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THE IMPACT OF NEED FOR COGNITION ON PRIMACY AND
RECENCY EFFECTS IN THE EMPLOYMENT INTERVIEW

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
in
Psychology:
Industrial/Organizational

by
Amy Marie Lawton

March 2007

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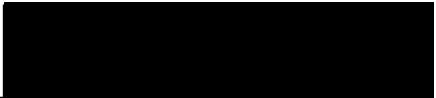
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3/2/2007
Date

ABSTRACT

Using competency-based questions during the employment interview allows for multiple ratings which are specific to a certain knowledge, skill or ability possessed by the candidate. This type of multiple-rating scale increases reliability of interviewer ratings. However, rater biases still occur. The order of interview questions during the interview may influence candidate ratings, giving an unfair advantage to some candidates. This study was done to test the effect of the interviewer's need for cognition, the desire to use cognitive energy, on primacy and recency effects during the employment interview. A transcript of competency-based behavioral description interview questions was given to approximately 300 participants, along with Cacioppo's 18-item Need For Cognition Scale (1984) Evidence was found for recency effects only, and no significant differences were found that could be attributed to the interviewer's need for cognition.

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CHAPTER ONE

INTRODUCTION

Interviews are one of the most common methods of selection within both public and private organizations. Interviews have come to be expected during the selection process for virtually every type of position. "The interview is used almost universally as one of the sources of information on which personnel decisions of hiring, placement, and, in all likelihood, transfer and promotion, are made" (Ulrich & Trumbo, 1965, p. 100). Interviews allow employers to evaluate potential job candidates for communication and interpersonal skills. Interviews also provide an opportunity for employers to assess the organizational fit of each candidate, as well as provide information to the applicant about the company and negotiate salary.

The primary role of the interview, however, is to determine an applicant's suitability for a job with the organization. Unfortunately, since interviewers rate candidates based on their own perceptions of an ideal candidate, a great deal of variability is often found in interview ratings that cannot be attributed solely to the people being interviewed. During the interview process

interviewers create a stereotype of the ideal candidate and compare each actual candidate based on the ideal qualities she or he has pictured (Arvey & Campion, 1982). Each interviewer holds slightly different stereotypes based on what Dipboye calls a "knowledge structure." A knowledge structure consists of each rater's unique combination of education, training, and experience (Gatewood & Feild, 2001). Interviewers carry their own pre-existing assessments of the necessary knowledge, skills, and abilities (KSAs) into the interview, as well as their own ideas about how these KSAs should be presented by the candidates. These biases are likely to be present in the interview even when raters make every attempt to be impartial. Much of the research conducted in the past 50 years about the interview has been about reducing or eliminating these biases.

Structured Interviews

Structured interviews, which require raters to ask the same questions of each candidate, have become widely used as a replacement for the traditional unstructured selection interview during the past several years (Shippmann et al., 2000). Structured interviews greatly improve the reliability of the interview by striving to

provide the same atmosphere to all candidates through a list of standardized questions. Limiting the irrelevant information in an interview greatly reduces the risk of biased ratings. Structured interviews have consistently been shown to be more reliable and valid than unstructured interviewing techniques. Meta-analyses that have compared criterion validity and reliability of the structured interview to the unstructured interview consistently demonstrate that the structured interview is superior on both counts. In addition, the structured interview displays more evidence of content validity (Harel, Arditi-Voget, & Janz, 2003).

Focusing solely on the questions prepared for an interview ensures greater consistency than that found in unstructured interviews. Asking each question the same way to every applicant decreases the chances that an interviewer will provide extra encouragement or hints to some of the applicants and not to others. Structured questions also limit the amount of irrelevant information discussed during the interview. By selecting a group of KSAs to be measured for each candidate, the interviewer(s) will be able to obtain only relevant information about each applicant and ignore characteristics which are irrelevant to the position for which they are applying.

This uniformity in KSAs to be accessed of each candidate is especially important when all candidates for a given position are not interviewed by the same rater. However, this method of structured interviewing is effective only if the set of questions is based on a thorough job analysis.

Competency Modeling

One approach to collecting job information for the purpose of developing structured interviews is through competency modeling. Competency modeling requires framing human resource decisions and processes so that they are based on necessary worker qualities for a given position. Competencies are similar to KSAs in that they are based on the attributes a candidate possesses which allows him or her to perform effectively in a position. Competencies can be described as "the knowledge, skills, and attributes that differentiate high performers from average performers. They are observable, behavioral capabilities that are important for performing key responsibilities of a role or job" (Shippmann et al., 2000, p. 705).

According to a 2000 study by Shippman et al., 75% to 80% of companies surveyed used competency modeling or a similar method in their organization. Some of the human

resource functions that have made use of competency modeling include performance evaluations, performance feedback, training and development, compensation, and of special interest for this thesis, selection (Pearlman & Barney, 2000). Competency modeling, originally used for methods of job analysis, has great potential for continued use in many facets of today's organizations, especially selection. Competencies are becoming an increasingly popular method of linking job tasks to necessary candidate qualifications. Linking competencies to qualifications has a clear benefit for speeding up selection and creating more accurate results (Pearlman & Barney, 2000).

The changing nature and often faster pace of today's work requires a more efficient and streamlined process of accurate employee selection and therein lies one of the appeals of competency modeling. Competency modeling breaks down job requirements into their simplest components based on a thorough job analysis. Each of these tasks can be matched with one or more core competencies. Then the competencies of interest for a given job can be used to develop standard interview questions. This structured method of interviewing ensures that positions at all levels of an organization are evaluated consistently because once necessary job KSAs have been broken into

their smallest components, they can be more readily analyzed. Using only the competencies relevant for each position allows an analyst to create a method of measuring these competencies during the employment interview through corresponding interview questions. Using these competency-based interview questions, the interviewer is able to screen more accurately job applicants for the most qualified candidates, increasing the validity of the interview process.

Using competency-based interview questions is beneficial to both the candidate and the interviewer. When faced with questions which tap into the level of a certain competency, a candidate may be able to answer strongly even if the example provided was based on work done in a completely different position than that for which she or he is interviewing. Allowing candidates to present evidence of competencies, rather than basing interview questions on tasks which the candidates may or may not have completed, turns the focus to a candidate's potential rather than their previous work positions. The rater is able to rate candidates more easily because there is less ambiguity in the rating process; the rater compares candidate characteristics to an agreed upon profile of the ideal candidate for that position (Shippmann et al., 2000;

Warech, 2002). Competency modeling also permits greater distinctions between the qualifications of candidates by eliciting multiple ratings for each candidate, each one specifically linked to a required competency. This use of multiple ratings allows for more accurate comparisons between candidates during the selection process.

Behavioral Description Interviews

Concepts central to competency modeling are also important to the utility of another type of structured interview, the behavioral description interview. Behavioral description (BD) interviews are based on the premise that behavior which candidates have displayed in the past is likely to be displayed in the future (Conway & Peneno, 1999). For example, a candidate who has effectively dealt with a workplace conflict is expected to be more capable of diffusing future conflicts that arise in the workplace than a candidate who was unable to handle professionally a similar situation. The behavioral description interview makes use of the oft quoted adage that "past behavior is the best predictor of future behavior." Proponents of BD are more specific still in that they argue that recent behavior is more relevant in predicting future behavior and that patterns of behavior

measured over longer periods are more important than single incidents in predicting future behavior (Roth & McMillan, 1993).

Behavioral description interview questions essentially ask candidates to present evidence of a time when they showed high levels of a particular behavior or skill. These are more reliable than situational interviews, which ask candidates how they would handle a hypothetical job situation. Behavioral description interviews are based in fact and prevent candidates from presenting ideal solutions during the interview which they would not in fact use. Interviews using BD require candidates to communicate truthful information given that they answer each question based on past occurrences that can be verified by checking with past employers. This method also elicits specific information based on actual events which have occurred, which allows candidates to explain their skills based on their own experience (Barclay, 2001).

The behavior description interview, which requires the use of standardized interviewing procedures, can effectively be used in conjunction with competency modeling. During this type of interview, typically one or two questions are asked per competency, which allows a

candidate to describe a previous experience which illustrates his or her mastery of this competency. Because each person is asked the same set of questions, the interviewer is able to compare similar information for each question. However, as each candidate is able to relate the question to an experience in his or her past, enough specific information can be collected regarding each competency. Since each candidate is able to frame the information based on his or her own experiences, the details are free to vary. This is essential for the explanation of complex situations, where the evidence for the competency being tested is free to emerge, no matter what task the quality was used for (Huffcutt, Conway, Roth & Klehe, 2004).

