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EXAMINING THE RELIABILITY AND FACTOR STRUCTURE OF THE CLIMATE FOR INNOVATION QUESTIONNAIRE

John F. Cabra

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Examining the Reliability and Factor Structure of the Climate for Innovation Questionnaire

A Thesis in
Creative Studies

by

John F. Cabra

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

May, 1996

State University of New York
College at Buffalo
Center for Studies in Creativity

ABSTRACT

The purpose of the this study was to determine the extent to which the current version of the Climate for Innovation Questionnaire (CIQIV) had improved in its reliability and internal factor structure. A comparison was made across three previous versions--the CIQIIIA, the Creative Climate Questionnaire (CCQIIA), and the CCQ. This study was an extension of Lauer's (1994) examination of the CCQ's validity. The sample included 1841 respondents who were administered the CCQIIA; 1297 subjects who were administered the CIQIIIA, and 639 respondents who were administered the CIQIVA. The majority of the respondents participated in Creative Problem Solving training programs. All other subjects were students enrolled in Creative Studies courses at the State University College at Buffalo. Responses were subjected to inter-item correlations, exploratory factor analyses, and reliability studies. The results suggested that the CIQIVA operated as it was designed and did so in a consistent manner. The results also suggests that the questionnaire had been improved but may need some minor refinements. Areas of future research with the measure are also suggested.

State University of New York
College at Buffalo
Center for Studies in Creativity

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Dates of Approval:

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Dr. Thomas Quatroche
Dean of Graduate Studies and Research

DEDICATION

To my grandfather, Carlos Arturo Vidales, who taught me the value of play, creativity and innovation...

To my Mother and Father and their forefathers, whose belief in God, integrity, and hardwork, as a wonderful heritage, inspired me.

To my best friend Gerard Puccio
whose love and support gave me wings to fly.

ACKNOWLEDGMENTS

First and foremost I thank God for providing me a great source of love and light through out this entire process.

What an incredible learning experience this turned out to be. It is the author's intent to thank the following people and organizations that have helped me enormously through out this journey.

I wish to give special thanks to my mother and father. Their insatiable pride, faith and confidence in me served as a constant source of inspiration. I thank them for their love, support, and encouragement. I love them very much. To my brother Michael and my sister Claudia, I thank them for their patience and understanding throughout these two years of my absence.

My heartfelt appreciation and gratitude goes to my advisor Dr. Scott Isaksen. I am indebted to his trust, support, time and patience. He had an impact on my learning and development to such an incredible degree not just for this work but for countless other projects. He taught me things that will stay with me for the rest of my life. He pushed and challenged me beyond my own self-imposed constraints. My love for investigation and the pursuit of quality comes from him. Words are not enough to express the deepest respect and admiration I have for him. Thank you.

I would also like to extend my deepest and most sincere thanks to Ken Lauer. The quality of this work is a direct result of his assistance and guidance. He taught me so much about statistics and research. Moreover, he served as a constant source of support and encouragement. I thank him for his vote of confidence, and for this opportunity. I would have never completed this project without him!

To my best friend, Dr. Gerard Puccio, I thank him for our friendship. My skills, abilities, and confidence, that were critical for the completion of this work, is a culmination of a decade of his guidance and mentorship.

A special thank you goes to Dr. Andy Joniak for his meticulous attention given to Chapters Four and Five of which are *replete* with numbers. I thank him for his help and belief in me.

To Jonathon Vehar, thanks for the edits on such short notice! I was desperate and you came through without any hesitation.

I would also like to thank Reg Talbot for providing me insightful data analysis. Moreover, he helped me fill gaps in my work and provided me with great ideas on how to present user friendly numbers.

To Marves Isaksen, I thank her for caring for my well being. It was heartfelt. To Brian Dorval, his support and trust and countless moments of fun and laughter made my visits to the office an enjoyable one and an educational one during the late hours.

