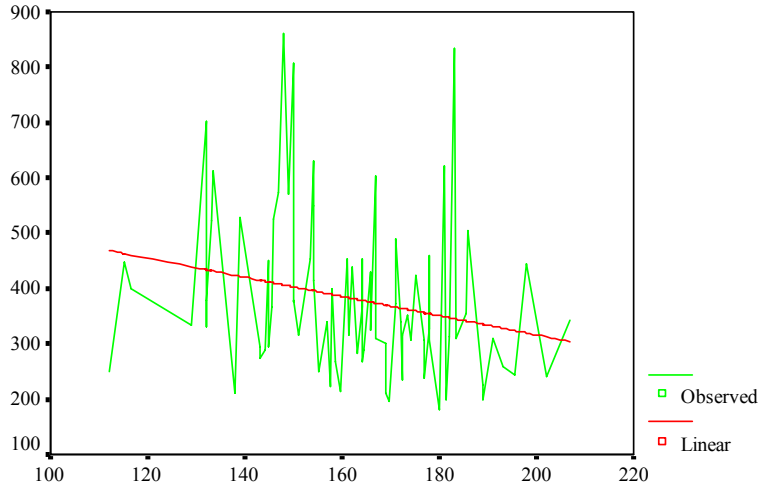


Time on employees, initial response



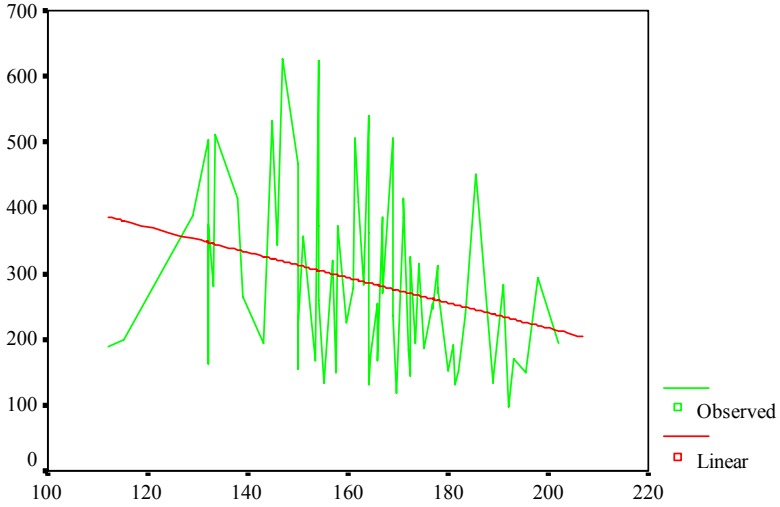
Average of DNFC scores

Time on dilemmas



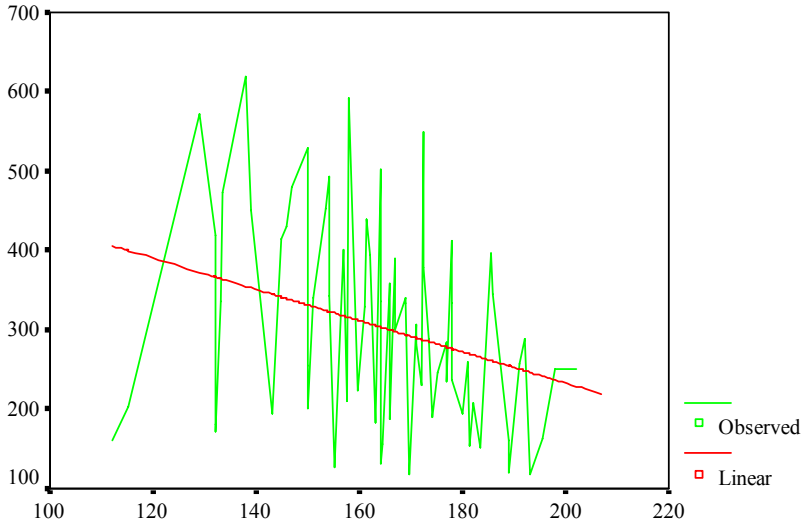
Average of DNFC scores

Time on Keaton, initial response



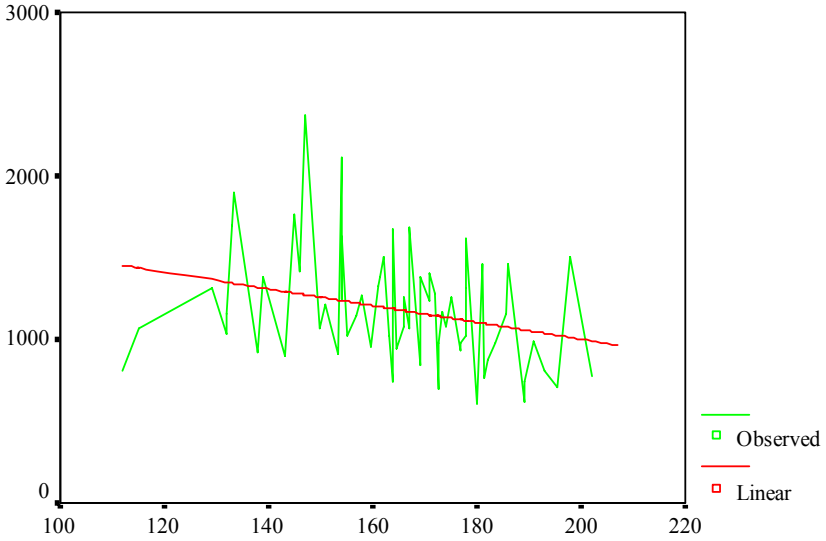
Average of DNFC scores

Time on Keaton, revisions



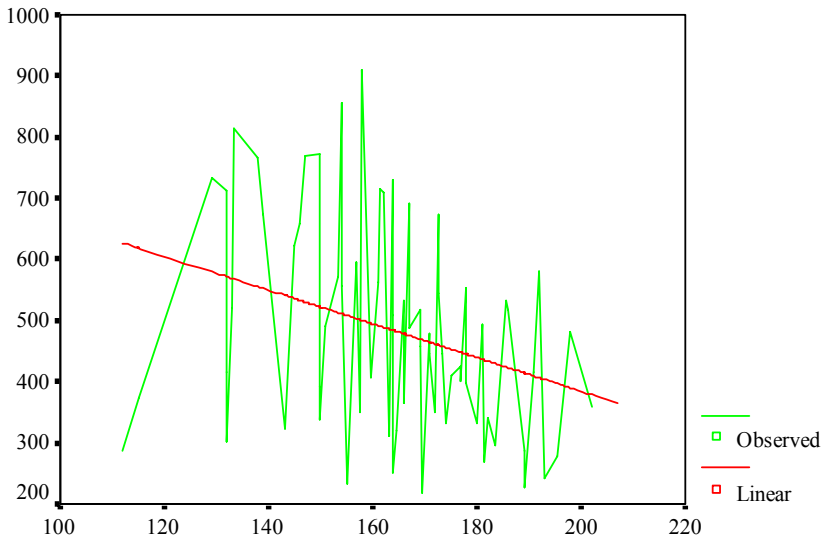
Average of DNFC scores

Total time on straightforward

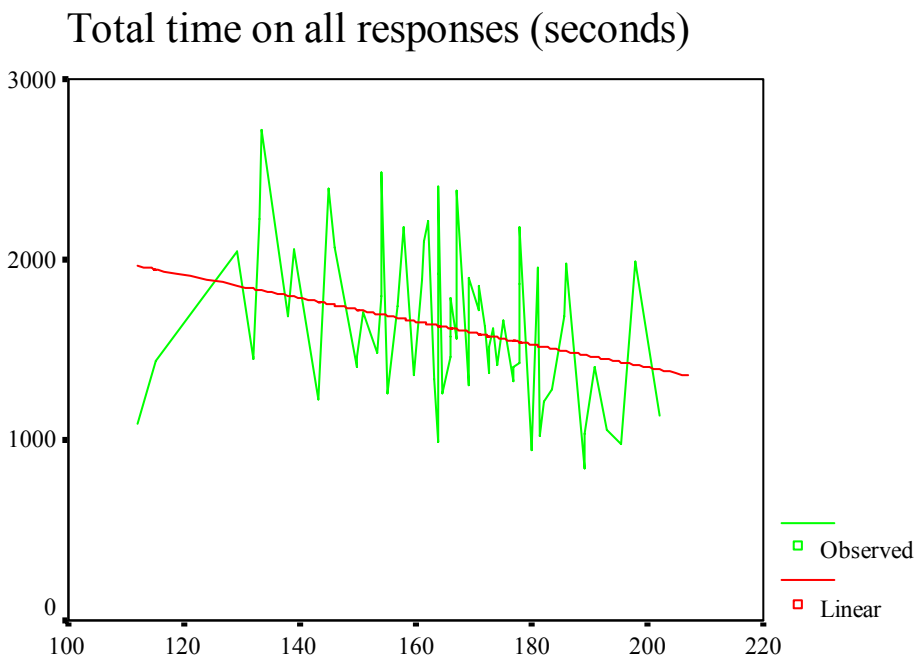


Average of DNFC scores

Total time on judgment revision



Average of DNFC scores



SUMMARY AND CONCLUSIONS

Much research and study has been devoted to judgment and decision-making. This research presents evidence about Dispositional Need for Closure, a personality characteristic which affects the judgment and decision-making process. First, this study attempts to determine if accountants at various ranks differ in their DNFC, by testing accountants who had self-categorized their area of professional interest as auditing and worked for a Big Four accounting firm.

We do find a significant difference between partners and lower level accountants in the firms, with the partners being lower in DNFC than the lower level ranks. The characteristics of lower DNFC individuals indicate that partners are therefore less likely to "freeze" on information early, that they will take the time to consider all sides and possibilities, and are better able to see

the bigger picture when making decisions. Individuals lower in DNFC are better able to deal with ambiguous circumstances and changing environments. Kruglanski's early study showed that accounting students were high in DNFC, but we find that accountants at the upper ranks tend to be lower in DNFC. Possibly students high in DNFC are attracted to the accounting major because of its structure, but once experienced in a business environment, they find that the profession is not as structured as they had anticipated. Therefore, the lower DNFC individuals are the ones that remain as auditors for an extended period and are promoted to the level of partner.