Some Problems with Interviews

Although the validity of interviews as part of the selection process has improved, there are still inconsistencies which occur during the rating process. Interviews, even when structured, are one of the least consistent methods of evaluating potential employees. Although a few of these problems may never be fully resolved, including such difficulties as mood or lack of

attention, competency modeling can reduce a variety of problems that arise during employment interviews.

Rater bias is one of the main sources of inconsistencies in interview scoring. Since individual interviewers are responsible for rating interviews, human error is always present. One limitation of this method is that raters are more likely to attribute positive characteristics to candidates whom they perceive to be similar to themselves. Referred to as the "similar-to-me" effect, this phenomenon is likely to influence candidate ratings during the interview process, which is likely to affect job offer and salary decisions. The use of multiple ratings in interviews can reduce this effect by focusing the interviewers' attention on specific areas of evaluation. In one study, Baskett (1973) found that when interviewers rated candidates on multiple competencies, they were still likely to rate those candidates who appeared similar to themselves as more competent overall. However, this overall impression did not have a significant effect on the specific ratings of each candidate.

Related to the similar-to-me-effect is the issue of stereotyping. While stereotyping is a common social process in day-to-day life, the transference of

stereotypes to the employment interview can lead to discrimination and possible lawsuits. Often this type of discrimination is not intentional, but still effectively advantages those of a particular gender, race, or age, when comparing multiple candidates' abilities to succeed in various positions within an organization. This discrimination occurs because of stereotypes perpetuated within our society linking persons of given demographics with certain types of occupations and expected behaviors. The use of competencies during a structured interview is an effective way to combat this tendency by again shifting the interviewer's focus to gathering specific types of information which are dependent on the questions being asked.

Primacy Effect

Although competency-based questions mitigate some of the problems which are typically found in interview settings, some inconsistencies in the interview process can still occur. One of these potential difficulties is the primacy effect. The primacy effect causes the first pieces of information collected during an interview to be the ones that have the greatest effect on the overall ratings (Anderson, 1960; Farr, 1973; Springbett, 1958;

Sydiaha, 1961; Webster, 1964). The first few minutes of an interview is when the interviewer collects the most new information from the candidate. Therefore, the candidate qualifications or competencies evaluated first will be weighted more heavily than the other competencies.

Interviewers often make judgments in the early minutes of an interview and evaluate any subsequent information from the candidate in light of that initial impression (Nickerson, 1998). Blakeney and MacNaughton (1971) found evidence of the primacy effect at work. Subjects were required to rate candidates based on multiple types of information, which were the same each time except for the substitution of negative information for the original throughout different parts of the interview. The negative answer was located in a different place in each version. Even though multiple ratings were required for each candidate, a significant correlation was found between the initial rating and the final rating in each condition. Among the most striking examples of the primacy effect, Springbett (1958) found in his study that interviewers had made their decisions for each candidate after only four minutes, even though the interviews were much longer.

Various theories have attempted to explain the primacy effect. The first is that once a single piece of

information has been collected, 'additional pieces are added to it. These new pieces are always given less weight than the first piece since the overall information about the candidate is no longer based on the answer to a single question. Therefore, the information collected at the very beginning of the interview is more influential than if that very same information had been presented later in the interview (Bolster & Springbett, 1961). A second theory is that interviewers simply pay more attention in the beginning of an interview and then lose focus. When this occurs, the primacy effect results because later information is, in effect, ignored. This explanation may be referred to as the "attention decrement hypothesis" (Steiner & Rain, 1989). The attention decrement hypothesis is in line with the Blakeney and MacNaughton (1971) study, where evidence was found that interviewers were less receptive to additional information toward the end of an interview. A third line of reasoning behind the primacy effect called the "consistency hypothesis" has also been proposed by Steiner and Rain (1989). The consistency hypothesis states that once people create an initial impression toward a candidate they do not want to undergo the mental work associated with changing this opinion. Instead of changing this generalized impression toward the

candidate, they instead change their perception of the new information being presented to them. In other words, interviewers stick with the schema they formed at the outset, which they view as a stable representation of the candidate, and fit information collected later into their already existing schemas (Steiner & Rain, 1989).

Unfortunately, no study has been able to definitively confirm one of these three theories. Most likely there are multiple causes for the primacy effect.

No matter the cause, it is clear that the primacy effect can have a significant effect on the ratings of applicants in the interview. Typically during a structured interview a given set of questions is asked in a fixed order. Due to the primacy effect, if two candidates are both strong on different competencies, the candidate who is strong on the competencies first asked during the interview is more likely to be rated higher than the candidate who is strong on the competencies which are tested later. Conversely, if negative information is presented early in the interview, a candidate is unlikely to receive high overall ratings for the interview (Johns, 1975). Further, if positive information is revealed about a candidate early in the interview, the candidate is more likely to be rated highly overall, even if negative

information was revealed later in the interview (Webster 1964). Blakeney and MacNaughton (1971) found such results for the saliency of early negative information. Their findings showed a strong impact on overall ratings for negative information uncovered early in the interview. Although competency modeling can combat some of the problems of the interview (i.e., inconsistency in questions asked), competency modeling is not fool proof. Competency modeling is reliant on the premise that each competency is rated separately for each candidate. However, due to the primacy effect, an interviewer is already likely to be biased in ratings after a candidate has been evaluated on the first few competencies. The influence of the primacy effect causes raters to judge a candidate's overall interview performance on a limited number of competencies because an opinion of the candidate is already formed during the first few questions of the interview. This result is similar to giving the candidates one overall score, which contradicts the main principles of competency-based modeling in the interviewing process.

It can be argued that the primacy effect by itself may not be strong enough to affect overall interview ratings, especially if the interviewer is focused on the multiple ratings required during the competency modeling

process. Although the primacy effect seems evident, constant evaluation of new information should theoretically be able to counter this effect. However, when considering the primacy effect in conjunction with confirmation bias, the occurrence of biased ratings seems unavoidable.

Confirmation Bias

Confirmation bias is the unconscious framing of new information in such a way that it remains consistent with previously held beliefs. Typically, interviewers will pay more attention to, and weight more heavily, information which is consistent with their beliefs about a candidate. The evaluation which has been formed about a candidate is not only averse to change, but continues to bias new information revealed during the interview process (Sackett, 1982). This opinion of the candidate is held strongly, even when new evidence is presented which counters this impression. Confirmation bias often occurs in cases where interviewers are doing their best to remain objective. However, it is almost impossible to remain completely objective during the interview process. Even if one doesn't have an opinion before an interview begins, a small piece of information given in the first few minutes

can be very influential and once a mind is "made up," it can be hard to change that mind set. Unfortunately, the confirmation bias is a difficult construct to test.

Recency Effects

Although primacy effects have been shown to have significant effects on the interview rating process, recency effects cannot be ignored. Recency effects occur when the information presented last during an interview is weighted more heavily in the interviewer's mind than any of the information presented previous to that point. This effect may occur because this is the information which is easiest to remember. Recency effects are most likely to affect interview ratings when no strong primacy effect has already influenced the interviewer in his or her overall impression of the candidate, or when interviewers are warned not to make decisions regarding the candidates until the end of the interview (Steiner & Rain, 1989). It has also been theorized that both primacy and recency effects can occur during the same interview, which cause information presented at both the beginning and the end of the interview to have a greater effect on the overall rating than the information presented during the middle.

Stewart (1965) asked subjects to make assessments of an individual based on a series of informative statements. When subjects were asked to rate the individual after each piece of information was provided, they were more likely to show a recency effect. In the Carlson (1971) study, which required nine ratings of hypothetical job applicants, with an additional piece of information added each time, raters exhibited a recency effect when negative information was presented after positive information. It has been shown that recency effects may be more likely to occur after the presentation of negative (as opposed to positive) information. London and Hakel (1974) found that raters were more likely to assign a negative overall rating to candidates who provided positive information followed by negative information.

Farr (1971) revealed that the order of information can produce significant effects in interview rating. Specifically, those candidates who presented positive information toward the end of the interview were more likely to receive higher ratings than those who presented the same information earlier in the interview. This occurred even though interviews were set up in such a way that multiple ratings were given to each candidate. Although Farr's study did not use a competency modeling

approach, his method of interviewing was similar to competency modeling-based interviews in that each competency was scored separately for each candidate. One might then assume that superior answers presented toward the end of an interview have the potential to inflate an overall rating or be rated more highly than if those same answers had been provided earlier in the interview. Based on these results, the testing of recency effects in the interview is necessary, along with testing for primacy effect. However, primacy and recency effects are not equally likely to occur in every situation. Characteristics of the interviewer may cause variation in the strength of primacy and recency effects.