I would also like to thank the management staff and my co-workers at United Airlines Buffalo for accommodating my demanding academic schedule. I wish to give special thanks to Mel Olson my close friend who helped me stay focused. Thanks for being there in your own special way. Special thanks also goes to Elizabeth O' Donnell for all her encouragement, guidance, and emotional support. I would also like to thank the following people for their assistance and support: Dr. Mary Murdock, Carol Nickoloff, staff members at the Graduate Studies office, The Center for Studies in Creativity, Brad Lewandowski, John Gaulin, Chris Grivas, Andy Dutcher, Morian Sobiek, and all my friends who withstood my absence.

Finally, thank you Dr. Göran Ekvall for providing me the opportunity to stand on such great shoulders.

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CHAPTER 1

STATEMENT OF THE PROBLEM

OVERVIEW

The purpose of Chapter One is to provide the reader with the rationale for the importance of this study. It begins by introducing the major question, sub-questions and related questions to be addressed by this study. Second, the Climate for Innovation Questionnaire (CIQ) is introduced and then its development is summarized. Lastly, this chapter answers why the major questions and sub-questions are important.

INTRODUCTION

Today the business world is changing radically (Kanter, 1992; Connor, 1992). It is hardly a news flash to read or hear that organizations have entered an era of fierce competition, increasing levels of complexity and change. Perhaps nowhere is the reality of change more evident than in the American airline industry today.

Wrought with bankruptcies, acquisitions, mergers and hostile takeovers, the airline industry is a highly complex and shifting environment. It is characterized by competing corporations trying to capture more market shares by reducing fares, cutting costs, shaping and reacting to governmental policies and finding newer and better ways to service their customers.

As a result of the complexity and the shifting environment, the ability to be innovative becomes more than critical if an organization wants to ensure its survival. But how do organizations foster innovation? Of course there are

many factors. In this study the major concept that is considered is creative climate.

Creative climate has important implications for understanding human behavior in organizations (Turnipseed, 1994). Ekvall (1983) suggested that climate affects how organizational members communicate, solve problems, make decisions, handle conflicts, learn and motivate, and thus, can be noted by the efficiency and productivity of the organization. He noted that climate has an influence on job satisfaction and organization members' ability to innovate.

Isaksen, Murdock, Lauer, Dorval, & Puccio (1995) described creative climate as a complex combination of many factors influencing ordinary and daily interactions among friends, family, and organizational members. Britz (1995) defined creative climate as:

> ...a conglomerate of attitudes, feelings and behaviors within an organization that allow, encourage and foster the creation of change...by producing and implementing new or novel ideas by its members. (p. 16)

This study considers the climate of the organization and its association with factors known to contribute to creativity, innovation and change. Since it is only in recent years that creative climate has received empirical investigation, it is appropriate to conduct more studies that will contribute and add value to the field. This study concentrates on the most recent version of Climate for Innovation Questionnaire subsequently referred to as the CIQIVA. This study essentially summarizes the entire development from the first version (CCQ) all the way up to the current version (CIQIVA) and points to, in

a documented fashion, those things that need to be done for further development of the questionnaire.

Lauer (1994) stated in his work that the CCQ needed a tremendous amount of work. This study is more about documenting and examining the developments that has been done since that time; and more formerly and explicitly, it answers the major question and sub-questions that are raised in this thesis:

1. To what extent have the developments on the climate measure actually improved the psychometric properties of the CIQIVA measure?

   A. What is the reliability of the CIQIVA?

   - How do the measures of central tendency compare across two of its previous versions?
   - How do the item-to-item correlations compare across two of its previous versions?
   - How do the item-to-dimension correlations compare across two of its previous versions?
   - How do the factor structures compare across two of its previous versions?
   - How do the internal reliabilities compare across three of its previous versions, including the original CCQ?

In summary, most of the work to understand and assess a climate for creativity has been done intuitively. It has only been recently that researchers and practitioners have been looking at ways to more formally assess and develop a climate conducive to creativity. It is in this light that this

study examines a particular area of development that builds off of the work of Lauer, Isaksen, and colleagues. Lauer supported Isaksen by examining the basic construct validation of the first version. Since then a number of key developments have taken place. This study is about examining and documenting those key developments.

