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EMOTIONAL INTELLIGENCE AS A MODERATOR OF PROBLEM BASED
AROUSAL ON SOLUTION QUALITY AND QUANTITY

A Thesis

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Masters of Arts

University of Nebraska at Omaha

by

Anne E. Herman

December 2004

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THESIS ACCEPTANCE

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University of Nebraska, in partial fulfillment of the
requirements for the Master's of Arts degree,
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EMOTIONAL INTELLIGENCE AS A MODERATOR OF PROBLEM BASED
AROUSAL ON SOLUTION QUALITY AND QUANTITY

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University of Nebraska, 2004

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The study examined the interactive influence of the affective qualities of a problem and a problem solver's emotional intelligence (EI), an individual difference in the ability to perceive, express, integrate, understand, and regulate emotion, on the quality and quantity of solutions generated to two different ill-structured problems. The general hypothesis was that emotional intelligence would moderate the effect of the negative emotional arousal of a problem controlling for the influence of cognitive intelligence, such that the discrepancy between those higher and lower in emotional intelligence would be greater for the problem which is high in emotional arousal than for the problem which is low. Emotional intelligence would provide a greater advantage to generating higher quality solutions for the high emotional arousal problem. High negative emotional arousal was thought to restrict the quantity and quality of solutions. The study required that 99 participants generate solutions to two ill-structured problems, one high and one low in negative emotional arousal. The solutions were evaluated in terms of resolving power, or the extent to which the solution addressed the conflicting aspects of the problem. Results did not support the interactive effect of EI and negative emotional arousal. In addition, participants generated more solutions to the high negative arousal problem than to the low negative arousal problem. However, EI was found to

predict the average resolving power of solutions generated across both problems.

Exploratory analyses indicated that a people who are better at managing their emotions had a higher rated highest resolving power solution than those who were less skilled in managing their emotions. Though results were largely unresponsive to the predictions, this study provided evidence for the influence of the affective qualities of a problem on the quality and quantity of solutions generated by problem solvers. In addition, organizations should consider both the qualities of the decision maker and the problem when choosing who will be involved in decision making endeavors.

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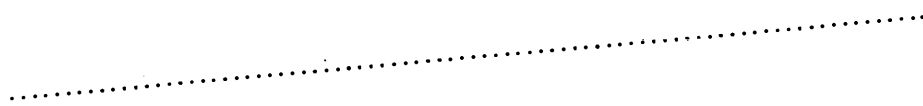
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Chapter I

Overview

People are confronted with decisions every day of their lives. Decision making is a vital activity in all organizations, and the impact of decision making can be seen in personnel decisions, layoff decisions, vendor choices, human resource policy decisions, etc. Research in decision making is critical because of the magnitude of the outcomes that are influenced by decision making. It is very important to extend help to decision makers where and when it is possible.

Psychologists conduct research on the decision making process in order to maximize decision making outcomes. Most research has focused primarily on how people process, evaluate, and choose among decision alternatives provided for them rather than examining processes and outcomes when problems are ill-structured or ill-defined. Ill-structured problems are defined as those with incomplete or ambiguous information presented for which the decision maker must generate solutions from which to choose (Abelson & Levi, 1985). When making decisions concerning an ill-structured problem, alternative generation is crucial because a poor set of alternatives generated will result in the selection of a poor solution and consequently a possible costly decision. Many organizational decisions are ill-structured and it is therefore important for both scholarly and practical reasons to further study influences on alternative generation, and more specifically on the quantity and quality of alternatives generated.

An additional void in the problem solving and decision making literature is the result of an almost exclusive emphasis on rational, emotionless decision making; the

emotions of the person confronting the problem, and the affective influences on processing and outcomes have largely been ignored. Further, careful comparisons of the effects of different sources of problem solver emotions (e.g. task, situation, traits) and different types of emotions on problem solving in ill-structured domains are non-existent.

It is surprising that many reviews of the problem solving and decision making literatures (e.g. Abelson & Levi, 1985; Stevenson, Busemeyer, & Naylor, 1991) continue to ignore the role of emotions, despite the considerable evidence from social cognition scholars that individuals' trait-based emotion, and/or environmental stimuli have important influences on cognitive processing. Clearly, generating solutions to an ill-structured problem is an example of a cognitive activity that may be influenced by a problem solver's affective traits and by the content of the problem. As noted by Schwarz (2000), it appears that decision making scholars and emotion scholars are not communicating with one another and a fruitful integration of literatures has not occurred.

The primary purpose of this study is to examine the effect of one potential source of a problem solver's affect, namely emotional intelligence, and the affective qualities of the problems presented on alternative generation. In addition, a distinction between the contribution of emotional intelligence and cognitive intelligence on solution generation will be investigated.

Obviously an important research and practical goal is to be able to understand and predict the ways in which people can maximize the quality and quantity of solutions from which they can choose. Clearly the omission of all high quality alternatives early in the decision process makes any other process subsequent to that moot. This study will seek to

provide an understanding of alternative generation outcomes when people are confronted with problems differing in affective qualities. This understanding will help decision makers improve their problem solving skills, and in turn maximize the quality of decision outcomes.

Chapter II

Decision Making Process and Solution Generation

It is critical to understand the decision making process to provide context for this study. First, a conceptual framework based on stage models of decision making will be presented. Second, solution generation will be discussed. Third, a conceptual framework of influences on decision making will be offered.

Scientists have developed various stage models of decision making (Abelson & Levi, 1985; Brim, Glass, Lavin, & Goodman, 1962; Kast & Rosenzweig, 1974; Lipshitz & Bar-Ilan, 1996; Pounds, 1969). Though decision making processes do not always proceed in an invariant, lockstep order, it is important to recognize that the steps within the process are cyclical and therefore early steps may have an impact on all the other steps in the decision making process. In addition, the earlier stages of the decision making process, including problem definition and solution generation, have been ignored relative to the latter steps in the process. If the earlier steps in the process are inadequately performed or omitted, then subsequent decision making will be poor.

On average, decision making stage models range from two steps to eight steps. A simplistic model that provides a concise framework for the context of this study was developed by Abelson and Levi (1985). Abelson and Levi's four basic stages in the decision making process describe the situation when decision makers are confronted with ill-defined problems: problem recognition, alternative generation, alternative evaluation, and alternative selection. These steps describe a process that includes identifying a

problem, generating solutions to that problem, evaluating the solutions generated to the problem, and finally choosing a solution to implement from the existing alternatives.

Although the other steps in the decision making process are notable, the present study focuses on solution generation. In the decision making process, solution generation is a critical step because the best option cannot be chosen as the course of action if it is not included as part of the alternatives to be evaluated by the decision maker. Though the alternative generation step has been acknowledged as extremely significant by some researchers, it has not received much attention in the literature (Adelman, Gualtieri, & Stanford, 1995; Pitz, Sachs, & Heerboth, 1980).

There are different ways to assess solution generation. Quantity, or ideational fluency, refers to the number of unique solutions generated to a problem. The focus on the quantity of solutions or ideas was popularized by brainstorming research (e.g. Kramer, Fleming, & Mannis, 2001; Mullen, Johnson, & Salas, 1991). Although the quantity of ideas may be of importance in certain circumstances, a more practical assessment of solutions is found through gauging the quality of solution.

Quality can be conceptualized in many different ways such as appropriateness, creativity, and originality. However, in most problem solving scenarios, success is generally evaluated by whether or not the problem is dealt with adequately. Although other types of quality definitions exist, Scherer's (1985) definition of resolving power represents the most fundamental element of solution quality, namely whether a solution solves the problem. Scherer's conceptualization was based on the earlier work of Upshaw (1975) who was among the first to acknowledge solution quality in terms of resolving the

problem. Other quality definitions such as originality or appropriateness do not include the criterion of solving the fundamental problem, but instead focus respectively on the degree to which the solution is creative or practical. The goal of this study is to better understand the factors influencing decision makers' ability to generate solutions that resolve the problems they confront.

In order to explore factors that may have an impact on solution generation, it is beneficial to provide a framework of how decision making can be studied. A useful framework provided by Scherer (2003) has integrated work presented by Abelson and Levi (1985) and Beach and Mitchell (1978). This framework includes four categories of influences on solution generation: (a) characteristics of the decision maker (e.g. ability, personality variables), (b) characteristics of the task (e.g. requirements of the task, difficulty of the task), (c) characteristics of the problem, (e.g. cognitive and affective influences of problem content), and (d) situational or contextual influences (e.g. decision importance, level of accountability). In this study the main and interactive effect of two primary categories of influences on decision makers will be investigated: (a) the characteristics of the problem content, and (b) the characteristics of the decision maker. The next sections will provide a more thorough overview of the characteristics of the problem and the characteristics of the decision maker.

Chapter III

Characteristics of the Problem

Until recently researchers have neglected the influence of the characteristics of the problem, or problem content, when doing research on the decision making process. Specific problem characteristics will be discussed in this chapter. Important differences between well-structured and ill-structured problems will be presented. In addition, affective and cognitive influences of problems will be reviewed. Finally, a review of the brief research investigating the effect of the problem content on solution generation will be offered.

Ill-structured and well-structured problems. An important aspect of understanding the characteristics of the problem is to comprehend the distinction between an ill-structured decision situation and a well-structured decision situation. Researchers have started to categorize situations into well-structured versus ill-structured (Abelson & Levi, 1985; Scherer, Butler, Reiter-Palmon, & Weiss, 1994). In clear-cut decision situations, the problem is well-defined, decision alternatives are provided and most, if not all information needed to make a high quality choice is present. In contrast, in ill-structured decision environments, the decision maker has to define and interpret the problem, decision options must be generated, and at least some information needed to solve the problem is absent.

An additional distinction between ill-structured and well-structured problems is that in the ill-structured situation, multiple options may address a problem with varying degrees of quality, and several options might be equally viable or desirable. In the most

well-defined decision context, however, only one solution is the “right” one. Note that the distinctions drawn between ill-structured and well-structured problems do not indicate an assumption that these are dichotomous categories, but rather they are more accurately represented on a continuum (Scherer et al., 1994). Though, often decision makers are presented with situations higher in structure in which options are provided, such as when an employee must choose among a given set of applicants, frequently decision makers are confronted with the task of generating a set of possible alternatives from which to choose, and it is this type of ill-structured context that this study will address. Within the domain of ill-structured problems, there are other characteristics that are also present. The remainder of this chapter will discuss those characteristics pertinent to this study.

Affective influence of the problem. Until recently the idea of affect in decision making was ignored with most research focusing on rational decision making and overlooking affective influences (Payne, Bettman, & Johnson, 1993; Schwartz & Clore, 1996). Affect refers to mental states involving evaluative feelings or states in which a person is feeling good or bad about what is happening to them (Gray & Watson, 2001). Affect encompasses both mood and emotion, and can be regarded as a more general term (Gray & Watson, 2001). Mood refers to affective states without objects or for which the object is not salient, or has become diffuse or nonspecific (Clore, Wyer, Dienes, Gasper, Gohm, Isbell, 2001). Emotion refers to psychological states focused on the goodness or badness of events, actions, or objects appraised for their relevance to one’s goals, standards, attitudes, and tastes (Ortony, Clore, & Collins, 1988). It is also important to

note that emotional responses tend to be dictated by both internal (traits/skills) and external cues.

Many problem solving scenarios involve problems with affective content, and understanding the influence of affect will provide additional opportunities to improve decision making. For example, in organizations people are faced with layoff decisions, budget alterations, and which client to help first, all of which are likely to induce feelings that may influence the decision maker's processing and final decision.

An examination of the research on affective influences on problem solving and decision making reveals a pronounced dominance of studies examining mood effects rather than emotion effects on decision making. For example, Isen, Means, Patrick, and Nowicki (1982) found that consumers making decisions made a more extensive search of information and took longer to decide when they were in a negative rather than a positive mood. In a persuasion scenario, happy participants were less influenced by the quality of the message than were neutral and sad participants (Bless, Bohner, Schwarz, & Strack, 1990; Worth & Mackie, 1987). Worth and Mackie (1987) also found that happy participants were more likely to be influenced by peripheral cues. People in a positive mood are more likely to rely on heuristics and stereotypes, whereas people in a negative mood are more likely to process individual information one step at a time (Bless, 2001).

Though mood influences have been investigated to some extent (e.g. Isen, 1987; Isen & Means, 1988), the influence of specific emotions on decision making processes and outcomes has been virtually ignored. Whereas mood is more diffuse, emotions are

stimulus specific (Clore et al., 2001), and therefore it should be recognized that the problems themselves can be emotion eliciting stimuli.

The emotionally arousing nature of a problem is often overlooked when assessing an individual's responses to a problem. Researchers found that task induced negative affect biases the quality of decision processing (Luce, Bettman, & Payne, 1997). Scherer and Billings (1996) also proposed that high emotional involvement with a problem might encourage people to "take sides" and consequently generate alternatives that address only one aspect of a problem. In addition Scherer et al. (1994) observed that cognitive and affective problem involvement does differ among problems. A review of the research explicitly investigating the influence of the type of problem, or content of the problem, will be presented.

Effect of problem type on solution generation. Very few studies have explicitly examined the influence of problem type, or content of the problem, on solution generation. The work done by Scherer and colleagues (1994) represents one of the first studies to explicitly acknowledge and demonstrate that the content of the problem itself influences decision makers' cognitive and affective reactions to the problem independent of any other influences.