Need for Cognition

Need for cognition is a personal quality which can be described as a willingness to engage in cognitive effort for enjoyment. Those who possess a high need for cognition are more likely to seek out work and leisure activities which require a greater amount of analysis and effort. "Individuals high in need for cognition are characterized generally by active, exploring minds and, through their sense and intellect, reach and draw out information from their environment" (Dudley & Harris, 2002). Need for

cognition also provides an explanation for individual differences in information processing and decision making. Those individuals with high levels of need for cognition are more likely to continue seeking and evaluating information during decision-making beyond the amount of time which others are willing to commit to this process. Individuals high in need for cognition prefer to wait until all relevant information has been collected rather than risk making a premature decision.

Individuals low in need for cognition, on the other hand, are more likely to choose activities which require less effort and can be learned easily. They do not often spend time analyzing information when they feel a decision can quickly be reached. "Individuals low in the need for cognition should be more likely to confirm an erroneous expectancy about a target individual because they have a greater tendency to rely on the information they are provided with rather than engage in effortful, evaluative processing of the target's true behavior" (Dudley & Harris, 2002).

Though a relatively new concept, the early research suggests that the need for cognition may be an important individual difference in decision making. Levin, Huneke, and Jasper (2000) illustrated the impact of need for

cognition on the quality of decision making. Levin et al. (2000) compared students with a low need for cognition to those with a high need for cognition. The study required the students to gather information to make a decision about a computer. Those students with a high need for cognition were better able to focus on relevant information and were more likely to make a more accurate decision than those with a low need for cognition. The need for cognition construct seems to illustrate an important difference which may naturally occur between raters.

Rationale for this Study

Taking the literature on primacy, recency, and need for cognition together, I expect to find that interviewers with a high need for cognition are less likely to commit errors in rating due to primacy or recency effects during the interview process. These individuals will evaluate information based on responses to each question before generating a final overall evaluation for each candidate, and therefore, will be more open to information which others may ignore. Raters who can be characterized as having a high need for cognition are more likely to abstain from making a final decision until all information

has been collected. Interviewers with a lower need for cognition, on the other hand, are more willing to make decisions prematurely rather than remaining in a state of indecisiveness. These interviewers are more likely to be influenced by a primacy effect, generating a general impression about a candidate's overall performance within the first few minutes.

Hypotheses

Hypothesis 1: Participants presented with superior interview answers first will rate the subsequent control items (i.e., average responses) higher than control items presented before the superior answers (testing primacy effects).

Hypothesis 2: Participants presented with superior interview answers last will provide an overall rating for the candidate that is higher than the competency ratings of the average answers that preceded the superior answers (testing recency effects).

Please see Figure 1, for the predicted ratings for participants who receive the superior answers first (Group A), and Figure 2, for the predicted ratings for participants who received the superior answers placed in the middle of the answers to responses (Group B).

Hypothesis 3a: Participants with a high need for cognition will be less likely than a participant with a low need for cognition to show primacy effects in their candidate ratings when the superior answers are located in the beginning or middle of the interview and will be less likely to show recency effects in their candidate ratings when the superior answers are located at the end of the interview.