CLIMATE FOR INNOVATION QUESTIONNAIRE

This section describes the Climate for Innovation Questionnaire and highlights the milestones that led to the development of the CIQIVA. A more detailed description of the CIQIVA's development is found in Chapter Three.

The CIQIVA stems from the work of Dr. Göran Ekvall who is a professor emeritus of organizational psychology at the University of Lund, Sweden, and is also a research fellow with the Swedish Council for Worklife Issues. In 1981, Ekvall developed a 50-item questionnaire to measure the creative climate of organizations. Subsequent to the development of this questionnaire, Ekvall initiated developmental steps to create two more versions. His third version contained 50 items and measured eight dimensions.

In 1986, Ekvall collaborated with Isaksen and colleagues from the Center for Studies in Creativity to translate his questionnaire from Swedish to English. It consisted of 50 items which measured 10 dimensions. The translated version was called the Climate for Creativity Questionnaire (CCQ).

Subsequent to the translation of the questionnaire, the CCQ was revised by Isaksen and colleagues from the Center for Studies in Creativity (CSC) and the Creative Problem Solving Group-Buffalo (CPS-B) researchers. It was subjected to factor analyses, reliabilities, and correlations using a sample size

of 1,200 subjects. The CCQ had 51 items that measured the original 10 dimensions used by Ekvall.

In 1991, the CCQ was subjected to another revision in its structure and a revision to its name. As a way of clarifying the purpose of the instrument, the CCQ was renamed the Climate for Innovation Questionnaire (CIQ). Moreover, CPS-B became the host for the CIQ to maintain commitments and provide on-going support for research.

Subsequently, the CIQ's copyright changed to "Creative Problem Solving Group-Buffalo, CCQ Research Edition IIA-Adapted from Göran Ekvall, Swedish Council for Management and Worklife Issues." Its structure consisted of 60 items and continued to measure 10 dimensions. Some of the items were rewritten or excluded. The dimensions were also rewritten to include new descriptions. In addition, three open-ended questions were included as a result of Isaksen observing that some respondents to the questionnaire would sometimes include written statements as a way of further explaining their responses.

The CIQIVA is a questionnaire based on the work of Ekvall, Arvonen and Waldenström-Lindblad (1983). This questionnaire resulted from more than ten years of collaboration and research with Dr. Göran Ekvall. The CIQ provides information on nine dimensions and includes three open response questions for people's voices to be heard. Results of the CIQ are used to develop strategies and implement actions that enhance the creative productivity of people in an organization. Moreover, the results are used to manage increasing levels of change, complexity and competition.

Specifically, the CIQ serves the purpose of structuring the respondent's thoughts and perceptions as well as making their feelings comparable to the perceptions of others (Britz, 1995). The CIQ is filled out by rating the

applicability of each question on a four-point Likert scale ranging from 0 (Not at all applicable) to three (Applicable to a high degree). The ratings are then averaged and the results are then multiplied by 100. As a result the average scores are presented as numbers between zero and 300 as opposed to zero to three.

RATIONALE

A major reason why this study is important is because the only thorough investigation of the psychometric properties of any of the versions of the creative climate measure was done by Lauer (1994) and was limited to the early edition called the CCQ. There had been numerous additional editions, but they lacked in-depth psychometric analysis.

This is important if researchers are to understand how these developments have added value to the reliability and factor structure of the measure. This study is about being systematic about comparing the developments that have been done and tracking those developments. As a result, the systematic documentation provides a record which can guide future development.

The major question and sub-questions examined in this study are important because good measurement is needed in the area of creative climate as part of a larger framework of research and practice such as the ecological approach to creativity research (Isaksen, Puccio, & Treffinger, 1993). As noted by MacKinnon (1978), creativity is not uni-dimensional, and that in the future new and emerging research and statistical methods could be used to improve understanding of this multi-dimensional concept.