Scherer et al.'s (1994) study involved rating and classifying twelve problems based on the cognitive and affective reactions of participants. Participants read six of twelve possible ill-structured problem scenarios, and then used a semantic differential scale to indicate the extent to which the problems made them feel mad, tense, nervous, elated, and irritated (Scherer et al., 1994).

Participants also responded to statements assessing their beliefs, which authors called cognitive reactions, to the problems using a 6-point Likert-type response scale (Scherer et al., 1994). The cognitive and affective reactions were analyzed via a factor analysis and resulted in nine dimensions (a) problem complexity, (b) emotional involvement, (c) problem realism, (d) problem based efficacy, (e) negative arousal, (f) elation, (g) fear, (h) boredom, and (i) positive arousal (Scherer et al., 1994). Responses to these nine dimensions to the twelve problems were then submitted to a cluster analysis to determine differences among the problems. A 5-cluster solution using Ward's method was obtained, indicating that problems differed reliably on the type of cognitive and affective reactions they induced.

Scherer et al.'s study (1994) is the only empirical effort to document differences in emotions induced by problems. These differences in the emotions induced by problems can also be referred to as problem based arousal. Problem based arousal is defined as the extent to which a problem solving scenario elicits different types and levels of emotional arousal.

In order to understand stimulus-induced specific emotions and their influence on decision making and problem solving, problems with reliable differences can be used. For example, Scherer and colleagues' (1994) study established that two problems, the Acme Organization problem (employee retention problem) and Carol's problem (a sexual harassment problem), fit into two different clusters. The Acme problem concerns an organization's dilemma whether or not to increase wages in order to be more competitive in the engineering job market, while simultaneously remaining competitive in the

marketplace because of lower product costs. In contrast to the Acme problem, Carol's problem concerns a lawyer who is sexually harassed by a partner in her law firm. Carol knows she must leave the law firm, but is reluctant to begin the job search again because lawyer positions are hard to find in the currently saturated job market.

Though it was clear from the Scherer et al. (1994) research that problems differed affectively and cognitively, the study did not explicitly examine the impact of the affective and cognitive influences on solution quality and quantity. One of only two empirical studies to date that have looked at the effect of problem type on solution generation was done by Butler and Scherer (1997). Butler and Scherer (1997) explored the influence of problem type, expertise operationalized as domain knowledge, and elicitation aids on the quality and quantity of solutions generated to two ill-structured problems.

Problem type was differentiated by the emotionally involving nature and the negatively arousing quality of the problem. Emotional involvement involves the extent to which a person's feelings or affect are aroused by the stimulus presented to them. Negative arousal refers to the extent to which a problem elicits negative affect. One problem, the Acme employee retention problem, used in the study was characterized as low in emotional involvement and negative affect, and the other problem, Carol's sexual harassment problem, was characterized as high in emotional involvement and negative affect. Elicitation aids were varied in terms of providing no objective, or either one or two objectives at a time to the participants.

As predicted, participants generated higher resolving options to the low-emotionally involving and low-negatively arousing problem (employee retention problem) than to the high-emotionally involving and high-negatively arousing problem (sexual harassment problem). In addition, an unpredicted interaction was found with respect to problem type and expertise. High knowledge individuals generated more high resolving options for both problems, however the difference between the high-knowledge individuals and the low-knowledge individuals was greater for the low-emotionally involving and low-negatively arousing problem (employee retention problem).

The only other empirical study that explicitly investigated the influence of problem type on solution generation was done by Reiter-Palmon and Scherer (2002). Participants were given one of three different problems to solve based on characteristics of the problem identified in the Scherer et al. study (1994). An employee retention problem was used because it was considered difficult, but not emotionally involving. A college roommate problem was considered emotionally involving, and a problem depicting a manager with an unproductive employee was considered neutral. Participants completed the Wonderlic Cognitive Ability Measure and were asked to generate as many solutions as possible to the ill-structured problem. As predicted the participants who responded to the non-emotionally involving employee retention problem, generated more solutions than the participants who responded to either of the more emotionally involving problems depicting the roommate scenario or the unproductive employee problem. The results also supported the prediction that cognitive ability is related to generating more solutions to the problem, regardless of problem type.

Most researchers would agree that in order to get a complete picture of decision making, we must incorporate the affective influences on decision outcomes and processes. In fact, Schwarz reflected on this exact point in his recent review of decision making literature when he stated, "To date, systematic collaborations between emotions and decision researchers are rare, despite the overlap in the issues they address," (2000, p. 438). The difference in affective qualities of a problem has often been overlooked when assessing different strategies of decision making as well as when interpreting the outcome of a decision. It is important to remember the potential effects that these emotional differences can have to the processes and outcomes of decisions that are made. Knowing that emotion can have a negative impact on decision making behavior should cue researchers to search for something to overcome the potentially damaging effects of emotion.

Overcoming the potential effects of emotion is not to suggest that emotion be removed from problems, in part because the removal of emotive content would be impossible in many circumstances. However, in the interest of overcoming the potential effects of emotion a possible solution is to identify potential qualities in the decision maker that can subdue possible negative effects from emotion on the decision making process and decision making outcomes. The next section will review characteristics of the decision maker and will focus on the influence of these individual differences on solution generation.

Chapter IV

Characteristics of the Decision Maker

People take different approaches to the decisions they make, and these different approaches are fairly consistent and are influenced by individual differences (Greenberg, 2000). Individual characteristics can be classified into abilities and personality traits. Several individual differences variables have been examined with respect to decision processes (Hunt, Krzystofiak, Meindl, & Yousry, 1989; Hynan & Pantle, 1996; Pacini & Epstein, 1999), but only a handful of studies have focused on the influence of individual differences on solution generation.

Some studies have looked at the influence of a variety of personality variables on an array of decision stages including extraversion on multi-attribute decision making (Hynan, & Pantle, 1996), and neuroticism and openness to experience on coping strategies (Bouchard, 2003). However, very few studies have examined personality influences on solution generation. One such study investigated the effect of trait-anxiety, decision objective presentation, and problem structuring on solution generation, though no significant results were found regarding trait anxiety (Wightman, 1999). Another study found that individuals high in methodical personality traits (i.e. being methodical) are not rated as successful at generating novel and innovative ideas as those who are low in methodical traits (Janovics & Christiansen, 2003).

Similar to the research examining personality influences on solution generation, very few studies have investigated the influence of an individual's ability on solution generation. Cognitive intelligence has been suggested to influence an individual's ability

to solve problems, but until very recently this had not been empirically examined in the domain of solution generation (Reiter-Palmon & Scherer, 2002).

Reiter-Palmon and Scherer (2002) investigated the effect of cognitive ability and problem type on the quantity of solutions generated. Recall that Reiter-Palmon and Scherer (2002) found that participants high in cognitive ability generated more solutions to any of the ill-structured problems presented than participants who were low in cognitive ability.

Remember also that Butler and Scherer (1997) examined the effect of domain expertise, elicitation aids, and problem content on the quality and quantity of solutions generated to two ill-structured problems. Participants high versus low in domain knowledge (expertise) were presented with two problems, differing in their emotional involving nature, and asked to generate as many solutions as possible to each of the problems. Butler and Scherer (1997) found domain experts generated both higher quality and a higher quantity of solutions to both problems compared to novices (Butler & Scherer, 1997).

Some investigators have examined the influence of both personality and ability characteristics on stages of the decision making process (e.g. Reiter-Palmon, Mumford, O'Connor-Boes, & Runco, 1997). However, only one empirical study has investigated the impact of both a personality and ability characteristic on solution generation in the ill-structured problem domain. Reiter-Palmon, Mumford, and Threlfall (1998) investigated the influence of personality (e.g. self-absorption, social achievement, career-orientation, pessimism, self-protectivism, and intellectual achievers) and problem construction ability

on the quality and originality of solutions generated to ill-structured problems. Participants were asked to complete a personality measure based on values, goals, and leisure activities. In addition, they completed a problem construction ability measure in which they were asked to restate the problem, and these restatements were evaluated for their quality. In addition, the participants were asked to generate one solution for each of the six ill-structured problems. The solutions were rated for their fit to personality type, and on their quality and originality. As predicted, participants' problem construction ability was positively related to the match between solution and personality type, such that individuals with higher levels of problem construction ability generated alternatives that matched their personality. Results also supported the prediction that solution quality and originality are associated to problem construction ability and solution-personality match. The match between the solution and personality did relate to solution quality and solution originality above and beyond the contribution of problem construction ability. These results suggest that individuals high in problem construction ability are able to relate to the problem in a way that they understand. The familiar construction of the problem allows individuals to generate solutions of higher quality originality.

Recall that researchers have found a pattern of differences in generating solutions to problems that differ in their emotionally arousing nature. In addition, researchers have also found that individuals with certain personality traits and abilities perform better in solution generation tasks. It would seem relevant to determine whether people who are more "affectively gifted" are better able to respond to affectively laden problems. Someone who better understands their own and others' emotions would be expected to

regulate their emotions better, such that the typical effects of emotion on creativity and information processing would not be as pronounced. A variable most closely related to being affectively gifted identified in the individual difference literature is emotional intelligence.

The next section will review emotional intelligence in depth and will present reasons for considering it as an individual characteristic that would temper affective influences on solution generation. A variety of definitions for emotional intelligence exist, but common to all emotional intelligence researchers' conceptualizations is the assumption that people high in emotional intelligence have some constellation of characteristics that make them more effective in responding to social-emotional situations. Certainly if the problem presented to a decision maker possesses or has some affective qualities it would be clear that emotional intelligence might have some bearing on the decision maker's ability to generate solutions.

Chapter V

Emotional Intelligence

This section will review the development of emotional intelligence as well as the definitions and measurement of emotional intelligence, followed by a comparison of emotional intelligence and cognitive intelligence

Development of the emotional intelligence construct. Though there are a variety of definitions and conceptualizations which will be discussed later in this chapter, emotional intelligence is the ability to perceive, express, integrate, understand, and regulate emotion (Mayer, Salovey, & Caruso, 2000). For the past decade emotional intelligence has increasingly become a construct of interest, due in part to the misguided belief that emotional intelligence predicts a multitude of “successful behaviors” in applied settings (Goleman, 1995a; Mayer, Salovey, & Caruso, 2000). However, the reality is a huge discrepancy between what is claimed about emotional intelligence versus what has been empirically documented.

The applied interest in emotional intelligence is understandable because of the many hypothesized practical outcomes presumably resulting from emotional intelligence. Many claim that people higher in emotional intelligence are better leaders, more persuasive, more self-confident, and open to change (Cherniss & Goleman, 2001; Goleman, 1998). From an applied perspective there is so much that is not accounted for by technical skills alone, and as a result emotional intelligence has attracted the interest of corporations. Though the hypothesized practical behaviors may be true, the empirical documentation has lagged behind the bold statements of some writers.

Scholars are also interested in emotional intelligence in part due to increased emphasis on understanding the complex relationship between emotions and cognition. Though some may have viewed emotion and reason as being the antithesis of one another, more recent theories concerning the connection between emotion and cognition acknowledge a relationship between the two (Forgas, 1995; Gross, 1998; Russell, 2003).

As with many new psychological constructs, emotional intelligence has been regarded with skepticism. Emotional intelligence has been criticized by some researchers as a redundant construct, referring to its conceptual and statistical relationship with existing measures of personality and other existing criterion measures such as life satisfaction (Ciarrochi, Chan, & Caputi, 2000). Other criticisms have centered on the measurement limitations associated with the current measures available to assess emotional intelligence (Davies, Stankov, & Roberts, 1998; Pfeiffer, 2000). In an attempt to qualify and investigate these criticisms it is important to understand the three primary conceptual models of emotional intelligence: (a) the personality model, (b) the mixed model, and (c) the ability model. These approaches to emotional intelligence will be reviewed in order to provide a clearer picture of the construct.

Definitions and measurement of emotional intelligence. To further complicate the emotional intelligence situation, nobody can agree on the nature of emotional intelligence, and if another measure is really needed. Emotional intelligence has been conceived as a set of personality traits, a mixed model of personality and ability, and in an ability model. Each conceptualization of emotional intelligence will be reviewed below, with an emphasis on the ability model of emotional intelligence.

Emotional intelligence is used by some researchers to refer to a particular constellation of personality characteristics. Goleman (1998) has defined emotional intelligence in terms of a person's self awareness, self-regulation, motivation, empathy, and social skills. Goleman (1995) has used this personality based framework to propose a model of emotional intelligence, which is clearly heavily borrowed from Mayer and Salovey's earliest research. Based on his reported review of almost 200 competency models, Goleman identified 25 social and emotional competencies that he claims to predict exceptional performance. He categorized the competencies into four dimensions and reduced the set of competencies to 19, which he then associated with the four dimensions. The four broad dimensions Goleman proposed include: (a) self-awareness, (b) self-management, (c) social awareness, and (d) social skills. Self awareness is defined as the ability to recognize and understand one's moods, emotions, and drives, and the effect of these on others (Goleman, 1998). Goleman (1998) defines self-management as the ability to control or redirect disruptive impulses and moods as well as to suspend judgment and think before acting. Social awareness involves empathy, organizational awareness, and service orientation (Goleman, 1998). Social skills are defined as proficiency in managing relationships and building networks (Goleman, 1998).