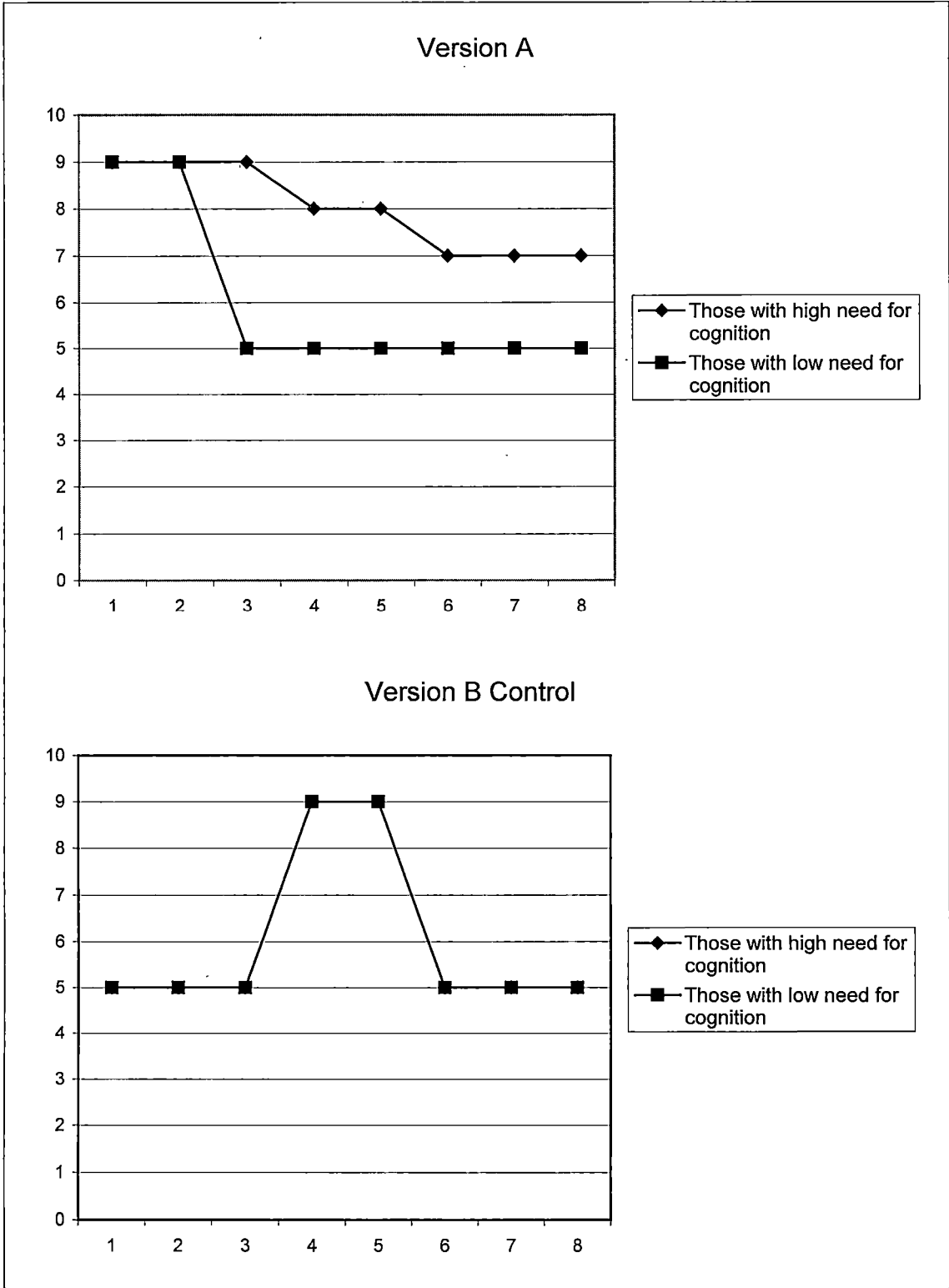


Figure 1. Predicted Ratings Due to Primacy Effect

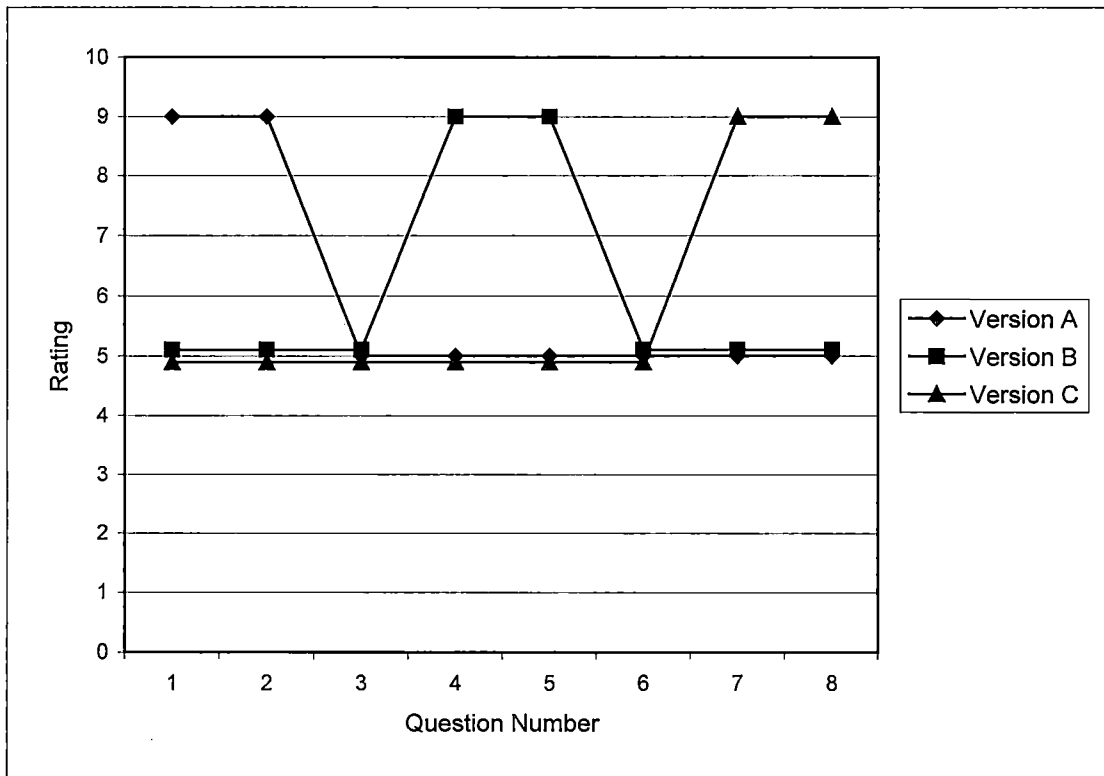


Figure 2. Predicted Ratings for Those with High Need for Cognition

Hypothesis 3b: Participants with a low need for cognition will be more likely than a participant with a high need for cognition to show primacy effects in their candidate ratings when the superior answers are located in the beginning or middle of the interview and will be more likely to show recency effects in their candidate ratings when the superior answers are located at the end of the interview.

A profile of the predicted means for this hypothesis is shown in Figure 3.

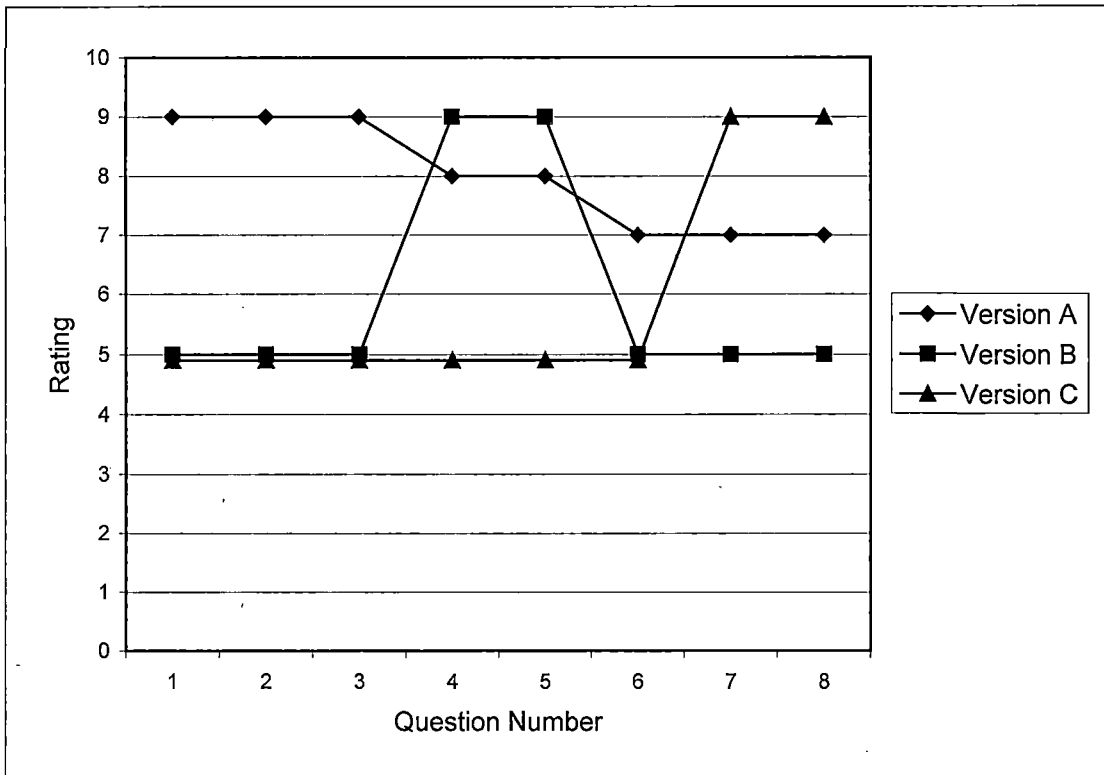


Figure 3. Predicted Ratings for Those with Low Need for Cognition

CHAPTER TWO

METHOD

Sample

All participants were recruited from undergraduate psychology classes. Surveys were collected from 307 participants. Following data screening, 245 cases remained: 79 people were in Group A (testing for primacy effect), 75 people were in Group B (used as the control) and 91 people were in Group C (testing for the recency effect).

Design and Procedure

Participants read a written transcript of an employment interview for Candidate M, which consisted of eight competency-based behavioral description interview questions (see Appendix A). The same interview question and corresponding answer were used each time, but the order was manipulated such that superior answers appeared in three different positions during the interview, depending on the version. In the first version the questions with the superior answers were positions 1 and 2 of eight competencies (Order A). In the second version they were moved to position 4 and 5 (Version B). Version B was intended primarily to serve as a control or baseline

for comparison. The superior answers were the last two answers in the third version, questions 7 and 8 (Version C). Please see Table 1. These three versions will be a between subjects design; each participant will receive one version (A, B, or C).

Table 1. Competency Order by Group

Group A	Group B	Group C
Presentation Skills	Self Management	Self Management
Continuous Learning	Attention to Detail	Attention to Detail
Self Management	Analysis and Problem Solving	Analysis and Problem Solving
Attention to Detail	Presentation Skills	Handling Conflict
Analysis and Problem Solving	Continuous Learning	Informing
Handling Conflict	Handling Conflict	Using Technology
Informing	Informing	Presentation Skills
Using Technology	Using Technology	Continuous Learning

The set of interview questions were presented so that only one question was listed on each page, along with a definition of the competency being tested and the candidate's response. The participants were instructed to read each question-answer set, rate it, and move on to the next without rethinking previous answers. Each competency was rated individually on a scale from 1 - 9 (1 = failing,

3 = poor, 5 = average, 7 = good, 9 = superior). The participants were to assign the candidate an overall rating on the same scale of 1 - 9, and indicate their willingness to hire this candidate to work for them (yes or no).

To set baseline answers for each interview question I consulted with 12 subject matter experts (SME) from a large school district in Southern California. These SMEs were all Human Resource Specialists. They were selected because they work daily with competency based interview questions. After some modifications, multiple consultants had rated each of the control interview answers as a 5 out of 9 and the two superior competency answers as an 8 or 9 out of 9.

After completing the interview protocol, all participants filled out the 18-item Need for Cognition Scale (Cacioppo et al., 1984). The Need for Cognition Scale (shown in Appendix B), though it has been validated, is one of many possible approaches to assess this construct. Because of the central importance of Need For Cognition to this study, an additional measure was created by the author which consisted of items that asked respondents to recall important parts of the interview answers. Please see Appendix C, Interview Recall. One

question was presented for each competency. Half of these questions required participants to "fill in the blank" based on their memory of the candidate's answer and the other half of the questions were multiple choice. This measure was taken after all other parts of the survey had been completed and returned to the researcher.

CHAPTER THREE

RESULTS

Data Screening

Surveys were collected from 307 participants. The first part of the survey created variables of presentation skill, continuous learning, self management, attention to detail, analysis and problem solving, handling conflict, informing, using technology, and an overall score. The value for each competency was entered as its own variable. The items on the Need for Cognition scale were entered to evaluate the scale for reliability and then a summed score was created. Please see Appendix B for the Need for Cognition Scale items, including those items which were reverse scored. The eight Interview Recall questions measuring the subjects' memory of the competencies were each entered separately as right (y) or wrong (n). These items are listed in Appendix C, Interview Recall.

Data screening eliminated subjects who left unanswered questions during any part of the survey, as well as those who answered three or more of the Interview Recall questions incorrectly. Most of the variables showed no significant outliers. There were slight positive skews for the variables of presentation skill and continuous

learning. Rather than using transformations, which would make direct comparisons between competencies difficult, I chose to delete cases which contained the most extreme outliers for these variables. All other variables were normally distributed and no variables had significant kurtosis. After deleting the outliers and cases missing data, 245 cases were retained for further analysis: 79 people were in Group A (Version A, testing for primacy effect), 75 people were in Group B (Version B, used as the control) and 91 people were in Group C (Version C, testing for the recency effect). Please see Appendix D, Descriptive Statistics, for the means and standard deviations of the ratings of the eight competencies by condition.