These questions are also significant because the outcome will be used to improve the reliability of the questionnaire so it may be made available to

practitioners committed to stimulating creativity and innovation. This study produces data which may be appropriate for a manual that will provide practitioners a reference to support effective administration and use of the questionnaire.

For researchers the outcome of the major question and sub questions are important because it allows them to apply a tool to the study of phenomena of creative climate. Specifically, a response to these questions allows a researcher to arrive at concise and precise statements of regularities regarding phenomena to an extent attainable without the benefits of measurement (Pedhazur, Pedhazur, & Schmenlkin, 1991). Moreover, it fits the larger research and development goals of contributing reliable instrumentation to the field of creativity (Isaksen et al., 1996). The outcomes also support an understanding of creativity to improve products and services. Finally, the outcomes of these questions supports the CSC's and the CPS-B's profiling initiative to develop a multi-dimensional framework to help understand and predict Creative Problem Solving (CPS) performance.

The other intent of this study is to confirm that the items of these measures align with the dimension of climate they are intended to measure and that they do so in a reliable manner (Lauer, 1994). The reason why so much energy is being placed on this study is because the CIQ is a translation from Swedish and therefore requires special handling. Also, the CIQ has gone through so many different transformations and thus, it is important to consider how each change along the way added value and strength to the various psychometric characteristics of the measure.

Reflective practitioners and researchers have come to accept that for any measure to be considered useful for research or practice, a high level of reliability and validity is a required element (Isaksen, et al., 1996). Often,

researchers and practitioners make decisions and conclusions that are drawn from measures that have low levels of reliability and are built on the types of chance and randomness that typically result in failure. Cronbach (1984) stated that erroneous and unfavorable conclusions which are damaging, disruptive, and unjust can happen when they are affected by temporary variations in performance or by the types of questions included on a measure.