Goleman has proposed that his emotional competencies be measured by the Emotional Competence Inventory, a 360-degree appraisal, or an appraisal that is completed by peers, subordinates, and superiors, that collects ratings on twenty emotional and social "competencies" (Cherniss & Goleman, 2001). Although Goleman's original conceptualization of the emotional competencies contained five clusters, the Emotional

Competence Inventory only measures four due to earlier testing of the measure (Cherniss & Goleman, 2001). The measure utilizes the concept of a “tipping point” wherein a score above a pre-determined point from other samples is used to delineate an individual who will have superior performance on the competency in their job. Little to no published data are available to assess the psychometric properties of the Emotional Competence Inventory. As of 2001, there has not been a review of the validity of the tipping points (Cherniss & Goleman, 2001).

Schutte, Malouff, Hall, Haggerty, Cooper, Golden, and Dornheim (1998) developed a measure of emotional intelligence based on the conceptual mixed-model definition provided by Salovey and Mayer in 1990 and the ability focused conceptualization by Mayer and Salovey (1997). Schutte et al. (1998) wanted to provide a brief measure of emotional intelligence that was based on a comprehensive conceptualization. Salovey and Mayer’s 1990 definition was postulated using three categories of adaptive abilities: appraisal and expression of emotion, regulation of emotion, and utilization of emotion in solving problems. Mayer and Salovey’s 1997 conceptualization is discussed later in detail within the context of an ability model conceptualization, but can be briefly defined as consisting of four branches of emotional intelligence: perception, appraisal, and expression of emotion; the emotional facilitation of thinking; understanding, analyzing, and employing emotional knowledge; and regulation of emotions. Schutte et al. (1998) believed that both the 1990 conceptualization as well as the 1997 conceptualization provided a solid foundation for

their 33- item measure. Some of the items used to assess emotional intelligence via the Schutte et al. measure are:

1. Other people find it easy to confide in me.
2. I seek out activities that make me happy.
3. I use good moods to help myself keep trying in the face of obstacles.

Bar-On (1997) has also conceptualized emotional intelligence under what is referred to as the mixed model approach (Mayer et al., 2000). The mixed model approach appears to have focused on combining the early conceptualization of emotional intelligence with non-ability traits (Mayer et al., 2000). This generally results in the mixed model approaches being very broad in their scope and experiencing much overlap with existing constructs in the personality area.

Bar-On's conceptualization of emotional intelligence focuses on the literature from personality characteristics, which is congruent with his background in clinical psychology. He wanted to expand on the earlier theoretical model presented by Salovey and Mayer (1990) by adding non-ability traits. Bar-On has defined emotional intelligence as "an array of personal, emotional, and social competencies and skills that influence one's ability to succeed in coping with environmental demands and pressures" (Bar-On, 1997, p.3). Over several years of research he devised five areas that appear to be related to success in life, they include (a) intrapersonal skills, (b) interpersonal skills, (c) adaptability, (d) stress management, and (e) general mood (Bar-On, 1997).

Bar-On (1997) defines intrapersonal skills in terms of someone who is in touch with his/her feelings, feels good about himself/herself, feels positive about what he/she is

doing in their lives, able to express feelings, and is independent, strong, and confident in conveying their ideas and beliefs. Some of the items used to measure these intrapersonal skills are:

1. It's hard for me to share my deep feelings with others.
2. It's fairly easy for me to tell people what I think.
3. I feel sure of myself in most situations.

Interpersonal skills relate to a person's ability to understand, interact, and relate well with others (Bar-On, 1997). Some items used to assess this dimension are:

1. It's easy for me to make friends.
2. I care what happens to other people.
3. If I could get away with breaking the law in certain situations, I would (R).

Bar-On (1997) defined adaptability as people who are flexible, realistic, effective in understanding problematic situations, and competent at arriving at adequate solutions.

Sample items used to assess this quality are:

1. When facing a problem, the first thing I do is stop and think.
2. People don't understand the way I think.
3. I'm able to change old habits.

The stress management component was defined as an individual who is able to withstand stress without losing control (Bar-On, 1997). Some items used to measure this dimension are:

1. I can handle stress without getting too nervous.
2. When I start talking, it is hard to stop.

3. I'm impatient.

The general mood dimension involved one's ability to enjoy life, and one's outlook on life (Bar-On, 1997). Sample items used to assess this dimension are:

1. I am satisfied with my life.
2. I like to have fun.
3. I generally hope for the best.

Although Bar-On developed a measure of his conceptualization of emotional intelligence called the Emotional Quotient Inventory (EQ-I), he is relatively cautious in his claims for his model of emotional intelligence (Mayer, Salovey, & Caruso, 2000). In spite of the broad coverage of Bar-On's model, he has been somewhat careful to interpret the definition of success that his model predicts. He defined success as "the end product of that which one strives to achieve and accomplish" (Bar-On, 1997, p. 3). In addition, he has made the distinction and has referred to the potential of success as opposed to behavioral success (Bar-On, 1997). Likewise, Bar-On has taken much care to test his measure for psychometric properties. The EQ-I has been shown to be a valid and reliable instrument in measuring Bar-On's conceptualization of emotional intelligence (Bar-On, 1997).

In stark contrast to Bar-On's mixed model approach, Goleman has made extraordinary claims for the predictive value of his model. He proposed that effective leaders possess a high degree of emotional intelligence (Goleman, 1998). Goleman (1998) has also suggested that emotional intelligence absolutely increases with age and is also a learnable skill. His unfounded claims have contributed to the popular notions of the

emotional intelligence construct, which unfortunately have little, if any empirical basis to substantiate Goleman's conjecture.

The discussion of the mixed model approach to defining emotional intelligence presented a broad conceptualization that included mostly personality components (Mayer, Salovey, & Caruso, 2000). This broader definition of emotional intelligence is in contrast to the approach taken by Salovey and Mayer in an attempt to reduce the scope of their definition. Salovey and Mayer (1990) first proposed the concept of emotional intelligence and defined it as consisting of three categories of adaptive abilities: appraisal and expression of emotion, regulation of emotion, and utilization of emotion in solving problems. After much review and empirical study of their original conceptualization of emotional intelligence, Mayer and Salovey (1997) amended their original definition and proposed an ability model. They recognized the need to constrain the definition of emotional intelligence to a mental ability and distinguish it from association from traits of outgoingness, warmth, and other personable virtues (Mayer, Salovey, & Caruso, 2000). The new model incorporated the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and the ability to regulate emotions so as to promote emotional and intellectual growth.

Mayer and Salovey's ability model focused on four branches of emotional abilities ranging from basic competencies to higher levels of abilities. The most rudimentary skills include the perception, appraisal, and expression of emotion. This includes the ability to identify emotion in one's physical states, thoughts, and feelings. It also includes the ability to identify emotions in other people, language, appearance,

behavior, etc. Perception and expression of emotion also encompass the ability to express emotions accurately, and to express needs related to those feelings, and finally the ability to discriminate between accurate and inaccurate expressions of feeling.

The second branch of Mayer, Salovey, and Caruso's model (2000) is the emotional facilitation of thinking or assimilating emotion into thought. This branch incorporates allowing emotions to prioritize thinking in productive ways. Emotions are vivid and available and can be used as aids to judgment and memory concerning feelings. The emotions can also encourage multiple points of view because of the change in an individual's perception when they experience different mood and emotional states.

The third branch of the ability model deals with understanding and analyzing emotions, and employing emotional knowledge. This area involves the ability to label emotions, including complex emotions and co-existing emotions. Also included in this set of skills is understanding relationships associated with changes in emotion as well as recognizing likely transitions among emotions.

Finally, the fourth branch of emotional intelligence is the reflective regulation of emotions. The reflective regulation of emotions is posited to promote emotional and intellectual growth (Mayer & Salovey, 1997). This branch includes the ability to stay open to feelings as well as the ability to reflectively engage or detach from an emotion depending on its judged utility.

The ability model of emotional intelligence encompasses the ability of obtaining information from emotion. I propose that the ability model of emotional intelligence as defined by Mayer and Salovey (1997) would appear to be most relevant to problem

solving due to the proposed relationship between emotion and information. The proposed relationship centers on the idea that emotion can provide information that may be necessary to solve problems that are based on those patterns of information. The ability model's more narrow definition allows for a more specific interpretation of what emotional intelligence is and what it may contribute to cognitive tasks such as problem solving, above and beyond existing psychological constructs.

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) was derived to measure emotional intelligence as an ability. In contrast to the self-report measures used to ascertain emotional intelligence from the standpoint of the mixed models, the MSCEIT was designed to be an objective test that measures "how well people perform tasks and solve emotional problems" (Mayer, Salovey, & Caruso, 1999b, p. 4). The MSCEIT is based largely on the work that was done on the Multifactor Emotional Intelligence Scale (MEIS), which was the first ability measure of emotional intelligence (Mayer, Salovey, Caruso, Sitarenios, 2003; Mayer et al., 1999b; Mayer, Salovey, & Caruso, 1997). The MSCEIT allows researchers to interpret an individual's score at an overall level as well as at the dimensional level of the four branches or levels of emotional intelligence. Testing of the MSCEIT has demonstrated evidence of the measure's reliability and validity measure of the ability model put forth by Mayer, Salovey, and Caruso (Mayer et al., in press).

Emotional intelligence versus cognitive intelligence. Intelligence has been defined by many people in many ways (Sternberg, 2000) and many researchers argue for a theory of multiple intelligences (Gardner, 1998). Though the theory of multiple intelligences

Gardner (1993, p. 12) provides the definition of an intelligence as “the ability to solve problems, or to create products, that are valued within one or more cultural settings.”

What is most relevant to this study is the distinction and connection of what is traditionally considered cognitive intelligence and emotional intelligence. A review of these two constructs will be presented and discussed.

Gottfredson (1997, p.13) defined cognitive intelligence as a “very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience.” For many years, the bulk of research has been on the effect of cognitive intelligence on performance, success, behavior, etc. In the context of decision making, many of the studies have focused on analytic tasks. In this area Sternberg (1977) provided some “metacomponents”, or higher order mental processes that intelligent individuals use effectively to guide their problem solving efforts:

1. Identifying that a problem exists and needs to be solved.
2. Defining the givens, goals, and obstacles of the problem.
3. Selecting the lower order processes that will be needed to solve the problem.
4. Choosing an appropriate strategy for solving the problem.
5. Selecting a mental representation or “mental map” of the givens, the relations among the givens, and the goals found in the problem.
6. Allocating one’s attention and other mental resources for use in solving the problem.

7. Monitoring how well one is achieving one's goals during problem solving.

8. Evaluating the results once a solution has been reached.

Sternberg (1985) posited that the use of these “metacomponents” explain the chronic emergence of the general cognitive intelligence in factor analytic studies of intelligence. Sternberg (1985) also explained that performance components are the lower order mental processes by which intelligent individuals execute the “metacomponents.”

More relevant to the present study is the work of Reiter-Palmon and Scherer (2002). They investigated the effect of cognitive intelligence as measured by the Wonderlic cognitive ability test on ideational fluency, or the quantity of solutions generated to ill-structured problems. Reiter-Palmon and Scherer (2002) found that people with higher cognitive intelligence generated more solutions to problems than people with lower intelligence did. This finding is important to the present study because it explicitly connects cognitive intelligence to solution generation. The focus of the present study goes beyond the information ascertained by ideational fluency and examines the effect of cognitive intelligence on the quality of the solutions generated. It is also my intention to investigate the unique effects of cognitive intelligence and emotional intelligence on solution generation.

Mayer and Salovey's ability model definition connects intelligence and emotion by combining the ideas that emotion makes thinking more intelligent and that one thinks intelligently about emotion (1997). In addition, the ability model posits emotional intelligence to meet three empirical criteria that other intelligences meet: (a) mental

problems have right or wrong answers, (b) the measured skills correlate with other assessments of cognitive ability, (c) the absolute ability level increases as age increases (Mayer, Salovey, & Caruso, 2000). In the Mayer Salovey Caruso Emotional Intelligence Test, the items have correct and incorrect answers and are assessed by the combination of alternative scoring procedures. In addition, the skills assessed do correlate with other measures of mental ability. Finally, the older individuals had higher scores.

Emotional intelligence as a predictor. The work on emotional intelligence as a predictor is a varied mix of research and conjecture. The more recent empirical research has analyzed emotional intelligence as a predictor of behavior, with the behaviors assessed ranging from debt collection to job interview performance to the identification of emotion in faces, colors, and artwork. Conjectures have varied from those having a strong theoretical basis to others making claims counter to existing empirical research in related areas such as cognitive intelligence and personality (Mayer, Salovey, & Caruso, 2000). This section will review the empirically studied predictive value of emotional intelligence as well as the theoretically based conjecture.

Lam and Kirby (2002) investigated emotional intelligence as a predictor of individual cognitive performance. They assessed individual performance using the following three assessments: (a) eight anagram problems from the Burney logical reasoning test, (b) emotional intelligence as measured by the short version of the MEIS, and (c) cognitive intelligence as measured by the Shipley Institute of Living IQ scale. Participants were placed in stressful situations manipulated through the researchers'

choice of very difficult reasoning problems and limited the amount of time the participants were given to complete them.

The researchers hypothesized that overall emotional intelligence would contribute to cognitive performance over and above what was attributable to cognitive intelligence. In addition, Lam and Kirby posited that performance could also be explained by the ability to perceive emotions, the ability to understand emotions, and the ability to regulate emotions. The results supported the contribution of overall emotional intelligence, the ability to perceive emotions, and the regulation of emotions to explaining the variance in the performance on the cognitive reasoning tasks.