Analyses

Hypothesis 1

In Hypothesis 1, I predicted that participants presented with the superior interview answers first would rate the control items immediately *following* those superior answers higher than the control items presented *before* the superior ones. Using the collected data, I looked for a significant between-subjects effect for the rating for item (competency) 3, self-management, due to

version. I used the ratings for the competency of self-management because this competency was placed immediately after the superior items in Version A, but before the superior items in Versions B and C. I contrasted the ratings of the competency presented third (self-management) for each group to check for a primacy effect and found a significant difference between the self management score in Group A and the same competency score in Groups B and C ($F(1, 242) = 7.719, p = .006, \text{partial } \eta^2 = .031$). However, contrary to expectation, participants in Groups B and C rated this competency higher ($M_n = 6.53$ and 6.51 , respectively) than those in Group A ($M_n = 5.94$), which suggests evidence for a contrast effect but does not support the hypothesis of a primacy effect. According to my hypothesis, the rating for the group who received Version A of the survey should be higher overall than the other two groups because those in Group A had been exposed to the superior competencies immediately prior to the self management competency while the other groups had not.

Hypothesis 2

To test Hypothesis 2, I compared Group C's six control competencies (i.e., ratings to the first six competencies which were "average" responses) to the overall rating to test for a recency effect. There was a

significant difference between at least two of the dependent variables within the ratings (Wilks' $\lambda = .453$, $(6, 85) = 17.104$, $p < .05$, partial $\eta^2 = .547$). An examination of the simple mean effects shows that participants in Group C gave significantly higher ratings at the beginning and end of the control variables, as well as on the overall score. When responses to the six competencies were averaged and directly compared, using a contrast, to the overall score, there was a significant difference between the averaged competency scores and the overall score ($F(1, 90) = 69.986$, $p < .05$, partial $\eta^2 = .437$). This result supports Hypothesis 2, that Group C would provide higher overall ratings relative to their ratings of the average competencies; in Version C, the superior answers were placed directly before the overall rating request.

Please see Figure 4, Version C: Control Scores and Overall Score, for a graphical representation of the individual means. As shown in Figure 4, the average scores for the first five competencies are lower than the overall score, which is shown last. Although the first six competency ratings shown are the control items, the last control competency mean is visibly higher than the other scores, including the overall score. This result mitigates

somewhat the interpretation that the overall score represents a consequence of the recency effect as the sixth competency was an "average" response and appeared before the superior answers (Competencies 7 and 8).

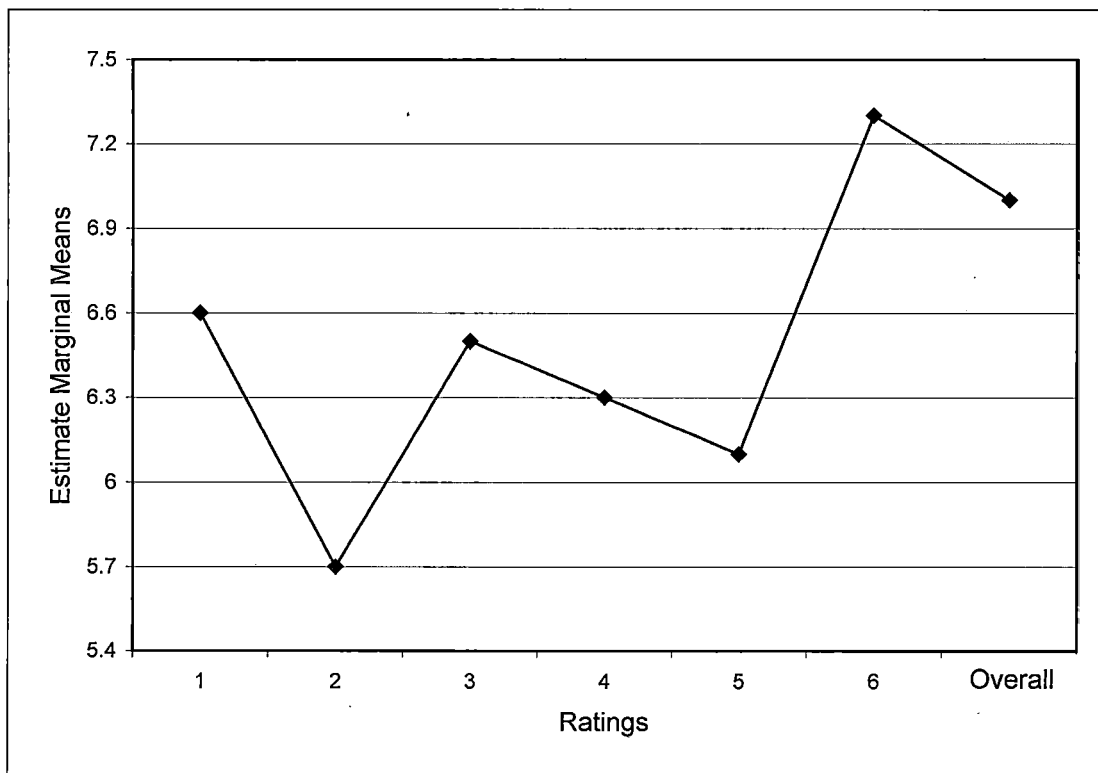


Figure 4. Participant Ratings for Group C

Hypothesis 3

To test for differences in competency ratings between need for cognition groups, I analyzed the data using multiple analysis of variance with a split of the sample on the basis of the need for cognition variable. I employed an extreme groups split for those high and low in

need for cognition, keeping those in the top and bottom 35%. A 35% split was employed because a median (50-50) split does not typically provide for much differentiation in the middle range of scores on the criterion variable. Also, there is some evidence that there is additional power in the analysis of extreme groups (cf., Preacher, Rucker, MacCallum & Nicewander, 2005). This split left 169 final cases to analyze; the item mean for the high need for cognition group was 4.02 and for the low need for cognition group was 3.04 (on a 5-point scale).

First I analyzed those in Group B, consisting of 23 participants scoring low in need for cognition and 30 participants with high need for cognition. Since the sample sizes were unequal, Box's Test of Equality of Covariance Matrices was calculated which showed that the covariances were similar across groups ($F(21, > 1000) = 1.17, p > .05$). To check for a primacy effect, I compared the first three control competencies, which in Version B are presented before the superior competencies, to the last three control competencies, which are presented after the superior competencies. There was not a significant between-subjects effect in overall scores between those in the high need for cognition group and those in the low need for cognition group,

$F(1, 50) = .845, p > .05$. The overall mean, across all competencies, was 6.31 for the high need for cognition and 6.67 for the low cognition group.

There was a significant within subjects effect between the first set of control competencies and the last set of control competencies (Wilks' $\lambda = .694, F(4, 202) = 10.125, p < .05, \text{partial } \eta^2 = .167$). The second group of control competencies was rated higher than the first group of competencies, which generally supports the notion of a primacy effect. Please see Figure 5, Scores for Competencies 1, 2, and 3; Figure 6, Scores for Competencies 6, 7 and 8, to view a pictorial representation of the participants' ratings. See also Table 2, Means of Control Items for Group B, for a list of these means.