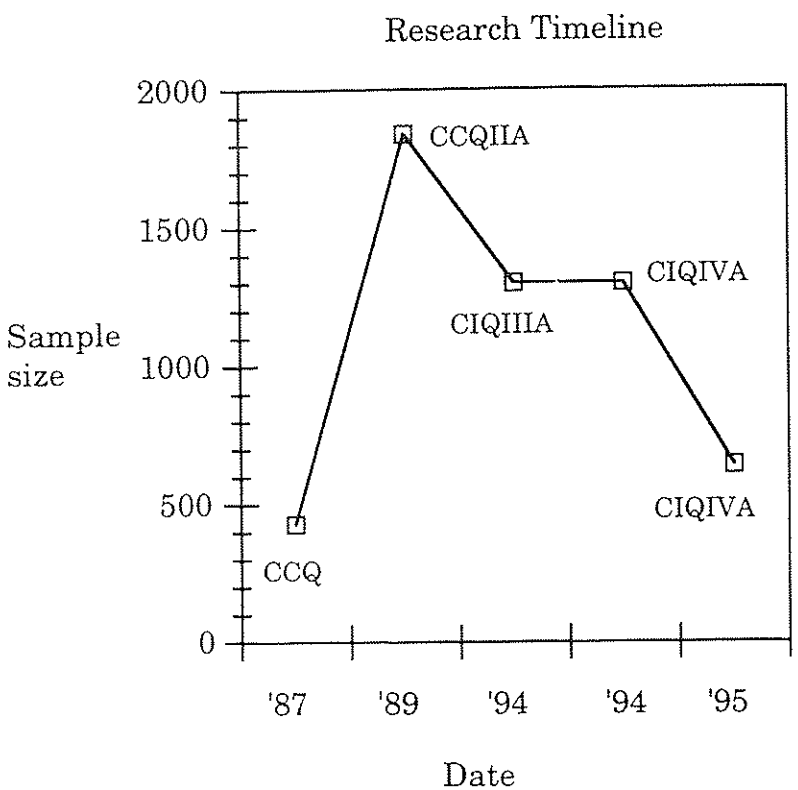
STATEMENT OF THE PROBLEM

In Lauer's (1994) thesis, a multimethod study was conducted to examine creativity literature for the existence of the ten dimensions of the CCQ. In addition to the review, Lauer also conducted one psychometric analysis of the CCQ. The sample size included 434 subjects who participated in Creative Problem Solving training programs. Responses were subjected to exploratory factor analyses. The results suggested that this measure functioned as it was designed and did so in a reliable manner. However, Lauer (1994) suggested that the measure should be used as a research tool pending further study and possible modification as a result of its variations in factor structure. Two possible studies were suggested by Lauer (1994). He suggested the examination of how collinearity of the CCQ's items influences the results of further statistical analysis. More specifically he suggested that the measure be subjected to the factor extraction technique known as maximum likelihood. He also suggested the reliabilities of the ten dimensions be tested by examining the results of the Cronbach alphas and examined to determine if the removal of an item would increase the alpha for a dimension.

Since that time, further studies and modifications were conducted that led to the development of the CIQIIIA and subsequently the CIQIVA (a detailed description of these developments are provided in Chapter Three).

Figure 1.1 shows a timeline and sample sizes from the studies conducted subsequent to the translated CCQ in 1986. Each date signifies a milestone achieved per each study conducted to develop the climate measure. In 1994, the internal reliability and factor structure study of the CIQIVA were based on an adjustment to the CIQIIIA to improve inter-item correlations. Specifically, it involved the theoretical elimination of items from the CIQIIIA (based upon the variance among dimension items). A comparison of the Cronbach alphas, per each milestone, will be presented in Chapter Four in a tabular and graphic format.

Figure 1.1



Since there is a substantial demand for researchers and practitioners to understand and assess the climate for creativity, this study therefore

investigates to what extent the developments on the climate measure have actually improved the psychometric properties of the questionnaire.

SUMMARY

The purpose of Chapter One was to provide the reader with the rationale for the importance of this study. The chapter began by introducing the major question, sub-questions and related questions to be addressed by this study. Second, the Climate for Innovation Questionnaire (CIQ) was introduced and then its development was summarized. Lastly, this chapter answered why these questions are important.

CHAPTER 2

REVIEW OF LITERATURE

OVERVIEW

Chapter One presented a statement of the problem that is addressed in this study. It also examined the rationale for this study by presenting the major question and sub-questions addressed in this study. That chapter answered why those questions are important. In this chapter the historical, psychological, and philosophical foundations of the CIQIVA are reviewed. The working definitions of creativity, change, climate for creativity and change, and profiling are provided. The linkage of these concepts to assessment of climate is also presented. Chapter Two also examines conceptual and methodological issues involving climate that are bound within the CIQ. These issues are important to clarify because it develops the theory that supports the research in this study. Moreover, it navigates the study through the conceptual problem of how climate can be perceived. Subsequent to this examination, the methodology to be used in examining the reliabilities and factor structure of the climate measures and other related issues are presented.

FOUNDATIONS

The next five sub-sections review the concepts of creativity, change, climate for creativity and change, and profiling. The purpose is to provide a foundation that supports the creative climate measure.

The purpose of this section, however, is not to review, in depth, literature related to creative climate because such a review is available elsewhere