This study further examined the five facets of the dispositional construct. The difference on four of the five facets (preference for order, preference for predictability, discomfort with ambiguity and closed mindedness) was significant between partners and the lower ranking individuals, with scores for each facet of the partners significantly lower than the scores for each facet of the lower ranking subjects. The difference between ranks was not significant for the "decisiveness" facet, indicating that auditors at all ranks experience the same level of urgency to make a decision.[9]

[9] This might be explained by the importance that American society places on one's ability to make a decision, so that decisiveness is seen as a sign of authority or intelligence. For example, (Chiu et al, 2000, 252) note that "Relative to Chinese participants, American participants were more decisive; they had a greater preference for a quick and confident decision on one best solution to a problem. This finding is in line with the observations that Americans tend to adopt a linear and less contextualized approach, whereas Chinese tend to prefer a dialectical and relatively contextualized approach to problem solving."

The series of experiments with student subjects produced some interesting, if limited, results. First, they demonstrated that high-DNFC accountants may, as expected from existing psychological research, be more susceptible to stereotyping behavior when forming evaluations of persons. We suspect that the series of experiments, starting with the administration of the NFCS, may have lacked subtlety, so that the subjects did not always respond in a natural mode. However, subjects did display markedly different behavior as to the amount of time spent on tasks requiring cognitive deliberation.

Limitations

The sample of auditors that chose to participate in this research may not be truly representative of Big Four auditors. Demographic data indicates the subjects represent a national sample and subjects are varied in their age and experience levels. However, the sample appears to lack variety in ranks.