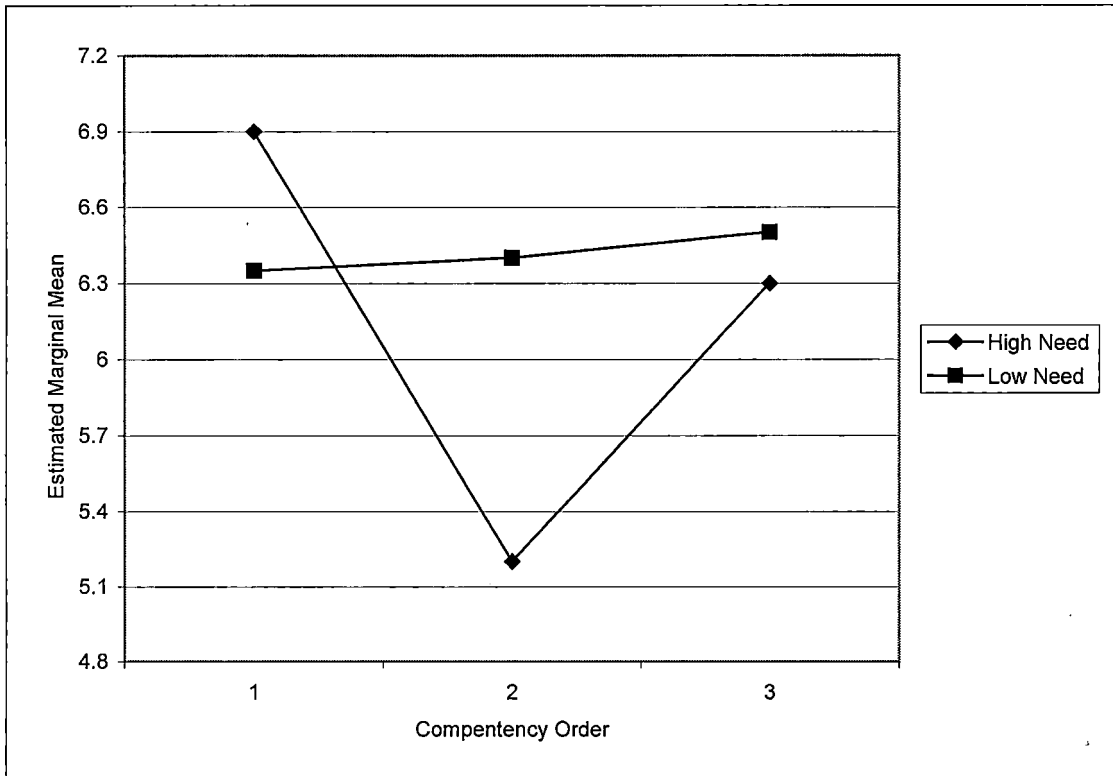


Figure 5. Participants' Scores for Competencies 1, 2, and 3, Presented Before the Superior Answers Still Need a Graph of the Before and After Means Collapsed across the Need for Cognition; also, the Legends are not Sufficiently Complete

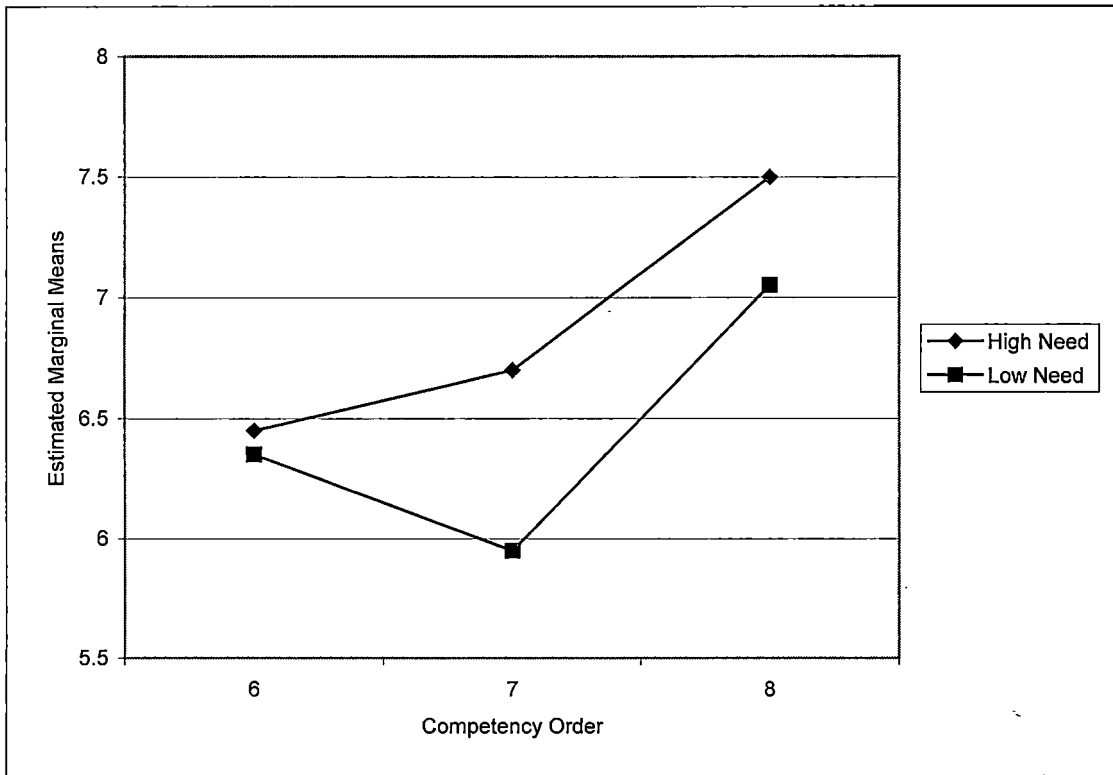


Figure 6. Scores for Competencies 6, 7, and 8, Presented after the Superior Answers

Table 2. Means of Control Items for Group B

Competency	Need for Cognition	Mean
1	Low	6.35
	High	6.90
	All	6.66
2	Low	6.39
	High	5.20
	All	5.72
3	Low	6.52
	High	6.37
	All	6.43
6	Low	6.48
	High	6.37
	All	6.42
7	Low	6.74
	High	5.93
	All	6.28
8	Low	7.57
	High	7.07
	All	7.28

The means of control competencies 1 (Mn = 6.624), 2 (Mn = 5.796), and 3 (Mn = 6.444) are lower than the means of control competencies 6 (Mn = 6.422), 7 (Mn = 6.336), and 8 (Mn = 7.316).

When separated by need for cognition I found that those with a low need for cognition consistently rated the

candidate higher on average for each of the competencies, and also had a higher standard of error for each competency, which can be seen in Table 2. Conversely, those with a high need for cognition showed a slightly lower average rating for each competency, but had a smaller range of scores. There was an interactive effect for the ratings of the first three competencies by need for cognition ($F(2, 102) = 6.68, p < .05, \text{partial } \eta^2 = .118$), but not for the last three competencies ($F(2, 102) = 1.53, p = .22$). Please see Figures 5 and 6.

Next, as another way to analyze for the primacy effect, I looked at the ratings for Group A. After executing an extreme groups split for those with high and low need for cognition, keeping those in the top 35% and bottom 35%, 27 participants remained in the low need for cognition group and 25 people in the high need for cognition group, for a total of 52. To check for primacy as a between-groups effect I compared the first two control competencies (ratings 3 and 4) to the last two (ratings 7 and 8). In this case the first two control competencies are presented immediately after the superior competencies while the last two control competencies are positioned at the end of the competencies. In Group A there was a significant within subjects effect, Wilks'

$\lambda = .771$, $F(4, 49) = 7.259$, $p < .05$, partial $\eta^2 = .229$, meaning that across need for cognition groups, there was a difference in the ratings immediately following the superior ratings and the last control ratings. Means for the first two competencies were 5.803 and 5.238 (averaged = 5.576); for the last two competencies the means were 6.061 and 6.987 (averaged = 6.475).

There was not a significant between-subjects effect in averaged scores between those in the high need for cognition group and those in the low need for cognition group, Wilks' $\lambda = .921$, $F(4, 49) = 2.108$, $p = .132$, nor was there a significant interactive effect of the need for cognition by ratings, Wilks' $\lambda = .984$, $F(4, 49) = .407$, $p = .668$.

Last, to assess for recency effects by need for cognition, I analyzed the results from Group C, again splitting the sample into high and low need for cognition groups. Using the same extreme groups split, I kept 33 low need for cognition subjects and 31 high need for cognition participants for Version C. As stated before, there was statistically significant evidence for the recency effect in the comparison of the six control ratings with the overall rating (Wilks' $\lambda = .525$, $F(1, 62) = 56.089$, $p < .001$, partial $\eta^2 = .475$). Although participants in

both groups showed significant recency effects, those in the high need for cognition group scored Candidate M lower for all control items, $F(1, 62) = 5.57, p < .05$, partial $\eta^2 = .08$, with those in the high need for cognition group assigning an average of 6.29 to the six control items and the low need for cognition group assigning scores which averaged 6.93 for the same control items. There was no interactive effect; those with high need for cognition gave lower ratings than those with a low need for cognition to both the control responses and the overall rating. Both those with high need for cognition and those with low need for cognition exhibited a recency effect.