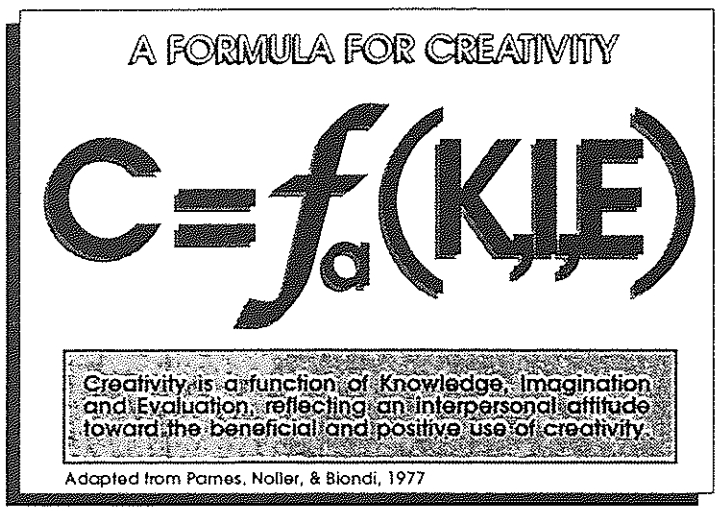
(Lauer, 1994). In his study, Lauer provided a 107-page review that examined the extent to which the creativity literature supports the existence of the ten dimensions of the CCQ. His conclusion was that the ten dimensions underlying the CCQ are theoretically supported. The review in Chapter Two is focused on the conceptual and methodological issues involving the climate measure.

Creativity

This section discusses the concept of creativity. The purpose of this section is to define the term creativity and explain how this term relates to the Climate for Innovation Questionnaire.

Ruth Noller, Distinguished Service Professor Emeritus of Creative Studies at Buffalo State College, formulated an equation for creativity:

Figure 2.1 Formula for Creativity



Source: Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (1994). *Creative approaches to problem solving*. Dubuque, IA: Kendall/Hunt. Reprinted with permission.

She suggested that creativity is a function of an interpersonal attitude toward the beneficial and positive use of creativity in combination with three factors:

Knowledge, Imagination, and Evaluation. In her function formula, each factor changes through life experiences. Moreover, creativity always occurs in some context of knowledge. However, while expertise is important and necessary, it is not sufficient for determining creativity. Finally, in her formula, creativity is depicted as a function of an interaction between knowledge, imagination and evaluation. In this formula, if there is too much knowledge and not enough of the others, the overall function value will go down. That is why Noller emphasizes the interaction among all three functions.

The creative climate questionnaire considers the key factors within a context or social setting that influences a person's willingness to learn about and use his or her talents to be creative (Isaksen et al., 1995). The questionnaire also considers the readiness level of organization members to exhibit a new behavior and habits that are conducive to making an output of creativity widespread. Creativity relates to the measure in the sense that it involves the assessment of interaction between the person and the environment and how it impacts creativity and innovation. Lewin (1951) stated that to understand and predict behavior, the organization member and his/her environment have to be considered as intervening factors.

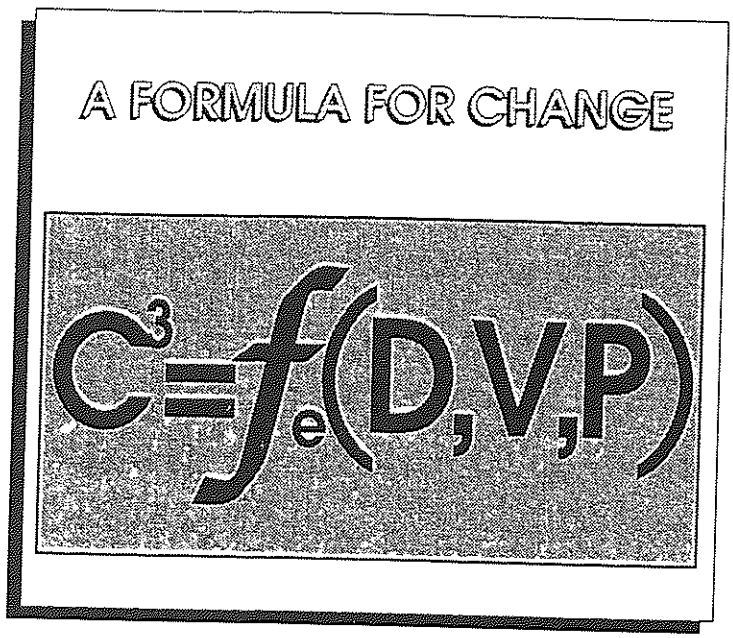
Change

This section discusses the concept of change as it relates to the creative climate measure. The purpose is to describe a foundation that supports the study of the creative climate measure. Moreover, this section provides two definitions of the concept of change.