This suggests that emotional intelligence does contribute to better performance on cognitive tasks over and above the contributions of cognitive intelligence. This finding is groundbreaking in its investigation of emotional intelligence with empirical studies concerning performance on cognitive tasks, but also recognizes the impractical nature of anagram tasks from a “real world” problem solving approach. A more realistic simulation of daily problem solving activities can be achieved through solving ill-structured and emotionally laden problems. It is the intention of this study to add to the findings of Lam and Kirby while considering the context of the problem solving task itself. In addition, Lam and Kirby’s study might have benefited from also assessing emotional intelligence from the perspective of the ability model.

Fox and Spector (2000) investigated the effect of emotional intelligence, practical intelligence, cognitive intelligence, and trait affectivity on interview outcomes.

Researchers assessed three components of emotional intelligence as defined by the mixed

model of emotional intelligence (empathy, self-regulation of mood, and self-presentation) as well as cognitive intelligence, social intelligence, and practical intelligence.

Controlling the influence of cognitive and practical intelligence, emotional intelligence was related to interview outcomes. Interview outcomes were operationalized by the ratings concerning the interviewer's decision to hire, perceptions of qualifications of candidates, perceived similarity, and liking. In addition, the finding that emotional intelligence and cognitive intelligence are unique contributors to successful interview outcomes was important.

Fox and Spector's (2000) study again established the potential for emotional intelligence to contribute to explaining performance beyond the contributions of cognitive intelligence. It is important to note the implications of this study distinguished emotional intelligence from intelligence in the area of personal interaction. A premise of emotional intelligence is the interpersonal nature of the construct, and it is important to assess this premise when trying to predict performance that is related to interpersonal awareness and related behavior.

Bachman et al. (2000) assessed the emotional intelligence and performance of debt collectors. The conceptual basis for this relationship dealt with the complex state of emotions associated to a situation in which debt collectors are communicating with individuals about their current financial predicaments. Performance in debt collection over a period of time was collected and then researchers administered the EQ-I (based on Bar-On's mixed model definition) as a measure of emotional intelligence. Higher emotional intelligence scores were associated with the higher performing debt collectors.

Subsequently lower emotional intelligence scores were associated with the lower achieving debt collectors.

The emotional nature of debt collection was an excellent fit for assessing the predictive value of emotional intelligence. Bachman's study has real implications for choosing new employees or selecting current employees for roles in an organization that will have a significant emotional tenor to them. The "match" between employee and emotional nature of the job tasks will lead to better performance and less emotional fatigue in highly emotional job situations.

It is important to note that many of the studies reviewed have focused on tasks that have an interpersonal and emotional nature to them. Emotional intelligence distinguishes itself from other potential predictors of performance in domains where emotion is present. The impact of emotion has been overlooked for some time, and the potential for a more thorough understanding of how emotion can change the process by which a situation is addressed, or even more so the outcome of that situation is vital to improving the current climate in organizations. Although the broad understanding of the impact of emotion on performance is paramount, the present study will investigate the impact of emotion on decision making behavior. In using the present study to further understand emotion and its impact on solution generation, the goal is to identify a potential moderating factor for the instances when the emotional tenor of an issue could interfere with the resolution of that issue.

In addition, the Salovey, Mayer, and Caruso model contains a hypothesized dimension concerned with utilization of emotion to facilitate cognitive processes. This

assertion highlights the need to investigate the effect of emotional intelligence on the problem solving process. This empirical investigation into the definition of emotional intelligence will also help us further understand potential contributors to performance when situations are emotionally charged. Finally, no study to date has examined the effects of emotional intelligence on solution generation to ill-structured problems.

Chapter VI

This Investigation

Overview. The purpose of this study was to contribute to the knowledge of variables that influence solution generation; specifically the goal is to examine the role of problem type and emotional intelligence on the quantity and quality of solutions generated to ill-structured problems. Quantity of solutions was defined as the number of non-repeating solutions provided by each participant. The conceptual definition which was used when evaluating solution quality is that of resolving power, or the degree to which a solution addresses the conflicting aspects of the problem (Scherer, 1985). Better decision makers should be able to generate solutions that resolve the problems presented to them. In addition, the characteristics of the problem and the decision maker that were the focus of this study will be discussed.

The crux of the present study is to ascertain if problems that induce different levels of negative emotional arousal, or problem-based arousal, will affect solution quality and quantity. Recall that the Scherer et al. (1994) study showed that people's affective and cognitive reactions differed depending on the problem presented to them. Two different problems were chosen for use in this study based on previous research by Scherer et al. (1994), which showed that the problems differed in the type of emotions provoked by the problem. A cluster analysis using Ward's method showed that the twelve problems examined in their study resulted in a five-cluster solution. The two problems to be examined in this study were taken from two different clusters.

Specifically, Scherer and colleagues' study established (1994) that one of the problems to be used in this study, the Acme Organization problem (employee retention problem), fit into a cluster that was different from the cluster that contained the other problem, Carol's problem (a sexual harassment problem). The Acme problem concerns an organization's dilemma whether to increase wages in order to be more competitive in the engineering job market, while simultaneously remaining competitive in the marketplace because of lower product costs. In contrast to the Acme problem, Carol's problem concerns a lawyer who is sexually harassed by a partner in her law firm. Carol knows she must leave the law firm, but is reluctant to begin the job search again because lawyer positions are hard to find in the currently saturated job market.

With respect to the present study's focus, the Acme employee retention problem was very low in negative arousal meaning that participants did not feel a high state of negative arousal in response to this problem (Scherer et al., 1994). The Acme problem was also rated low in boredom and in fear.

Carol's sexual harassment problem is very different from the Acme employee retention problem (Scherer et al., 1994). Specifically, participants rated it very high in negative arousal. Carol's problem was also rated high in fear, meaning that participants associated this problem with being scared, distressed, threatened, and afraid. Carol's problem was evaluated low in boredom as participants felt very interested, concerned, and captivated by the problem.

Remember that characteristics of the decision maker are also of interest in this study. Specifically, individual characteristics that can temper the influence of emotion on

solution generation would be of great importance when confronted with an issue of a social and emotional nature. Emotional intelligence will be examined in order to determine if this individual characteristic will assist people when they are confronted with an interpersonal decision making scenario. Recall that emotional intelligence is defined as the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and the ability to regulate emotions so as to promote emotional and intellectual growth (Mayer et al., 2000, p. 396). No study to date has systematically examined the effects of emotional intelligence on the alternative generation stage of the decision making process.

Predictions and rationale. There are two primary objectives of this study; the first is to separate the effects of cognitive versus emotional intelligence on solution generation. Furthermore, it is important to determine if emotional intelligence will add to our understanding of solution generation above and beyond the contribution of cognitive intelligence. The second objective is to determine whether emotional intelligence moderates the effect of problem type on solution generation.

There is much disagreement as to the independence, or non-independence, of emotional intelligence and cognitive intelligence, therefore when doing research one must account for the possibility of a relationship between these two constructs. Thus, it is important to determine if emotional intelligence adds any influence above and beyond the contribution of cognitive intelligence to solution generation.

Hypothesis 1a: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate a greater quantity of high

resolving power solutions across both problems than those lower in emotional intelligence.

Hypothesis 1b: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate higher quality of the highest rated resolving power solution across both problems than those lower in emotional intelligence.

Hypothesis 1c: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate higher average resolving power quality of solutions across both problems than those lower in emotional intelligence.

The emotional nature of a problem can restrict the process of solution generation (Butler & Scherer, 1997; Scherer & Billings, 1996). As noted before emotional intelligence has often been regarded as an individual difference that will counteract the effect of emotion on performance. Emotional intelligence will moderate the effect of problem type on solution quantity and quality because of the emotional awareness, regulation, and utilization abilities present for someone with high emotional intelligence. The discrepancy between those higher and lower in emotional intelligence will be greater for the problem which is higher in negative emotional arousal than for the problem which is lower, with emotional intelligence conferring a greater advantage under the higher negative arousal problem. The form of the predicted interaction can be seen in Figure 1.

Hypothesis 2a: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the quantity of high resolving power solutions.

Hypothesis 2b: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the average resolving power of the solutions generated.

Hypothesis 2c: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the quality of the highest resolving power solution provided by each participant.

Cognitive intelligence has often been theorized to be a relevant ability that improves problem solving outcomes (e.g. Gottfredson, 1997). Few researchers, however, have explicitly investigated the relationship between cognitive intelligence and ill-structured problem solving. Recall that one of the few studies was done by Reiter-Palmon and Scherer (2002), where they found that people with higher cognitive intelligence generated more solutions to problems than people with lower intelligence. This finding was important because it explicitly connected cognitive intelligence to solution generation, and as such an attempt is made to replicate the finding. In addition, a goal of this study is to contribute to our understanding of the relationship between cognitive intelligence and solution generation by assessing the influence on the quality of the solutions generated.

Hypothesis 3a: Those with higher cognitive intelligence will generate a higher quantity of solutions compared to those lower in cognitive intelligence.

Hypothesis 3b: Those with higher cognitive intelligence will generate a greater quantity of high resolving power solutions across both problems compared to those lower in cognitive intelligence.

Hypothesis 3c: Those with higher cognitive intelligence will generate a higher quality of the highest rated resolving power solution across both problems compared to those lower in cognitive intelligence.

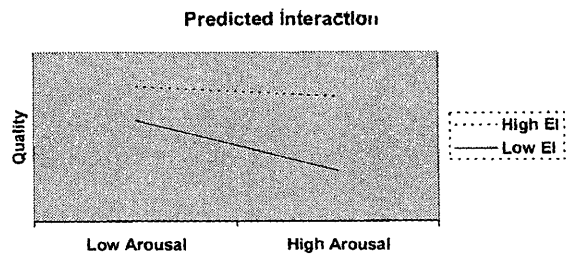
Hypothesis 3d: Those with higher cognitive intelligence will generate a higher average resolving power quality for solutions across both problems compared to those lower in cognitive intelligence.

An additional objective was to determine the influence of problem-based negative arousal on solution quantity. Prior research has shown that when a person is confronted with a highly emotionally involving problem, their thinking tends to be restricted. Billings and Scherer (1996) acknowledged that people seemed to take sides when they were emotionally aroused by an issue. In addition, Vosberg (1998) found that people in a negative mood generated fewer ideas than did people in a positive mood. For these reasons it is proposed that participants confronted with a problem higher in negative emotional arousal will generate fewer solutions.

Hypothesis 4: Participants will generate a greater quantity of solutions to the lower-emotionally arousing problem and will generate fewer solutions to the higher-emotionally arousing problem.

Figure 1.

Predicted interaction for Emotional Intelligence and Problem Arousal.



Chapter VII

Summary of Hypotheses

Hypothesis 1a: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate a greater quantity of high resolving power solutions across both problems than those lower in emotional intelligence.

Hypothesis 1b: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate higher quality of the highest rated resolving power solution across both problems than those lower in emotional intelligence.

Hypothesis 1c: Controlling for the effects of cognitive intelligence, those higher in emotional intelligence will generate higher average resolving power quality of solutions across both problems than those lower in emotional intelligence.

Hypothesis 2a: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the quantity of high resolving power solutions.

Hypothesis 2b: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the average resolving power of the solutions generated.

Hypothesis 2c: Controlling for the effect of problem order, emotional intelligence and problem type will interact to affect the quality of the highest resolving power solution provided by each participant.

Hypothesis 3a: Those with higher cognitive intelligence will generate a higher quantity of solutions across both problems compared to those lower in cognitive intelligence.

Hypothesis 3b: Those with higher cognitive intelligence will generate a greater quantity of high resolving power solutions across both problems compared to those lower in cognitive intelligence.

Hypothesis 3c: Those with higher cognitive intelligence will generate a higher quality of the highest rated resolving power solution across both problems compared to those lower in cognitive intelligence.

Hypothesis 3d: Those with higher cognitive intelligence will generate a higher average resolving power quality for solutions across both problems compared to those lower in cognitive intelligence.

Hypothesis 4: Participants will generate a greater quantity of solutions to the lower-emotionally arousing problem and will generate fewer solutions to the higher-emotionally arousing problem.

Chapter VIII

Method

The methodology and results for the two preliminary studies will be discussed, followed by the methodology used for the primary study.

Study 1. Prior research by Scherer and colleagues (1994) showed that a sexual harassment problem (Carol's problem) was perceived as more emotionally arousing than a problem depicting an employee retention problem (Acme problem). To control for the possibility that the previous perceived differences were not due to an emphasis on helping a person (Carol) versus helping an organization (Acme), the original Acme problem was slightly modified and renamed Scott's problem. Though the essential problem content remained consistent for the Scott versus Acme versions of the problem, the Scott version more strongly emphasized helping Scott solve his employee retention problem, thus more closely equating this aspect of the problem with the sexual harassment problem goal of helping Carol solve her problem.

To summarize, the purpose of the first study is twofold: (a) to determine if the Acme version and the Scott version of the employee retention problem elicit similar affective and cognitive reactions from participants, and (b) to demonstrate that participants' affective and cognitive reactions indicate a greater negative emotional arousal induced by the sexual harassment problem (Carol's problem) compared to the employee retention problem (Scott's problem).