CHAPTER FOUR

DISCUSSION

For the first hypothesis, I predicted that participants presented with the superior interview answers first would rate the subsequent control items higher than if the control items had been presented before the superior ones. Upon comparing the score for self management in Group A, which was presented directly after the superior items, to the score of that same item in Group B and Group C, in which the self management competency came before the superior items, I was unable to support this prediction. If self management was scored higher by Group A than it was for Group B and C, there would have been evidence for the primacy effect. Support was found for my second hypothesis, that participants in Group C, who were presented with superior interview answers last, would provide a higher overall rating for the candidate than would be predicted by taking the average score of each individual competency. By comparing the Group C participants' average responses with their final overall scores of the interviews, I found sufficient evidence of a recency effect. This result is consistent with Carlson's 1971 study, in which he

concluded recency effects could be found when substituting either positive or negative information during the final part of a simulated employment interview. In this study the presence of a recency effect means the Group C candidates were strongly influenced by the superior answers placed at the end of the interview, which prompted them to rate the candidate higher than one would expect based on the overall average of the eight interview scores.

As the third hypothesis I predicted that participants with a high need for cognition would be less susceptible than participants with a low need for cognition to making such rater errors as being swayed by primacy and recency effects. To create these two groups I used an extreme groups split, which included the highest 35% of performers on the Need for Cognition Scale and the lowest 35% of performers. In comparing the ratings for participants who scored high in need for cognition to the ratings of participants who scored low in need for cognition, I was unable to find a significant difference between the need for cognition groups for presenting a primacy or a recency effect.

However, I found a significant difference in the average rating of control items between high and low need

for cognition groups which did not conform to my prediction. Participants with high need for cognition rated competencies lower than did participants with a low need for cognition. Please see Appendix D for means. Participants with high need for cognition also showed a pattern of lower standards of error for each competency. In effect, participants with high need for cognition in each group more effectively centered their ratings, while those with low need for cognition showed greater variability in ratings.

The greater range of scores provided by participants who were low in need for cognition implies greater error as these scores were not as tightly centered around the mean for each competency, while the lower standard of error for the high need for cognition group suggests a greater consensus based on the information provided. This finding has important implications regarding the ability of those with high need for cognition to make accurate evaluations. Past literature also reflects this pattern. Levin & Huneke (2000) suggest that those with high need for cognition make more informed decisions based on the information provided by processing the information more extensively. Dudley and Harris (2002) explained that people who are high in need for cognition are more likely

to evaluate a target person's behavior, rather than rely solely on the information given to them. Although support was not found for my third hypothesis regarding need for cognition, need for cognition had a significant effect on the ratings provided by the participants.

One possible reason for the lack of support for the first and third hypotheses is that participants may have responded differently to the transcript of a hypothetical interview than an employer would to a more realistic interview setting. First, although I used a third measure to test for participants who did not pay close attention to the interview questions, effectively ruling out those who were merely circling random answers, my participants probably did not have the same motivation for accurately scoring Candidate M because their selections would not impact their place of work. If this interview had occurred in a workplace setting, the interviewer would have a greater incentive to try to read the candidate transcript based on the limited amount of information presented during the interview.

Another possibility is that the participants simply felt they were not given enough information in each limited response with which to create a strong schema regarding the hypothetical candidate. Actual competency

based interview questions may require a longer answer than was presented in my study to respond to the interviewer completely. The lack of additional nonverbal and verbal information may have prevented the establishment of a strong preconception of the candidate during the beginning of the interview, preventing the primacy effect from influencing the scoring of the control items. Also, the availability of such nonverbal cues as eye contact, facial expression, and body movements, as well as tone of voice could create stronger primacy effects in interviewers because they have been given more information with which to create a judgment. This issue may be especially important in consideration of the need for cognition variable. By definition, the need for cognition compels people to seek out more information, which would not have been possible in this experiment. In fact, an argument might be made that these overall results suggest support for the need for cognition construct; those with high need for cognition may have been reluctant to give high ratings based on the small amount of information provided. Perhaps the elevated ratings for the last of the competencies indicated recognition that there would be no more information to be had.

Another consideration is that a substandard response, rather than a superior response, may have been more likely to create a primacy effect which would affect the scores of the control items. In Steiner and Rain's 1989 study, a recency effect was found in performance evaluation scores when negative information was presented last. Blakeny and MacNaughton (1971) discovered primacy effects when negative information was presented during the first third of the interview. Negative information was not used in this study because loss of interest by the participants was anticipated in response to less than average responses. Follow up studies should be done to test for the use both positive and negative information to induce primacy and recency effects.

The use of written information itself could also have had an effect on the interview ratings. Rashotte (2003) suggests in her study that raters use different pieces of information when evaluating others based on whether they were provided with the information in written form or presented by individuals in a videotape. Arvey and Campion (1982) found that interviewers more often assigned negative ratings to interview candidates who they had met face-to-face, as opposed to those who provided only written information. One other possibility to consider is

that the superior answers were not stated strongly enough for the primacy effect to be detected. Although the superior items were analyzed by professional subject matter experts, they may have been interpreted differently by the students, which is a different population. The provision of a few practice interview question-answer sets may have produced more consistent ratings, which in turn may have led to stronger primacy effects. Comparably, providing frame of reference (FOR) training, which focuses raters on gathering work-related information and provides set standards with which to evaluate it, has been demonstrated to yield more accurate ratings of work performance (Schleicher & Day, 1998).

On the other hand, it's possible that these results were obtained for a different reason. One possibility is that the primacy effect did not occur because a written interview creates less rater bias than does an in-person interview. Although some information such as nonverbal cues is lost, this may allow interviewers to focus solely on the information presented to them. If this is the case, then one possible advisement is for interviewers to ask job candidates to respond to interview questions in writing. However, it will still be necessary to prevent unequal treatment of candidates by using precautions which

are similar to in person, structured interviews. For example, it would be important to ensure that candidates are tested under the same conditions. Specifically, each candidate should be given the same amount of time to answer the same questions. Further, organizations would be wise to continue to bring candidates in to write out their interview answers so that they are not tempted to resort to the help of others or of the internet rather than relying on their own experiences.

However, some problems would still occur with written interviews. While some are unable to communicate effectively in oral interviews, some are equally unable to communicate effectively in writing. Although many positions require writing skills, it would be unfair to evaluate candidates on their writing ability if this is not an essential competency for the position for which they are applying. A third possibility of audio interviews would prevent some rater biases that often occur. For example, "similar to me" biases and biases based on stereotypical information would be lessened. An audio recording of the interview would also allow answers to be revealed to the raters in different orders, weakening any possible primacy or recency effects.

Follow up studies could help determine the overall effectiveness of written interviews. For example, it may be practical to include one version of superior answers and one version for inferior answers when testing the primacy effect. Negative information tends to be more salient than positive information and may elicit more evidence of either a primacy or recency effect. Also, it might be useful to administer one version of interview answers to a group of subjects during a written interview and to then administer the same version as an in-person interview to another group of subjects. To compare raters to a set standard, it would be wise to include a scripted superior, inferior, and/or average answer to the interview as is done in FOR training. Last, it may be most effective to make the participants think they are actually making hiring decisions for an organization to duplicate real life circumstances. This would lead the participants to believe that they would have the possibility of working with the candidate if he/she is rated highly during the interview.

In summary, there is more work to be done to improve the accuracy of interview ratings. Although there is an increased reliability with structured interviews, rater biases still occur. Competency modeling is becoming an

increasingly popular tool for selection, as well as performance appraisals, and training and development. Continued studies should continue to increase our knowledge about decreasing errors in rating which typically occur during interviews. Written interviews may become a popular tool for their ability to reduce some sources of rater bias.

Conclusion

In conclusion, although competency-based questions are more reliable in interview settings, order of interview questions during the interview can influence candidate ratings. A transcript of competency-based behavioral description interview questions was given to approximately 300 participants, along with Cacioppo's 18-item Need for Cognition Scale (1984). Evidence was found for recency effects only. Although significant differences were not found due to Need for Cognition, further studies may be able to provide additional information about the effect of rater personalities on candidate interview scores.

APPENDIX A
INTERVIEW TRANSCRIPT

Interview Transcript

Analysis and Problem Solving

Definition of Competency: Breaks down problems into components and recognizes root causes. Generates a range of alternative solutions and courses of action with benefits, costs, and risks associated with each.

Interviewer: Tell us about a time when you had to solve a problem without the help of a boss or coworker in order to finish an assignment.

Candidate: There was a time when two sources provided conflicting information for a report I was given little time to complete. First I called both sources to check their facts, including their sources for this information. Next I contacted a third party who was able to clear up the discrepancy. I was able to get the information quickly and finish the report in time.