Collecting data via a website is an efficient research technique, but could have introduced a bias. When purchasing the list of names to use to develop email addresses, no information on rank was available. The fact that the sample includes so many partners and managers could be because the list had more managers and partners or it could be because those individuals felt more comfortable completing a survey on materiality. Only 2,902 of the 4,386 email addresses developed were accurate addresses. Some subjects responded that they were uncomfortable submitting data via the Internet—afraid that their results would not be truly anonymous.

Responses from auditors were collected during the months of June and July in the year 2002, during a sensitive period in the business and accounting environment. Subjects may have

answered more conservatively and the environment could have also affected the number of and type of subjects that were willing to complete the survey.

Contributions

The extent to which auditors seek and process information prior to forming a judgment can have important consequences in the conduct of an audit. Partners are at the highest level of accountability in the firm and this study found that partners are lower in need for closure. Individuals lower in need for closure tend to have a more extensive search for alternative hypotheses and more extensive information gathering process before making a decision than higher need for closure individuals. Lower need for closure individuals are better able to handle ambiguous circumstances and deal with a changing environment. Early identification of a characteristic that is apparently already leading to a rise to the rank of partner might be useful for accounting firms and allow for changes such as better training for future leaders in the firm. A better understanding of auditors and the decision-making process can be the first step in increasing public awareness and understanding of the limitations of the audit and a step towards increasing investor confidence in the accountants who produce the audit.