Participants

Participants were 60 undergraduates enrolled in psychology courses at the University of Nebraska at Omaha. They participated voluntarily and received extra credit for taking part in the study. Participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association [APA], 1992). The average age of the participants was 24.57 (SD = 6.24), with 43 females and 17 males. Fifty-six participants were white, three were African American, and one participant was of another ethnic background.

Stimulus Materials

Participants were presented with the Acme Organization Employee Retention Problem, Scott’s Employee Retention Problem, or Carol’s Sexual Harassment Problem (see Appendix A, B, and C, respectively). Participants were asked to read the problem and then respond to the Cognitive and Affective Problem Reaction Questionnaire developed by Scherer et al. (1994) (see Appendix D).

Results and Discussion

A one-way analysis of variance was utilized to determine differences between the Scott, Acme, and Carol problems for each of the following nine cognitive and affective problem dimensions: (a) negative arousal, (b) elation, (c) problem involvement, (d) boredom, (e) fear, (f) problem realism, (g) problem complexity, (h) positive arousal, and (i) problem based efficacy. Due to small sample size for this pilot study, the factor structure obtained by the Scherer et al. (1994) study was used to form the nine reaction scales analyzed in this study.

Three of the one-way analyses of variance were significant. The other six analyses probing the boredom, fear, realism, complexity, and positive arousal of the problem, as well as the participant's problem-based efficacy were not significantly different between the Carol, Acme, and Scott problems. This finding indicates that these qualities can be considered similar for all three problems.

There were, however, significant group differences in the negative arousal reactions of participants between the three problems, $F(2, 57) = 4.98, p < .01$. See Table 1 for problem means and standard deviations. Participants who read Carol's sexual harassment problem were more negatively aroused than participants who read either version (Scott or Acme) of the employee retention problem. There were no differences in the negative arousal reactions when comparing the Scott and Acme versions of the employee retention problem.

There were also significant differences between the groups for the participants' elation, $F(2, 57) = 12.03, p < .01$. See Table 1 for elation means and standard deviations presented for each problem. Both versions of the employee retention problem (Scott and Acme) were more elating than was Carol's sexual harassment problem. There was no difference in the elation reaction of the participants who read either version of the employee retention problem.

In addition, there were significant differences between the groups for the participants' involvement reactions, $F(2, 57) = 3.88, p < .05$. See Table 1 for means and standard deviations related to participants' involvement reactions. Participants who read Carol's problem reported more involvement with the problem than the participants who

read either version of the employee retention problem (Scott or Acme). Participants did not differ in their involvement scores between the Scott and Acme versions of the employee retention problem.

As predicted, the two versions of the employee retention problem did not differ in any of the nine affective and cognitive reactions. With this understanding, Scott's version of the employee retention problem will be discussed for the rest of the manuscript. Carol's sexual harassment problem elicited significantly higher negative arousal reactions than did Scott's employee retention problem. Furthermore, participants who read Scott's employee retention problem reacted with higher elation than did participants who read Carol's sexual harassment problem. Finally, Carol's sexual harassment problem is significantly more involving than Scott's employee retention problem, meaning that people were more engaged when reading Carol's problem than when reading Scott's problem.

Study 2. An important focus of the primary study in this thesis concerns the emotional reactions to ill-structured problems. Affective reactions can be a combination of emotions experienced as well as overall mood and temperament. Because this study is concerned with the emotional reactions, it is important to control the other factors that influence a participant's affective reaction. Though we cannot control for a person's temperament with an experimental control, mood can be assessed. Therefore, in order to rule out any influence of mood on the emotional reactions to the problems (Forgas, 1989), a pilot study was conducted to test the effect of a mood-neutralizing stimulus. An article discussing mathematical functions, thought to be challenging but not affective in

nature, was presented to the students in order to ascertain whether or not it could be a mood neutralizer.

Table 1

Means and Standard Deviations for the Affective and Cognitive Reactions to the Ill-Structured Problems

Variable	Carol ^a		Scott ^a		Acme ^a	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
**negative arousal	74.67 _a	10.59	64.02 _b	13.51	64.05 _b	12.66
**elation	25.04 _a	5.93	31.34 _b	5.70	34.20 _b	6.48
*problem involvement	15.10 _a	3.61	11.85 _b	3.41	12.95 _b	4.20

Note. All non-significant group differences were omitted. ^an = 20. **Means in the same row that do not share subscripts differ significantly at $p < .01$ by the Duncan significant difference comparison. *Means in the same row that do not share subscripts differ significantly at $p < .05$ by the Duncan significant difference comparison.

Participants

Participants were 34 undergraduates enrolled in psychology courses at the University of Nebraska at Omaha. They participated voluntarily and received extra credit for taking part in the study. Participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association [APA], 1992). The average age of the participants was 23.53, $SD = 8.16$, with 22 females and 12 males. Twenty-eight participants were white, three were African American, two were Hispanic, and one participant was of another ethnic background.

Stimulus Materials

Participants were presented with an article titled “On Comparison Meaningfulness of Aggregation Functions (Marichal & Mathonet, 2000) as well as a mood measure (see Appendix G) and a demographic questionnaire (see Appendix F). Participants were instructed to first read the article, next to respond to the mood measure, and finally to complete the demographic questionnaire.

Results and Discussion

The average mood score was 4.71, $SD = 1.75$. The score of 4.71 was within the mid-range values (4-7), which reflect a neutral score on the mood measure. The effect of the mood neutralizing stimulus was realized, meaning that participants’ moods were within the range which indicate a neutral mood on the mood measure.

Primary Study

Participants

Participants were 99 undergraduates, 54 females and 45 males, with an average age of 24.07, $SD = 6.00$. Data were collected from 102 participants, but three were removed from the analyses due to complications in completing the experiment. They were enrolled in psychology courses at the University of Nebraska at Omaha. Seventy-nine participants were Caucasian, twelve were African American, four were Latino, and four were of another ethnic background. They participated voluntarily and received extra credit for taking part in the study. Participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (APA, 1992).

Stimulus Materials and Task

The materials in this study were collected using paper and pencil and computer-based inventories, and through the participants’ written responses to demographic items and the ill-structured problems.

Cognitive intelligence. The Wonderlic Personnel Test (Wonderlic, 2002) was used to assess the participants’ cognitive intelligence. Previous uses of this questionnaire have shown internal consistency values for this measure ranged from .88 to .94 (Wonderlic, 2002). The reliability of this test administration was unable to be calculated due to the differential completion by the participants. Example items from the Wonderlic test include:

1. REAP is the opposite of

1 obtain 2 cheer 3 continue 4 exist 5 sow

2. In 20 days a boy saved one dollar. What was his average daily savings?

3. What is the next number in this series?

16 4 1 .25 ?

The Wonderlic was used in this study so that the influence of intelligence on solution generation could be accounted for before the effect of emotional intelligence was analyzed. The participants completed the Wonderlic under the pretext that they were providing information that was helping plan a future study.

Mood measure. Participants' mood was assessed in order to rule out any influence on the emotional reactions to the problems (see Appendix G). Cronbach's alpha indicated an acceptable level of reliability, $\alpha = .86$.

Emotional intelligence. The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) was used to assess the participants' emotional intelligence ability (Mayer et al., 2002). The measure consisted of eight sections that assess the four proposed branches of emotional intelligence via the ability model. The split-half reliability previously calculated for the standardization sample, which included over 5000 participants, for this measure was .91 (MSCEIT, 2002). The split-half method is used due to item heterogeneity for the total scale. The split-half reliabilities for the four branches from the standardization sample were: (a) .91, (b) .79, (c) .80, and (d) .83 for perceiving emotions, facilitating emotions, understanding emotions, and managing emotions, respectively.

Example items from the MSCEIT include:

1. Tatiana was annoyed that a coworker took credit for a project, and when he did it again she felt

a. anger b. annoyance c. frustration d. startled e. depression

2. A woman was angry and then felt guilty. What happened in between?

a. she lost the phone number of a friend who was very close to her

b. she didn't finish a job as well as she had hoped to because she didn't have enough time

c. she expressed anger at her friend, who she then discovered hadn't done anything to hurt her

d. she lost a close friend

e. she was angry that someone gossiped about her, and then discovered that others were saying the same thing

Ill-structured problems. The Scott's Management problem and the Carol's Sexual Harassment problem were used in order to facilitate the solution generation behavior that is of interest in the present study (see Appendix B and Appendix C, respectively). These problems were chosen from an array of ill-defined problems that were previously assessed to determine participants' reactions to the problems (Scherer et al., 1994). The problems were rated on several affective and cognitive factors such as involvement, positive arousal, negative arousal, fear, elation, boredom, efficacy, and realism. These two problems were selected because of the contrast between the affective ratings of the two problems.

Demographic questionnaire. Demographic information was obtained from all participants. Please see Appendix F.

Mood manipulation. In order to induce a neutral mood, participants were asked to read the article “On Comparison Meaningfulness of Aggregation Functions” (Marichal & Mathonet, 2000) under the guise that they were providing information for a future study.

Manipulation of the Independent Variable

Emotional arousal of the problem. The degree of the negative emotional arousal elicited from the problem was manipulated through the scenario of the problem. Participants received both problems, one higher and one lower in negative emotional arousal. Based on the results from Study 1, a statistically significant difference in the perceived emotional nature of the two problems is expected.

Dependent Measures

Quantity of nonrepeating alternatives. Two raters, who were unaware of the purpose of the experiment, counted the number of nonredundant alternatives generated to each problem by each participant. They were instructed to consider an alternative redundant if it is simply a restatement of another alternative using different word order or usage.

Measurement of resolving power. Resolving power was defined by Scherer as the degree to which a solution addresses the conflicting aspects of the problem (1985). Alternatives that attempted to resolve only one aspect of the problem were considered low in resolving power, and those that attempted to resolve the conflicting aspects of the problem were considered high in resolving power. Each alternative was rated on a 6-point scale on the extent to which it resolved the problem. A rating of 1 indicated that the alternative did a poor job of addressing any aspects of the problem and a rating of 6

indicated the alternative resolves both of the conflicting aspects of the problem. Two graduate students in psychology completed the ratings of resolving power. The rating scale is presented in Appendix E.

Prior to the start of the rating process, the raters were instructed on the meaning of resolving power and the use of the resolving power anchors. The experimenter utilized Carol's problem to provide examples of alternatives that were exemplars of the resolving power anchors. The ratings were discussed and the experimenter further clarified how the rating scale should be used. After the rater training was completed, the raters were asked to read both problems and to reach agreement on the essential conflicts for each problem. This was completed without any input from the experimenter.

Following this, the raters were asked to read all the alternatives generated by the study participants and independently generate a list of possible categories for those alternatives. The categorization process was done because it facilitates the rating process by grouping similar solutions together. Following a consensus on the list of categories, the raters divided the alternatives into categories independently and then came together to resolve any discrepancies and to reach a consensus on the category of an alternative.

After the category assignment reached consensus, raters began to independently rate the solutions based on the 1-6 scale of resolving power ratings. Raters came to consensus on the ratings and analyses were conducted on their rating consistency. The inter-rater reliability of the original assessments was calculated using kappa, which gauges the consensus among raters. A value of 1 would indicate perfect agreement, whereas a value of 0 would indicate no agreement. Morgan and Griego (1998) advised

that the realized value for the raters' agreement was acceptable because it was higher than .70 ($\kappa = .72$, $t = 51.46$, $p < .05$).

Six indices of the resolving power of solutions were created, three values representing the values within each problem, as well as three indices representing the combined across problems values: (a) the quantity of high resolving power solutions, (b) the highest resolving power rating, and (c) the average resolving power. These each capture a different aspect of quality, specifically through resolving power. The quantity of high resolving power solutions provides a measure of how many solutions by each participant were rated a high solution (4-6). The highest resolving power rating denotes the highest rated solution given by each participant. The average resolving power assesses the mean quality of all solutions provided by each participant.

Procedure

First, participants completed the Wonderlic questionnaire. Following the Wonderlic, the participants read the mood neutralizing journal article and filled out a questionnaire to assess their mood. Both of these activities were done under the pretext of gathering information for a future study. Participants then either generated solutions to the two problems or completed the MSCEIT questionnaire. The order was counterbalanced such that half the participants started with the solution generation tasks, and the other half of the participants completed the MSCEIT. Problem order was also counterbalanced with half the participants receiving Scott first, and the other half receiving Carol first. Participants then completed the demographic questionnaire. Finally,

participants were debriefed and thanked. The study took participants approximately one hour and forty-five minutes to complete.

Power Analyses

Based on Murphy's power analyses estimation procedures for this design, the planned use of 100 participants yielded a power of .80 (Murphy & Myers, 1998). The power analysis was based on an assumed strong effect size for problem type given results from prior research (Butler & Scherer, 1997; Reiter-Palmon & Scherer, 2002), and an assumed small effect size for emotional intelligence.

Chapter IX

Results

Table 2 presents the descriptive statistics for cognitive intelligence, emotional intelligence, perceiving emotions, using emotions, understanding emotions, and managing emotions. For overall emotional intelligence and cognitive intelligence there are restricted actual ranges relative to the possible ranges of scores for the variables. It is important to note the discrepancy between the actual range and the possible range for both cognitive intelligence and emotional intelligence. Table 3 presents the descriptive statistics for the solution quality measures, and solution quantity. However, the statistics show a noteworthy amount of variability with respect to the quantity of solutions generated to each of the problems. The statistics also show large variability for the quantity of high resolving power solutions generated for Carol's problem.