*Continuous Learning

Definition of Competency: Develops knowledge, skills, and abilities that are presently needed in his/her job. Attends training and/or seeks out external information beyond that which is required for the position. Anticipates future needs of the organization and pursues related learning.

Interviewer: Give us an example of something you have done to keep up with new information in your field.

Candidate: I regularly spend time researching new developments in my field in order to make sure I'm aware of new equipment and procedures. Once I brought a set of articles to my boss because I thought they would increase our productivity. My boss asked me to give a 30 minute presentation of this information to the others in the office, and we recently began implementing part of this procedure.

Using Technology

Definition of Competency: Is proficient with the equipment and computer applications used on the job, including how to use advanced features. Finds ways to apply technology to tasks to increase speed, quality, or create new capabilities.

Interviewer: Tell us about a project you completed which required the use of a computer.

Candidate: Every few months I have to write a summary report for the office including information about clients, services, and expenses. I use Word to summarize the information and Excel to create charts with numeric information. These reports are used to keep our boss informed of our status.

Attention to Detail

Definition of Competency: Shows a high level of care and thoroughness in handling the details of the job. Checks work to ensure completeness and accuracy. Makes few if any errors.

Interviewer: What methods do you use to ensure that you do not make careless mistakes with your work?

Candidate: I always look twice to make sure my reports don't contain errors. If I have to turn in a report to my boss I usually ask someone else from the office to read through it first to make sure there are no typos.

Informing

Definition of Competency: Ensures that information is conveyed effectively among coworkers.

Interviewer: How have you ensured that coworkers understand complicated messages that you have given them?

Candidate: I make sure I speak clearly when I give them the information and afterward I ask if they have understood.

Self Management

Definition of Competency: Prioritizes tasks with respect to importance and deadlines. Adjusts priorities as situations change. Utilizes sound methods to plan and track work and appointments. Clusters related tasks to increase efficiency. Initiates steps to improve personal organization and efficiency. Consistently meets deadlines.

Interviewer: How have you organized your work during periods of high stress?

Candidate: There was a time when I had to finish four large projects all within the same five week period. I created a calendar of due dates for various projects and kept working on them until they were done.

***Presentation Skills**

Definition of Competency: Delivers clear messages which includes the right amount of information. Varies type of presentation to fit the purpose of the audience. Uses method of presentation in order to effectively convey information to audience.

Interviewer: Tell us about presentations you have given for work. How did you ensure that these presentations were effective?

Candidate: At one point I was responsible for presenting significant changes in service to the parents of our students. I prepared an attention-grabbing power point presentation with the most important information and also sent the parents home with a hand out of the basic changes. I made sure the parents were able to understand how they and their children would be affected.

Handling Conflict

Definition of Competency: Deals with interpersonally and/or politically challenging situations calmly and diplomatically, diffusing tension. Handles disputes with composure and tact. Facilitate communication in order to resolve conflict.

Interviewer: How have you handled a tense situation with a coworker at the workplace?

Candidate: There is one employee in the office who is not easy to work with. One time she accused me of taking something of hers from her desk. I told her that I hadn't been by her desk that day and I pulled out my desk drawers to show her I didn't have what she was missing. Since then there haven't been any problems. I try not to talk to her unless except for when I need to ask her something that is work-related.

Overall Rating

What overall rating would you assign this candidate?

* Indicates superior answer. All others are average.

All competency definitions in this measure were adapted from the Unknown Author as part of the information provided by the Los Angeles Unified School District.

APPENDIX B
NEED FOR COGNITION SCALE

Need For Cognition Scale

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 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.*
9. I like tasks that require little though 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.

* Indicates that item must be reverse coded.

Appendix B adapted from Caccioppo 1984

APPENDIX C
INTERVIEW RECALL

Follow-Up Questions

Please answer the following eight questions to the best of your recollection.

1. Who did the candidate call to clear up a problem with conflicting information from different sources?
 - A. His or her boss
 - B. His or her sources of information
 - C. The other coworker with whom this candidate was completing the project.
2. What was the end result of the candidate's example for the continuous learning question?
 - A. The candidate was given a certificate of completion which he/she brought to the interview
 - B. The candidate's idea was implemented at his or her company
 - C. The candidate was given a raise for taking the course because he showed initiative
3. Which computer programs did the candidate specify using in his or her previous job?
4. How does the candidate check for errors in his or her work?
 - A. By looking at each document twice to check for errors
 - B. By asking another coworker to proofread his documents
 - C. By using advanced proofreading software
5. How does the candidate ensure that coworkers have understood him/her when providing them with information?
 - A. By following up with the coworkers the next day.
 - B. By speaking clearly and asking if they have understood
 - C. By following up with an email summarizing his points
6. What main tool did the candidate use to organize his or her work?
7. To whom was the candidate responsible for making a power point presentation during a previous job when a change in service was required?
8. How did the candidate resolve the conflict when a coworker accused him/her stealing something that belonged to the coworker?

APPENDIX D
COMPETENCY MEANS

Competency	Version	Need for Cognition	Mean	Standard Deviation	N
Presentation Skills	A	Low	6.63	1.363	27
		High	7.12	1.333	25
		Total	6.87	1.358	52
	B	Low	7.7	0.974	23
		High	8	0.91	30
		Total	7.87	0.941	53
	C	Low	7.87	1.147	31
		High	7.39	1.248	33
		Total	7.63	1.215	64
	Total	Low	7.41	1.292	81
		High	7.52	1.213	88
		Total	7.47	1.249	169
Continuous Learning	A	Low	6.89	1.577	27
		High	7.72	1.275	25
		Total	7.29	1.486	52
	B	Low	8.04	1.186	23
		High	8.07	1.048	30
		Total	8.06	1.099	53
	C	Low	7.94	1.124	31
		High	7.97	1.159	33
		Total	7.95	1.133	64
	Total	Low	7.62	1.393	81
		High	7.93	1.153	88
		Total	7.78	1.279	169
Self Management	A	Low	5.93	1.492	27
		High	5.68	1.574	25
		Total	5.81	1.522	52
	B	Low	6.35	1.301	23
		High	6.9	1.269	30
		Total	6.66	1.3	53
	C	Low	6.48	1.411	31
		High	6.39	1.519	33
		Total	6.44	1.457	64
	Total	Low	6.26	1.412	81
		High	6.36	1.518	88
		Total	6.31	1.465	169
Attention to Detail	A	Low	5.56	2.025	27
		High	4.92	1.847	25
		Total	5.25	1.949	52
	B	Low	6.39	1.777	23
		High	5.2	1.54	30
		Total	5.72	1.736	53
	C	Low	5.87	1.765	31
		High	5.12	1.709	33
		Total	5.48	1.764	64
	Total	Low	5.91	1.865	81
		High	5.09	1.679	88
		Total	5.49	1.813	169

Competency	Version	Need for Cognition	Mean	Standard Deviation	N
Analysis and Problem Solving	A	Low	6.41	1.6	27
		High	6.48	1.558	25
		Total	6.44	1.564	52
	B	Low	6.52	1.563	23
		High	6.37	1.81	30
		Total	6.43	1.693	53
	C	Low	6.74	1.505	31
		High	6.15	1.661	33
		Total	6.44	1.602	64
	Total	Low	6.57	1.541	81
		High	6.32	1.672	88
		Total	6.44	1.61	169
Handling Conflict	A	Low	6.67	1.593	27
		High	5.24	2.047	25
		Total	5.98	1.945	52
	B	Low	6.48	1.62	23
		High	6.37	1.752	30
		Total	6.42	1.681	53
	C	Low	6.39	1.564	31
		High	5.97	1.992	33
		Total	6.17	1.796	64
	Total	Low	6.51	1.574	81
		High	5.9	1.96	88
		Total	6.19	1.806	169
Informing	A	Low	6.48	1.968	27
		High	5.64	2.079	25
		Total	6.08	2.047	52
	B	Low	6.74	1.864	23
		High	5.93	1.701	30
		Total	6.28	1.801	53
	C	Low	6.13	1.586	31
		High	5.61	1.731	33
		Total	5.86	1.67	64
	Total	Low	6.42	1.795	81
		High	5.73	1.811	88
		Total	6.06	1.831	169
Using Technology	A	Low	7.33	1.359	27
		High	6.64	1.381	25
		Total	7	1.4	52
	B	Low	7.57	1.08	23
		High	7.07	1.172	30
		Total	7.28	1.15	53
	C	Low	7.77	1.117	31
		High	6.82	1.489	33
		Total	7.28	1.397	64
	Total	Low	7.57	1.193	81
		High	6.85	1.352	88
		Total	7.2	1.324	169

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