Assessment of an individual auditor's need for closure could be helpful in tailoring audit programs to overcome any limitations that might be faced because of an individual's information processing characteristics. Also, assessing individual differences in information processing and decision-making can be useful in forming audit teams (for example, pairing a low need for closure individual with a high need for closure individual). An assessment of an individual's

need for closure could also be helpful in customizing auditor training (for example, to help high/low need for closure auditors learn compensating techniques).

Suggestions for Future Research

This study used auditors exclusively. A comparison of auditors with a group of users of the financial statements (perhaps financial analysts) might provide insight into users expectations. Also, a comparison with non-Big Five auditors should provide additional information about the partner selection process.

The finding that accountants who are low in DNFC may spend more time at cognitive deliberation tasks is consistent with the consideration of more information and testing of more hypotheses. Although spending more time is not optimal in every instance, it should be desirable to the extent that the decision maker possesses expertise and can utilize the time well. Future studies might employ judgment or decision tasks with criteria for accuracy, to assess the impact of this additional time upon accuracy.

As with most research, the most interesting questions will involve consideration of interaction effects—i.e., under what circumstances in low DNFC beneficial, and under what circumstances is it not. The specific decisions made by auditors should be investigated to determine how those decisions might be affected by DNFC, both directly and indirectly with other factors.

References

Bouwman, M. J. , and W. E. Bradley. 1997. Judgment and Decision Making, Part II: Expertise, Consensus and Accuracy. In V. Arnold and S. G. Sutton, eds., *Behavioral Accounting Research: Foundation and Frontiers, pp.89–133*. Sarasota, FL: American Accounting Association.

Chaiken, S., A. Liberman, and A. H. Eagly. 1989. Heuristic and systematic information processing within and beyond the persuasion context. In *Unintended Thought*, ed. J. S. Uleman and J. A. Bargh, 212-252. New York, NY: The Guilford Press.

Chiu, C.-y., Y.-y. Hong, M. W. Morris, and T. Menon. 2000. Motivated Cultural Cognition: The Impact of Implicit Cultural Theories on Dispositional Attribution Varies as a Function of Need for Closure. *Journal of Personality and Social Psychology*, 78(2): 247-259.

Choo, F. 1989. Expert-novice differences in judgment/decision making research. *Journal of Accounting Literature*, 8: 106-136.

Dijksterhuis, A., A. V. Knippenberg, A. W. Kruglanski, and C. Schaper. 1996. Motivated Social Cognition: Need for Closure Effects on Memory and Judgment. *Journal of Experimental Social Psychology*, 32: 254-270.

Einhorn, H. J., and R. M. Hogarth. 1981. Behavior decision theory: process of judgment and choice. *Journal of Accounting Research*, 19(1, Spring): 1-31.

Estes, R., and D. D. Reames. 1988. Effects of personal characteristics on materiality decisions: a multivariate analysis. *Accounting and Business Research*, 18(72): 291-296.

Ford, T. E., and A. W. Kruglanski. 1995. Effects of epistemic motivations and the use of accessible constructs in social judgment. *Personality and Social Psychology Bulletin*, 21(9, September): 950-962.

Freund, T., A. W. Kruglanski, and A. Shpitzajen. 1985. The freezing and unfreezing of impressional primacy: Effects of the need for structure and the fear of invalidity. *Personality and Social Psychology Bulletin*, 11(4, December): 479-487.

Grada, E. D., A. W. Kruglanski, L. Mannetti, and A. Pierro. 1999. Motivated cognition and group interaction: need for closure affects the contents and processes of collective negotiations. *Journal of Experimental Social Psychology*, 35: 346-365.

Hair, J. F., R. E. Anderson, R. L. Tathan, and W. C. Black. 1995. *Multivariate Data Analysis (*4th ed.), New Jersey: Prentice-Hall, Inc.

Heaton, A. W., and A. W. Kruglanski. 1991. Person perception by introverts and extraverts under time pressure: effects of need for closure. *Personality and Social Psychology Bulletin*, 17(2, April): 161-165.

Hogarth, R. M. 1981. Beyond discrete biases: functional and dysfunctional aspects of judgmental heuristics. *Psychological Bulletin*, 90(2): 197-217.

------. 1991. A perspective on cognitive research in accounting. *The Accounting Review*, 66(2, April): 277-290.