Correlations among the study variables were calculated in order to investigate the relationships between the variables (see Table 4). Though correlational relationships were not proposed in the study, it was important to explore these variables because little empirical work has been done with respect to emotional intelligence. Of particular importance was the correlation between cognitive intelligence and emotional intelligence. A positive correlation was expected, however there was no relationship found. Emotional intelligence was significantly related to gender, $r = .34, p < .01$, such that females had higher levels of emotional intelligence than males. This is not very surprising as women are commonly associated with social interaction and emotional understanding, and many have provided conjecture for those popular notions (e.g. Baron, 1997).

Emotional intelligence was also related to Scott's average resolving power as well as the average resolving power across problems, $r = .21, p < .05$; $r = .25, p < .05$, respectively. The relationship between emotional intelligence and Scott's average resolving power was a little unexpected because I hypothesized that emotional intelligence would be more strongly related to the solution quality measures of Carol's problem.

Cognitive intelligence was related to the quantity of solutions generated to Carol's problem, $r = .23, p < .05$. Finally, cognitive intelligence was related to the quantity of solutions across both problems, $r = .21, p < .05$. The relationship between cognitive intelligence and solution quantity has been demonstrated before, so this finding was not surprising.

Gender correlated with three of the dependent variables of interest. Gender was correlated with the quantity of high resolving power solutions generated; female participants generated more high resolving power solutions than male participants, $r = .24, p < .05$. Second, gender was correlated with the highest rated resolving power solution across problems, such that females had significantly higher rated solutions than males did, $r = .20, p < .05$. Third, gender was significantly related to the quantity of high resolving power solutions generated for Carol's problem, $r = .33, p < .01$, with females generating more high resolving power solutions than males. Lastly, gender was significantly related to the quantity of solutions generated to Carol's problem, $r = .26, p < .01$.

Table 2

Descriptive Statistics for Independent Variables

Variable	<i>M</i>	<i>SD</i>	<i>Possible Range</i>	<i>Actual Range</i>
Cognitive Intelligence	24.48	5.28	0 – 50	13 - 36
Emotional Intelligence	96.37	11.07	0 – 135	72 - 122
Perceiving Emotions	97.95	13.71	n/a	66 - 129
Using Emotions	97.90	13.42	n/a	65 - 129
Understanding Emotions	97.18	9.20	n/a	75 - 115
Managing Emotions	95.58	10.25	n/a	70 – 116

Note. $N = 99$.

Table 3

Descriptive Statistics for Dependent Variables

Dependent Variables	<i>M</i>	<i>SD</i>
Quantity of Solutions		
Carol	5.57	2.43
Scott	4.76	3.06
Sum ^a	10.32	4.58
Average ^b	5.17	2.29
Quantity of High Resolving Power		
Carol	3.55	1.46
Scott	1.29	1.31
Sum ^a	2.41	1.01
Average ^b	4.84	2.02
Average Resolving Power		
Carol	3.92	0.74
Scott	2.90	0.91
Sum ^a	6.82	1.24
Average ^b	3.41	0.62
Highest Resolving Power		
Carol	5.71	0.61
Scott	4.46	1.49
Sum ^a	10.16	1.65
Average ^b	5.08	0.83

Note. $N = 99$.

^a indicates that the Sum is the additive value for both problems. ^b indicates that the Average is the average value across problems.

Table 4

Intercorrelations Among Study Variables

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender	-.19	.34**	.26*	.01	.08	.11	.30	.10	.33**	.11	.15	.13	.20*	.24*
2. Cognitive Intelligence	-	.04	.23*	.14	-.08	-.04	.09	.09	.12	.06	.21*	-.08	.12	.12
3. Emotional Intelligence	-	-	.03	-.08	.17	.21*	.18	.08	.18	-.07	-.03	.25*	.14	.08
4. Carol Quantity of Solutions	-	-	-	.39**	-.36**	-.07	.17	.16	.73**	.24*	.47**	-.26**	.23*	.76**
5. Scott Quantity of Solutions	-	-	-	-	-.29**	-.04	-.07	.34**	.12	.56**	.87**	-.20*	.28**	.45**
6. Carol Average Resolving Power	-	-	-	-	-	.13	.51**	-.04	.21*	-.15	-.39**	.69**	.15	.05
7. Scott Average Resolving Power	-	-	-	-	-	-	.05	.72**	-.02	.55**	-.06	.81**	.66**	.34**
8. Carol Highest Resolving Power	-	-	-	-	-	-	-	.08	.37**	-.03	.03	.34**	.44**	.24*
9. Scott Highest Resolving Power	-	-	-	-	-	-	-	.11	.70**	.31**	.50**	.93**	.93**	.53**
10. Carol Quantity of High Resolving Power	-	-	-	-	-	-	-	-	.07	.47**	.10	.23*	.23*	.76**
11. Scott Quantity of High Resolving Power	-	-	-	-	-	-	-	-	-	.50*	.31**	.62**	.62**	.70**
12. Quantity of Solutions Across Problems	-	-	-	-	-	-	-	-	-	-	-.27**	.29**	.29**	.67**
13. Average Resolving Power Across Problems	-	-	-	-	-	-	-	-	-	-	-	.56**	.56**	.27**
14. Highest Resolving Power Across Problems	-	-	-	-	-	-	-	-	-	-	-	-	-	.57**
15. Quantity of High Resolving Power Across Problems	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* $p < .05$, ** $p < .01$. $N = 99$.

Multiple regressions were used to test Hypotheses 1A, 1B, and 1C, the predictions pertaining to the relationships between emotional intelligence and cognitive intelligence with the resolving power indices across solutions. Because cognitive intelligence did not have a significant relationship with emotional intelligence or with the solution quality indices (see Table 3), analyses were completed with and without cognitive intelligence in the model. Cognitive intelligence did not influence the model or the relationships between the other predictors and solution quality, so the results presented do not include cognitive intelligence. Although no specific predictions were rendered with respect to gender, it was included in these analyses because of the relationships indicated from the zero-order correlation between gender and emotional intelligence, as well as the quantity of high resolving power solutions and the highest rated resolving power solution (see Table 3). Gender was put into the first step of the hierarchical regression analysis, and emotional intelligence was entered into the second step of each analysis.

Hypothesis 1A was not supported. Though the overall model used to test the relationship of emotional intelligence and the quantity of high resolving power solutions approached significance, the beta relating to emotional intelligence was non-significant.

Hypothesis 1B was also not supported. The overall model used to test the relationship between emotional intelligence and the highest rated resolving power solution was not significant. More importantly, the beta related to emotional intelligence was non-significantly related to the highest rated solution.

Hypothesis 1C, however, was supported. The overall model was significant, $F(2, 96) = 3.71, p < .05$ (see Table 5). More specifically related to the hypothesis of this study,

emotional intelligence did account for a significant amount of variance in the average resolving power of solutions across problems such that people higher in emotional intelligence also generated solutions to both problems which were higher in resolving power, ($\beta = .25$, $t(96) = 12.62$, $p < .05$), though the effect size of about 5% was small.

Table 5

Hierarchical Multiple Regression Analysis Relating Average Resolving Power Across Problems to Gender, and Emotional Intelligence

Step and predictor variable	β	R^2
1. Gender	.11	.01
2. Emotional intelligence	.25	.05*

* $p < .05$.

Multiple regression analyses were used to test the study's predictions (hypotheses 2A, 2B, and 2C) regarding the effect of emotional intelligence and problem type (higher versus lower negatively emotionally arousing) on solution quality (quantity of high resolving power solutions, average resolving power, and highest rated resolving power solution, respectively). Contrast coding was utilized for the within-factor of problem type and effect coding was used for the between-factors of problem order and gender. Scores on the emotional intelligence measure were mean deviated to permit emotional intelligence to be analyzed as a continuous variable and therefore maximize the power of the analyses.

In order to conduct the mixed design multiple regression, three contrast coded variables were created for average resolving power, quantity of high resolving power solutions, and highest rated solution using procedures presented by Judd and McClelland (1989)¹. The new variables created were difference scores, or the difference between Carol's problem and Scott's problem for each dependent measure on their respective analyses. This procedure allowed for a single variable to code the within-subjects variable of problem type in each of the three analyses. The multiple regression analysis included three steps in order to test the study's hypotheses. The interaction of problem type and problem order as well as the interaction between problem type and gender were controlled by entering them into the first and second steps of the hierarchical regression, respectively. The interaction between problem type and emotional intelligence was added in the third step of the hierarchical regression, which represented the substantive

predictions of the study regarding the interactive effects of emotional intelligence and problem type on solution quality. Table 6 presents the results of these analyses.

Quantity of high resolving power solutions. Though the overall model was significant, $F(3, 95) = 4.48, p < .01$, the hypothesized interaction between emotional intelligence and problem type did not account for a significant amount of variance in the quantity of high resolving power solutions generated and therefore hypothesis 2a was not supported (see Table 6). However, the interaction of problem type and the order in which the problems were received did account for a significant amount of variance, [$\beta = -.33, t(98) = -3.49, p < .01$], and this accounted for approximately 11% of the variance in the quantity of high resolving power solutions generated. Participants who reacted to Carol's problem first generated more high resolving power solutions to Carol's problem than those who responded to Scott's problem first. In addition, participants who responded to Carol's problem first generated fewer high quality solutions to Scott's problem than those who responded to Scott's problem first.

Though not proposed in Hypotheses 2a, 2b, or 2c, the interaction between gender and problem type was included in addition to the interaction between problem order and problem type in the analyses. This was due to the realized significant zero-order correlations among gender and other study variables. The interaction of gender and problem type was a significant predictor, $\beta = .22, t(98) = 2.31, p < .05$, and explained approximately 5% of the variability in the quantity of high resolving power solutions. Although females and males generated an equally low number of high resolving power

solutions to Scott's problem, females compared to males generated a significantly higher number of high resolving power solutions to Carol's problem.

Average resolving power. No significant effects were found for any of the variables on the average resolving power of solutions. With respect to the specific hypothesis of this study, the interaction between emotional intelligence and problem type did not account for a significant amount of variance in the average resolving power of solutions generated (see Table 6):

Highest rated solution. No significant effects were found for any of the variables on the highest rated resolving power solution. The hypothesis from this study which specified an interaction between emotional intelligence and problem type was not realized as it did not account for a significant amount of variance in the highest rated solution generated (see Table 6).

Table 6

Hierarchical Regression Analyses Relating Measures of Solution Quality to Interactions of Problem Type with Problem Order, Gender, and Emotional Intelligence

Step and interaction	Quantity of High Resolving Power Solutions ^a		Average Resolving Power ^b		Highest Resolving Power Solution ^c	
	β	R^2	β	R^2	β	R^2
1. Problem order X Problem Type	-.33	.11**	.10	.04	.12	.02
2. Gender X Problem Type	.20	.05*	-.04	.00	.02	.00
3. Emotional intelligence X Problem Type	.01	.00	-.04	.00	-.03	.00

Note. Interaction of problem type with problem order, gender, and emotional intelligence encompass both the participants' responses to Carol's and Scott's problems for the specific measure of solution quality in order to add the within variable of problem type into the analyses. This allowed for a single variable to code my within-subjects variable of problem type in each of the three analyses.

^a The new variable created was a difference score, or the difference between Carol's problem and Scott's problem on the quantity of high resolving power solutions. ^b

The new variable created was a difference score, or the difference between Carol's problem and Scott's problem on the average resolving power of the solutions. ^c The new variable created was a difference score, or the difference between Carol's problem and Scott's problem on the highest rated resolving power solution.

* $p < .05$, ** $p < .01$.

Table 7

Quantity of High Resolving Power Solutions Presented by Problem Type and Problem Order

Problem	<i>Carol</i>		<i>Scott</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Carol First	3.64	1.61	1.14	1.25
Scott First	3.45	1.29	1.45	1.37

Table 8

Quantity of High Resolving Power Solutions Presented by Problem Type and Gender

Problem	<i>Carol</i>		<i>Scott</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Female	3.98	1.38	1.30	1.27
Male	3.02	1.39	1.28	1.37

Solution quantity and cognitive intelligence. Hypothesis 3A was supported. Those with higher cognitive intelligence generated more solutions to the problems, $R^2 = .21, p < .05$. Unfortunately, cognitive intelligence was not related to the quality of solutions across problems, which were represented by hypotheses 3B, 3C, and 3D. In this sample, those higher in cognitive intelligence did not generate a higher quantity of high resolving power solutions across problems than those lower in cognitive intelligence. In addition, no relationship was found between cognitive intelligence and the highest rated solution across problems, or with the average resolving power of solutions across problems.

Solution quantity and problem type. Finally, a related samples t-test was used to test the hypothesis that participants would generate a fewer number of solutions for the higher negatively arousing problem than for the lower negatively arousing problem. Though there was a significant difference, $t(98) = 2.61, p < .01$, two-tailed test, the difference was not in the direction predicted (see Table 9). Participants generated significantly more solutions to Carol's sexual harassment problem than they did to Scott's employee retention problem.