Kanter (1983) defined change as involving the crystallization of new action possibilities (e.g., new policies, new behaviors, new methodologies, new products, or new market ideas) based on reconceptualized patterns in the

organization. Isaksen et al., (1994) developed a formula for change that was viewed as a function of empowerment, dissatisfaction with current reality, holding a vision for the future and using a process for attaining that vision (see Figure 2.2).

Figure 2.2 Formula for Change



Source: Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (1994). *Creative approaches to problem solving*. Dubuque, IA: Kendall/Hunt. Reprinted with permission.

To describe the formula, the term empowerment refers to the organization's *choice*, *commitment*, and ability to allow employees to initiate *change* on their own through decision making, experimentation, problem solving, and conceptual selling to those who have the ownership in implementing the concepts. *Dissatisfaction* with current reality suggests the displeasure one feels, for example, with specific day-to-day operations. This sentiment may be directed at performance that feeds business-as-usual

procedures or they may directed at strategic plans that do not promote proactive approaches to doing business.

The *vision* component encompasses the articulation of a desired state toward which an organization should aim (Nanus, 1992). It energizes and in effect it ignites the future by calling forth the skills, talents, resources, social and technical systems, and *processes* to manifest the desired state (The words that are italicized are represented in the formula for change).

Change is corollary to creativity and innovation. However, for creativity and innovation to flourish within an organization it is essential to have a climate that is conducive to it. Moreover, organizational change is stimulated not by pressures from the environment, but by the perceptions of that environment (Kanter, 1983). In early works, Payne & Pugh (1976) discovered how organizations influence psychologically meaningful environments for organization members and how factors within an environment effect creativity.

The link that change has with creative climate is based on the ability that organization members have to conceive, construct, and convert into new behavior a new reality of organizational reality and to readjust in response to the changes an innovation will require (Kanter, 1983). This ability is contingent, to a large degree, on the readiness of the organization's climate for change.

The relationship that change has with the CIQ is that the measure provides a method for assessing an organization's ability to introduce, support, and monitor change. Moreover, it also identifies variables that allow for novelty to be useful. Specifically, a creative climate questionnaire facilitates the process of inquiry so that a deeper understanding of a situation (e.g., readiness for change) is established (Isaksen, Firestein, Murdock, Puccio, &

Treffinger, 1994). Moreover, the measure permits interventionists to make exact descriptions of the current reality so that change initiatives are more targeted and change processes are appropriately selected.

Creativity and Change.

The purpose of this section is to provide a link between the concepts of creativity and change.

In order for creativity to become useful it must journey through a process of change. In essence, both terms--creativity and change--go hand in hand. Change is viewed as a transforming process (Isaksen, et al., 1995) consisting of components where specific behaviors occur in varying degrees (Clapp, 1991). Creative Problem Solving also functions as a transforming process consisting of three components (Isaksen, Dorval, & Treffinger, 1994). One component consists of understanding the problem. This component may involve the identification of performance gaps or dissatisfactions with the current state of how an organization operates. Another component consists of the generation of ideas that are potential solutions to a problem or challenge. The other component consists of the processes that facilitate the manifestation of the solution. Each component requires a creative approach to its application. Therein lies the link between creativity and change. Creativity is a major competency, especially when it involves the anticipation of, understanding of, and coping with change (Morgan, 1988).