------, and H. J. Einhorn. 1992. An examination of information search during initial audit planning. *Accounting, Organizations and Society*, 24: 1-55.

Holland, J. L. 1985. *Making vocational choices: A theory of vocational personalities and work environments.* Englewood Cliffs, NJ: Prentice-Hall.

Jamieson, D. W., and M. P. Zanna. 1989. Need for structure in attitude formation and expression. In *Attitude Structure and Function, Volume 3*, ed. A. R. Pratkanis and S. J. Breckler, 383-406. Hillsdale, N.J.: Lawrence Erlbaum Associates, Inc.

Jennings, M., D. C. Kneer, and P. M. J. Reckers. 1987. A reexamination of the concept of materiality: views of auditors, users, and officers of the court. *Auditing: A Journal of Practice and Theory*, 6(2, Spring): 104-115.

Johnson, R.A. and D. W. Wichern, *Applied Multivariate Statistical Analysis*, New Jersey: Prentice-Hall, Inc., 1988.

Kenhove, P. V., I. Vermeir, and S. Verniers. 2001. An Empirical Investigation of the Relationships between Ethical Beliefs, Ethical Ideology, Political Preference and Need for Closure. *Journal of Business Ethics*, 32(4, August): 347-361.

Kruglanski, A. W. 1980. Lay epistemo-logic—process and contents: another look at attribution theory. *Psychological Review*, 87(1): 70-87.

------. 1989. The psychology of being "right": the problem of accuracy in social perception and cognition. *Psychological Bulletin*, 106(3): 395-409.

------, and I. Ajzen. 1983. Bias and error in human judgment. *European Journal of Social Psychology*, 13: 1-44.

------, and T. Freund. 1983. The freezing and unfreezing of lay-inferences: effects on impressional primacy, ethnic stereotyping, and numerical anchoring. *Journal of Experimental Social Psychology*, 19: 448-468.

------, and O. Mayseless. 1987. Motivational effects in the social comparison of opinions. *Journal of Personality and Social Psychology*, 53(5): 834-842.

------, N. Peri, and D. Zakai. 1991. Interactive effects of need for closure and initial confidence on social information seeking. *Social Cognition*, 9(2): 127-148.

------, and D. M. Webster. 1996. Motivated closing of the mind: "seizing" and "freezing." *Psychological Review*, 103(2): 263-283.

Manetti, L., A. Pierro, A. Kruglanski, T. Taris, and P. Bezinovic. 2002. A cross-cultural study of the Need for Cognitive Closure Scale: Comparing its structure in Croatia, Italy, USA and the Netherlands. *British Journal of Social Psychology*, 41: 139-156.

Mayseless, O., and A.W. Kruglanski. 1987. What makes you so sure? Effects of epistemic motivations on Judgmental Confidence. *Organizational Behavior and Human Decision Processes,* 39: 162-183.

Richter, L. and A.W. Kruglanski. 1998. Seizing on the latest: Motivationally driven recency effects in impression formation. *Journal of Experimental Social Psychology,* 34: 313-329.

Smith, J. F. and T. Kida. 1991. Heuristics and Biases: Expertise and Task Realism in Auditing, *Psychological Bulletin* 109, No. 3

Taylor, S. E. 1982. The availability bias in social perception and interaction. In *Judgment Under Uncertainty: Heuristics and Biases*, ed. D. Kahneman, P. Slovic and A. Tversky, 190-200. Cambridge, UK: Cambridge University Press.

Tversky, A., and D. Kahneman. 1974. Judgment under uncertainty: Heuristics and biases. *Science*, 185: 1124-1131.

------, and D. Kahneman. 1982. Judgment under uncertainty: Heuristics and biases. In *Judgment Under Uncertainty: Heuristics and Biases*, ed. D. Kahneman, P. Slovic and A. Tversky, 3-20. Cambridge, United Kingdom: Cambridge University Press.

Vermeir, I., P. V. Kenhove, and H. Hendrickx. 2002. The influence of need for closure on consumer choice behavior. *Journal of Economic Psychology*, 23: 703-727.

Webster, D. M., and A. W. Kruglanski. 1994. Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67(6): 1049-1062.

------, A. W. Kruglanski, and D. A. Pattison. 1997. Motivated Language use in Intergroup Contexts: Need-for-Closure Effects on the Linguistic Intergroup Bias. *Journal of Personality and Social Psychology*, 72(5): 1121-1131.