Exploratory analyses. In addition to the specific hypotheses proposed in this study, other models were also investigated. The effect of the interaction between emotional intelligence and gender on solution quality was examined, however no significant finding was discovered. In addition, analyses were completed that investigated the influence of the four branches of emotional intelligence. There were no significant results with respect to any of the emotional intelligence sub-dimensions and the

interaction with problem type. However, a few interesting results were found for one of the sub-dimensions, managing emotions, and some of the solution quality indices across problems. A person's ability to manage emotions was related to the highest rated resolving power solution, $\beta = .20$, $t(98) = 2.04$, $p < .05$, such that those who were better in managing emotions had a higher rated resolving power solution than those who were less skilled in managing emotions. In addition, people who were better at managing their emotions generated solutions with a higher average resolving power than those who were less skilled at managing their emotions, $\beta = .31$, $t(98) = 3.15$, $p < .01$.

The main effects of emotional intelligence on the solution quality measures and of problem type on quantity were specifically proposed in hypotheses 1a, 1b, 1c, and 4 respectively. For exploratory purposes the main effects of gender, problem type, and problem order were also investigated.

After controlling for the influence of emotional intelligence, neither the main effect of gender nor the main effect of problem order were statistically significant with respect to the quantity of high resolving power solutions. There was, however, a main effect of problem type, $F(1, 98) = 139.58$, $p < .01$, such that participants generated significantly more high resolving power solutions to Carol's problem than to Scott's problem.

After controlling for emotional intelligence, the main effects of gender and problem order were not significant predictors of average resolving power. A main effect of problem type was found though for the average resolving power of solutions, $F(1, 98)$

= 87.78, $p < .01$. Participants had a higher average resolving power for Carol's solutions compared to Scott's solutions.

Controlling the effect of emotional intelligence, the main effects of gender and problem order were not significant predictors of the highest rated solution. There was however a main effect of problem type on the average resolving power of solutions, $F(1, 98) = 63.77, p < .01$. Participants had a higher highest rated solution for Carol's problem than for Scott's problem.

Table 9

Differences Between Carol's Problem and Scott's Problem for the Quantity of Solutions Generated

Problem	<i>Carol's</i>		<i>Scott's</i>		<i>t(98)</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Quantity of Solutions Generated	5.57	2.43	4.76	3.06	2.61**

** $p < .01$.

Chapter X

Discussion

Overview

The purpose of this study was to add to the understanding of predictors that contribute to explaining solution generation, and the specific goal was to examine the role of problem type and emotional intelligence on the quantity and quality of solutions generated to ill-structured problems. The pre-supposition is that by understanding which variables contribute to solution generation, we can improve the processes and outcomes in problem solving. This section will begin by presenting a summary of the findings and interpretations from this study. The implications of this study will follow. Finally, the methodological limitations as well as suggestions for future directions will be discussed.

Summary of Results from Predictions

Emotional intelligence and total average resolving power. One of the analyses to test the study's hypotheses with respect to emotional intelligence resulted in a realized prediction. Hypothesis 1C predicted that emotional intelligence would contribute to explaining average resolving power across problems above and beyond cognitive intelligence. The data in this study affirmed that people higher in emotional intelligence generated solutions that resulted in a higher average resolving power across problems than people lower in emotional intelligence.

Recall that the reasoning for this prediction was that because the problems did contain affective components, and that because emotional intelligence is posited to facilitate thinking and problem solving, emotional intelligence should be related to

solution generation. Therefore, one would predict that people higher in emotional intelligence would generate higher quality solutions than someone lower in emotional intelligence.

The other five hypotheses presented in this study relating to emotional intelligence were not realized. The non-significant influence of emotional intelligence on the quantity of high resolving solutions, the average resolving power between problems, and the highest rated solution may have contributed to the non-significant interaction between emotional intelligence and problem type. Though the results showed a significant relationship between emotional intelligence and the average resolving power across all solutions, this relationship did not carry over to the other dependent measures of interest.

Cognitive intelligence and solution quantity. Cognitive intelligence was related to solution quantity such that participants higher in cognitive intelligence generated more solutions across problems than those lower in cognitive intelligence. This replicates a previous finding by Reiter-Palmon and Scherer (2002). A discussion of the unexpected findings from this study will be presented next.

Summary of Unexpected Findings

Though a significant difference was found regarding the quantity of solutions generated to the two separate problems, it was not in the direction predicted. Participants generated more solutions to the higher emotionally involving and negatively arousing problem (the sexual harassment problem) than they did to the lower emotionally involving and negatively arousing problem (the employee retention problem).

Problem order was not hypothesized to have an influence on solution generation, but was included to control for a methodological influence to the study's conclusions.

The results indicated that the interaction between problem order and problem type had a significant influence on the quantity of high resolving power solutions generated.

Participants who received the sexual harassment problem first generated a higher quantity of high resolving power solutions to Carol's problem compared with participants who received the employee retention problem first (Scott's problem). Furthermore, participants who received Scott's problem first presented more high resolving power solutions to Scott's problem than the participants who responded to Carol's problem first. However, participants who received Carol's problem first generated fewer high quality solutions to Scott's problem than those who had been presented with Scott's problem first. Similarly, participants who responded to Scott's problem first provided fewer high quality resolving power solutions to Carol's problem compared with those who received Carol's problem first.

In addition, the interaction between gender and problem type was not originally considered to play a role in solution generation. However, due to the significant relationship between emotional intelligence and gender, such that females have higher emotional intelligence than males, gender was included and related to the quantity of high resolving power solutions. Females and males generated an equally lower number of high resolving power solutions to Scott's problem. However females provided significantly more high resolving power solutions than males for Carol's problem.

Summary of Exploratory Findings

A person's ability to manage emotions appears to be important when people are generating solutions to social problems. Those who were better in managing emotions had a higher rated highest resolving power solution than those who were less skilled in managing their emotions. People who were better at managing their emotions also generated solutions with a higher average resolving power than those who were less skilled at managing their emotions.

The pattern of results from this study has provided some interesting questions to be answered with future research. The next section will present an interpretation of these findings, and following that section future directions for research will be discussed.

Interpretation of Findings

Though unpredicted, problem order significantly influenced solution generation. It is possible that participants experienced fatigue from the experiment length, such that participants who received Carol's sexual harassment problem generated more high quality solutions to that problem, and participants who received Scott's employee retention problem did better on Scott's problem. After responding to the first problem, participants may have disengaged prior to generating solutions to the second problem which resulted in fewer solutions being generated to the second problem presented.

It was also interesting to find that gender and problem type interacted to influence the quantity of high resolving power solutions generated, such that females did better than males on the sexual harassment problem. It may be that females are more familiar with the sexual harassment scenario compared to males. Females may have thought more

about sexual harassment scenarios, and therefore have a better understanding of what they would do if confronted with the situation.

One possible explanation for this gender difference is that there is a disparity between genders and their value-based and outcome-based reactions to sexual harassment scenarios. Value-based reactions involve a person's internal values and morals, whereas outcome-based reactions involve a temporarily relevant outcome or goal (Illies & Reiter-Palmon, 2000). Value-based involvement triggers attitudes by involving the self-concept and therefore activating morals and values (Illies & Reiter-Palmon, in press). Outcome-based involvement involves attitudes because people are presented with a goal and then are able to choose whether to achieve or avoid the goal (Illies & Reiter-Palmon, in press). With respect to this study, females may feel more strongly about being sexually harassed, and may therefore be more likely to have thought about their values toward possible scenarios, and this may make the activation of related values easier than for the male participants. In addition, women may have also thought more about what the outcome should be in similar situations. The disparity between outcome and value based reactions may be something to further investigate in order to get a better understanding of the gender and problem type differences found in this study. In addition, an exploration of how values influence the taking of sides when solving a problem is something that should be done in future research.

The gender difference finding with respect to the sexual harassment scenario may be related to a finding by Wiener and colleagues. Wiener, Hacknet, Kadela, Rauch, Seib, Warren, and Hurt (2002) found that women were more likely to believe that a

complainant had been exposed to “unwelcome sexual conduct,” and that the conduct was harsh and all-encompassing. Wiener and colleagues (2002) concluded that the assessment of social-sexual scenarios, and the influence that gender has on the evaluation is quite “complex.”

The problems differed not only on their level of negative arousal, but also with respect to the emotional involvement of the problem. Because participants found Carol’s problem more emotionally involving, they might have become more interested in the problem solving tasks. Being interested may overcome the negatively arousing nature of the problem, and therefore emotional intelligence may not play as critical of a role in the outcome. In addition, being emotionally involved may have overridden the tendency for negative affect to diminish performance, and therefore resulted in participants generating more solutions to Carol’s sexual harassment problem as compared to Scott’s employee retention problem. The influence of the emotional quality of the problem on quantity, but not on the quality of ideas, is similar to the pattern of results previously found by Vosberg (1998), where positive mood was positively significantly related to the quantity of ideas, but not the quality of ideas.

It was hypothesized that because people would be more likely to take sides when confronted with Carol’s sexual harassment problem, they would in turn generate fewer solutions to the problem. This, however, was not what happened. It may be that interest or familiarity with the sexual harassment scenario may override the tendency for people to take sides and therefore reduce the universe of solutions.

Theoretical Implications

First and foremost, people may want to be cautious in proposing emotional intelligence as a major predictor of all organizational behavior (e.g. decision making, leadership, persuasiveness). The results of this study suggest that emotional intelligence may not equally influence all of the important organizational outcomes. It is important to recognize that though the concept of emotional intelligence has been around for over 10 years, the body of research investigating its influence is relatively small. Future studies should continue to investigate which organizational activities are most strongly influenced by emotional intelligence. With respect to this study, researchers should try to identify which steps of the problem solving process are more strongly influenced by emotional intelligence.

In addition, this study highlights that problem characteristics influence solution generation. Specifically, the type of problems that are encountered, as well as the order of their presentation, influence the quality of solutions generated to those problems. Organizations should recognize problem characteristics as a factor in deciding who should be involved in the decision processes, as well as when they should be involved.

Applied Implications

The individuals who are chosen to solve particular problems should possess certain qualities. Though premature, this study suggests that people higher in emotional intelligence will generate higher quality solutions for problems of varying emotional qualities than those lower in emotional intelligence.

Furthermore, companies may want to be more cautious about implementing emotional intelligence training programs, as it is still unclear as to how emotional intelligence is related to all potential desirable outcomes.

Methodological Limitations and Future Research

This study looked at nine different dimensions of problem characteristics. As such, I was unable to control for all possible differences between the problems. In addition, I was unable to rule out all the competing theories for the differences between the problems, and as such I will not make any claims based solely on the three significant differences found between problems. However, this limitation is important to point out so that future researchers can work to further define problem differences.

Similar to the previous point, both the emotional involvement and negative emotional arousal of the problems differed. However, we do not know how these two problem characteristics work together to influence solution generation. Our understanding of the potential interactive effect of these two problem differences is not clear. Future efforts to clarify whether these two aspects of the problem result in interactive and/or additive effects are needed.

Furthermore, these problems differed not only on their dimensions, but also in their content. The content may have resulted in the differential responses to the two problems. Future research needs to be done to differentiate between the effects of the content of the problems and the dimensions or category of the problems.

Finally, other problems that are identical to these two on their respective 9 dimensions need to be included in future research. In this study only one problem of each

type was included. Additional efforts should make an effort to include multiple problems within each problem type to make more clear whether the problem type or problems themselves are responsible for solution differences.

There is also a possible limitation with respect to the instructions given for the solution generation task. Participants were instructed to generate as many solutions as they could in order to deliberately reduce the probability that participants would prematurely stop generating solutions. However, the prompt to generate multiple solutions may have encouraged participants to maximize the quantity of their solutions at the cost of quality. Rather than integrating their best and most complete responses, participants may have kept their ideas separate and disconnected. These solutions, therefore, may not have reflected their ability to provide their best quality solution. Though some work has investigated how the instructions of the problem solving task influence solution generation performance (e.g. Butler & Scherer, 1997; Pitz et al., 1980; Wightman, 1999), future efforts should focus on how task instructions differentially influence the integration and separation of ideas.

Another limitation of this study is its ecological validity. Because I used somewhat hypothetical situations, I am limited as to the conclusions that are possible. People did react and respond to the problems, but the response did not come during real conditions. Participants may in fact respond differently to these scenarios when facing them in real life. Efforts to capture actual scenario

This study focused specifically on solution generation. It may be that the influence of emotional intelligence as well as problem characteristics might be realized

within another decision making activity such as how a decision maker represented the problem, or the criteria they used to evaluate alternatives. Future studies should investigate the influence of emotional intelligence and problem characteristics on other processes within the ill-structured decision making process.

An additional direction for future work could be an exploration of other individual difference variables. This study concentrated on the influence of only a few individual difference variables on solution generation (i.e. cognitive intelligence and emotional intelligence). Other individual difference variables, such as emotional stability, self-monitoring, cognitive complexity, and social intelligence, as well as their potential interaction with emotional intelligence and cognitive intelligence should be examined with respect to solution generation and other decision making domains.

Other research has shown that situational, task, and motivational variables influence solution generation. Variables such as identifiability, accountability, causal focus, time spent on task, and time limitations, should be included in future investigations of the influence of individual difference variables, such as emotional intelligence, on solution generation.

The problems used in this study were ill-defined problems, which should be more representative of real-world type scenarios. However, the influence of things such as company culture, norms, and resources should be included in the investigation of solution generation to these types of problems because of the interactive effects of many things most likely influence how a person will respond to these types of problems.

This study could also be replicated with problems less difficult in nature. It is possible that more difficult problems may hide the interactive influence of emotional intelligence and emotional problem characteristics because there is more for the problem solver to process. Future research could focus on problems with varying levels of difficulty to see if the predicted interactions from this study would be realized.

The problem order effects make salient that there may be engagement effects based on the order in which tasks are presented. It is important to understand if these are emotional carryover effects, or engagement differences, or if the differences were due to something else. It is also important to understand if these effects are durable. In addition, it would be valuable to understand how to utilize engagement effects to facilitate performance.

Future studies might also look at other measures of resolving power quality, such as the proportion of high resolving power solutions. In addition, other quality ratings such as originality, appropriateness, accuracy, or the number of different categories a problem solver's solutions belonged to, may also provide additional insight into how problem characteristics and individual characteristics are related to different aspects of quality. For example, quality measures such as accuracy may be more related to a measure of cognitive intelligence.

Finally, forthcoming research efforts could use a combination of dependent variables. It is possible that the three measures of interest in this study (i.e. quantity of high resolving power solutions, average resolving power, and the highest related solution) together would evince in an overall pattern that is more consistent with the

study's primary premise that problem type and emotional intelligence would interact to influence solution quality.

Though this study did not show all of the predicted relationships that were stated, it did provide an interesting framework to investigate the effects of problem characteristics and individual differences on the decision making process. Obviously the importance of improving decision making processes and outcomes requires that researchers continue to ask the questions that can help predict, define, and explain decision making.

Footnotes

1. Though a repeated measures analysis of variance would allow for the examination of within subject variables, categorical predictors must be used. Judd and McClelland (1989) developed a methodology for testing within subject variables of interest in conjunction with continuously measured predictors. For this study three new variables were created using Judd and McClelland's procedure. The procedure is described for the average resolving power variable, but was used to create variables for quantity of high resolving power solutions and highest rated solution. Contrast coding was used to incorporate the participants' scores on both Carol and Scott scenarios. Participants' average resolving power scores for Carol's problem were multiplied times a +1. Participants' average resolving power scores for Scott's problem were multiplied times a -1. These two values were then added together. The additive value was then divided by the square root of the sum of the squared contrasts codes. This new variable represented a score for average resolving power that was incorporated the difference between the two problems (Scott and Carol).

Chapter XI

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APPENDIX A

Acme Organization Problem

Please read the following problem confronting the Acme Organization.

The Engineering Department of Acme Company has been holding wage increases to a 6 percent level. The decision to hold wage increases came about from an effort to reduce product twice in the past year due to increased shipping costs of materials, and upper management does not feel that Acme can remain competitive if there are any future increases in the cost of their product. Unfortunately, the engineering job market in the area stands at about 12 jobs for every one trained engineer. Because of this, "headhunters" are cropping up and are enticing Acme's engineers with "better" jobs and "better" benefits. As of late, turnover among Acme's engineers has increased and productivity has decreased. Also, there is a considerable grumbling among current engineers about Acme's policy on wage increases. Upper management feels that much of the dissatisfaction is based upon the headhunters' enticements of better opportunities in other places. The concern at Acme is to maintain a quality group of engineers at a high level of productivity. Upper management at Acme does not know how to solve this problem.

APPENDIX B

Scott's Problem

Please read the following problem confronting Scott, a manager.

Scott is the manager of the Acme Engineering Department. The Upper Management of Acme Company has been holding wage increases to a 6 percent level. The decision to hold wage increases came about from an effort to reduce product twice in the past year due to increased shipping costs of materials, and upper management does not feel that Acme can remain competitive if there are any future increases in the cost of their product. Unfortunately, the engineering job market in the area stands at about 12 jobs for every one trained engineer. Because of this, recruiters are cropping up and are enticing Acme's engineers with "better" jobs and "better" benefits. As of late, turnover among Acme's engineers has increased and productivity has decreased. Also, there is a considerable grumbling among current engineers about Acme's policy on wage increases. Mr. Wentworth, an executive vice president, has directed Scott to improve the situation in the engineering department. Mr. Wentworth feels that much of the dissatisfaction is based upon the recruiters' enticements of better opportunities in other places. The concern at Acme is to maintain a quality group of engineers at a high level of productivity. Scott does not know how to solve this problem.

APPENDIX C

Carol's Problem

Please read the following problem confronting Carol, an attorney.

Carol is a single, 29 year-old lawyer who recently began working for a large law firm. Most of her work involves acting as a junior lawyer, assisting Frank, one of the senior partners in the firm. Frank is a highly respected corporate lawyer who is well-connected and a shrewd and successful attorney. Carol enjoyed her job very much at first. Frank saw to it that she was given more and more responsibility, and Carol was convinced that she was well launched into a very successful and fulfilling career. When Frank started asking Carol to accompany him to two-hour "working" lunches and suggesting they work late into the evening, she thought nothing of it. In fact, she was pleased that Frank had such confidence in her work and opinions. Carol began to feel uncomfortable, though, when she noticed that Frank frequently stared at her body. One afternoon during lunch, Frank began questioning Carol intensely about her previous romantic relationships. Suddenly he confessed in a roundabout way that he was interested in her romantically. Carol said she was not interested in a relationship. Subsequently, Frank has been overly critical of her performance in front of other partners and has been giving her less desirable assignments. Carol would like to switch to another law firm, but it took her a year to find this job because there are so many lawyers looking for work. She does not know what to do.

APPENDIX D

Cognitive and Affective Problem Questionnaire

For each of the adjective pairs below, circle the corresponding number that describes how the problem made you feel.

01.	scared	1	2	3	4	5	6	reassured
02.	energetic	1	2	3	4	5	6	tired
03.	riled	1	2	3	4	5	6	pacified
04.	relieved	1	2	3	4	5	6	apprehensive
05.	admiration	1	2	3	4	5	6	contempt
06.	afraid	1	2	3	4	5	6	unafraid
07.	tranquil	1	2	3	4	5	6	agitated
08.	repulsed	1	2	3	4	5	6	attracted
09.	interested	1	2	3	4	5	6	bored
10.	passive	1	2	3	4	5	6	uptight
11.	concerned	1	2	3	4	5	6	unconcerned
12.	undisturbed	1	2	3	4	5	6	mad
13.	apathetic	1	2	3	4	5	6	enthusiastic
14.	cranky	1	2	3	4	5	6	good-humored
15.	unperturbed	1	2	3	4	5	6	anxious
16.	somber	1	2	3	4	5	6	cheerful
17.	calm	1	2	3	4	5	6	excited
18.	disappointed	1	2	3	4	5	6	delighted
19.	detached	1	2	3	4	5	6	engrossed
20.	relaxed	1	2	3	4	5	6	tense
21.	jittery	1	2	3	4	5	6	serene
22.	fearful	1	2	3	4	5	6	fearless
23.	hopeful	1	2	3	4	5	6	hopeless
24.	offended	1	2	3	4	5	6	unoffended
25.	composed	1	2	3	4	5	6	nervous
26.	captivated	1	2	3	4	5	6	disinterested
27.	sluggish	1	2	3	4	5	6	alert
28.	placated	1	2	3	4	5	6	angry
29.	depressed	1	2	3	4	5	6	elated
30.	sedate	1	2	3	4	5	6	jumpy
31.	unruffled	1	2	3	4	5	6	irritated
32.	pleased	1	2	3	4	5	6	displeased
33.	alarmed	1	2	3	4	5	6	unalarmed
34.	dejected	1	2	3	4	5	6	exhilarated
35.	peppy	1	2	3	4	5	6	drained
36.	objectionable	1	2	3	4	5	6	unobjectionable
37.	unbothered	1	2	3	4	5	6	disgusted
38.	threatened	1	2	3	4	5	6	secure
39.	sad	1	2	3	4	5	6	happy
40.	lively	1	2	3	4	5	6	quiet
41.	distressed	1	2	3	4	5	6	comforted
42.	passionate	1	2	3	4	5	6	dispassionate

For each of the statement pairs below, circle the corresponding number that describes your perceptions and reactions to the problem.

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|--|
| 43. | strongly affected me personally | 1 | 2 | 3 | 4 | 5 | 6 | did not affect me personally |
| 44. | I have very little experience with similar problem | 1 | 2 | 3 | 4 | 5 | 6 | I have a lot of experience with similar problem |
| 45. | would need lots of experience to solve problem | 1 | 2 | 3 | 4 | 5 | 6 | do not need any experience to solve problem |
| 46. | problem is very realistic | 1 | 2 | 3 | 4 | 5 | 6 | problem is very unrealistic |
| 47. | problem would be difficult to solve | 1 | 2 | 3 | 4 | 5 | 6 | problem would be easy to solve |
| 48. | problem matters a lot to me | 1 | 2 | 3 | 4 | 5 | 6 | I could care less about problem |
| 49. | I could generate good solutions to the problem | 1 | 2 | 3 | 4 | 5 | 6 | I couldn't * good solutions the problem |
| 50. | would take a lot of time to solve the problem | 1 | 2 | 3 | 4 | 5 | 6 | would take very little time to * the problem |
| 51. | I feel a lot of sympathy for the person with the problem | 1 | 2 | 3 | 4 | 5 | 6 | I have no sympathy for the person with the problem |
| 52. | it is very important to find a good solution | 1 | 2 | 3 | 4 | 5 | 6 | it is not at all important to find a good solution |
| 53. | problem is very complex | 1 | 2 | 3 | 4 | 5 | 6 | problem is very simple |
| 54. | I have a lot of expertise with the problem | 1 | 2 | 3 | 4 | 5 | 6 | I have no expertise with the problem |

For each of the statement pairs below, circle the corresponding number that describes your perceptions and reactions to the problem.

- | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|
| 55. | characters in the problem are very believable | 1 | 2 | 3 | 4 | 5 | 6 | characters in the problem are very unbelievable |
| 56. | I could think of many solutions | 1 | 2 | 3 | 4 | 5 | 6 | I could not think of any solutions |
| 57. | problem provokes strong feelings | 1 | 2 | 3 | 4 | 5 | 6 | problem does not provoke strong feelings |
| 58. | issue depicted in problem is very important | 1 | 2 | 3 | 4 | 5 | 6 | issue depicted in problem is very unimportant |
| 59. | I could think of few compromise solutions | 1 | 2 | 3 | 4 | 5 | 6 | I could think of many compromise solutions |
| 60. | I'm very confident I could resolve the conflict | 1 | 2 | 3 | 4 | 5 | 6 | I'm very unsure I could resolve the conflict |
| 61. | problem requires very much expertise to solve | 1 | 2 | 3 | 4 | 5 | 6 | problem requires very little * to solve |
| 62. | I would take sides to resolve the conflict | 1 | 2 | 3 | 4 | 5 | 6 | I would not take sides to resolve the conflict |
| 63. | Satisfying all parties would be very difficult | 1 | 2 | 3 | 4 | 5 | 6 | Satisfying all parties would be very easy |

APPENDIX E

Resolving Power Anchors

Rating	Requirement
1	<p>Doesn't do a very good job of addressing any aspects of problem *addresses one sub-aspect of one aspect/side poorly</p> <ul style="list-style-type: none"> Exemplar Carol: Deal with the criticism because it will ultimately make her a better lawyer. Exemplar Scott: Talk to a recruiter to see how good the other options are.
2	<p>Addresses one aspect of the problem moderately well *only dealing with one sub-aspect of one aspect/ side moderately well or more than one sub-aspect on one aspect/ side not so well</p> <ul style="list-style-type: none"> Exemplar Carol: Use the hypercritical feedback from her boss as an opportunity to identify and correct mistakes. Once she has proven her ability to excel even under trying circumstances she should have many high-quality job opportunities available to her. Exemplar Scott: They could give them freedom and flexible work schedules as long as they get their work done.
3	<p>Effectively addresses one aspect of the problem *two out of three sub-aspects are effectively addressed on one aspect/ side</p> <ul style="list-style-type: none"> Exemplar Carol: File a sexual harassment lawsuit against him. Exemplar Scott: They can restructure their company so they can pay them more.
4	<p>Seems to attempt to address more than one aspect of the problem *addresses both aspects/ sides vaguely or addresses one aspect/ side moderately well and one vaguely</p> <ul style="list-style-type: none"> Exemplar Carol: Start a romantic relationship with him simply for the advancement of her career. Exemplar Scott: Bring in less experienced engineers and train them to do the job.
5	<p>Resolves the conflicting aspect of the problem moderately well *both sides mentioned: two sub-aspects addressed moderately well or a total of three sub-aspects mentioned vaguely</p> <ul style="list-style-type: none"> Exemplar Carol: Talk to Frank's superior about his actions. Exemplar Scott: Make teams for recruiting engineers and give prizes to those who recruit.
6	<p>Does a very good job resolving conflicting aspects of the problem *both sides mentioned: four sub-aspects addressed with two addressed very well or total of three sub-aspects addressed moderately well</p> <ul style="list-style-type: none"> Exemplar Carol: Have a meeting with all the partners (including Frank) inform everyone of the situation. Make Frank look like an ass. Exemplar Scott: Try to get pay based on productivity. That will improve the recent drop.

APPENDIX G

Mood Measure

Please indicate to what extent you feel this way right now, that is, at the present moment, using the scale provided below.

Sad	1	2	3	4	5	6	7	8	9	10	Happy
Depressed	1	2	3	4	5	6	7	8	9	10	Upbeat
Displeased	1	2	3	4	5	6	7	8	9	10	Pleased
Disappointed	1	2	3	4	5	6	7	8	9	10	Delighted