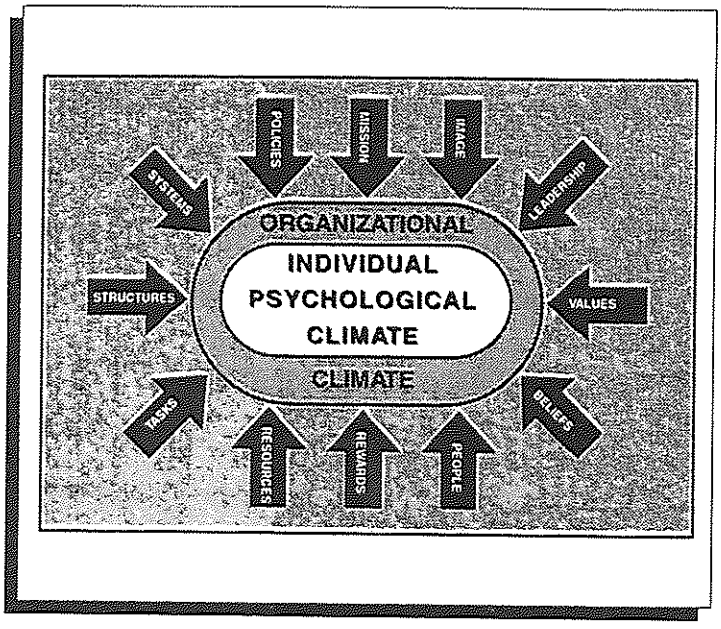
Climate for Creativity and Change

The purpose of this section is to provide more support for the link among climate, creativity and change and their association to the Climate for

Innovation Questionnaire. This section also reviews how the concept of creative climate has been studied.

Ekvall (1987) conceptualized organizational climate as the recurring patterns which characterize life in the organization. Ekvall indicated that members of an organization are influenced by the general psychological atmosphere and the climate as a whole (see Figure 2.3). Ekvall also indicated that climate compared to other organizational events such as leadership, task, policy, and culture, produces a more lasting influence on an individual's behavior and feelings in an organizational setting. He differentiated organizational climate from that of culture and individual psychological climate. Although influenced by a variety of factors, Ekvall suggested that organizational climate may waver but is fairly stable over time.

Figure 2.3 Factors Influencing Individual Psychological Perceptions



Source: Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (1994). *Creative approaches to problem solving*. Dubuque, IA: Kendall/Hunt. Reprinted with permission.

As a distinction, James and Sells (1981) defined psychological climate as the individual's psychological meaning and significance assigned to situational events. They define psychological climate as:

> Individuals' cognitive representations of relatively proximal situational events, expressed in terms that reflect the psychological meaning and significance of the situation to the individual. A central postulate of psychological-climate theory is that individuals tend to interpret situations in psychological terms; that is to assign psychological meaning to environment attributes and events...psychological climate is regarded as an attribute of the individual. (p. 275)

As a way to measure an individual's perception of the organizational climate, Ekvall designed a Creative Climate Questionnaire (CCQ) from which its translation to English from Swedish has been used to develop the CIQ subsequently called the CIQIVA.

Although past investigators dealt with the multi-faceted nature of creativity by separating them into more manageable arenas of investigation, there is a long tradition of looking at the notion of creativity, people, and climate (Astin & Holland, 1961; Fiedler, 1962; Weisberg & Kayla, 1961). In fact the National Science Foundation Studies (NSF) held at the University of Utah in 1955 also targeted the recognition and development of creative climate (e.g., *Some Developmental and Environmental Factors in Creativity* by Drevdahl, 1964). Specifically, researchers were invited to discuss and understand the fundamental nature of creativity and its characteristics (Taylor, 1961). This understanding would permit researchers to build

questionnaires to identify creativity so that educational, environmental, and other programs can be designed to be more favorable to creative talent (Taylor, 1961).

The general belief of psychologists that social and organizational settings influence human behavior (Lewin, Lippitt, and White, 1939) led to a growing interest in climate research (Amabile, 1988, 1987, & 1984; Amabile & Gryskiewicz, 1989; Ekvall & Tangeberg-Andersson, 1986; Witt & Beorkrem, 1989; Isaksen & Kaufmann, 1990; Opren, 1990; Turnipseed, 1994). Payne and Pugh (1976) placed emphasis on the following:

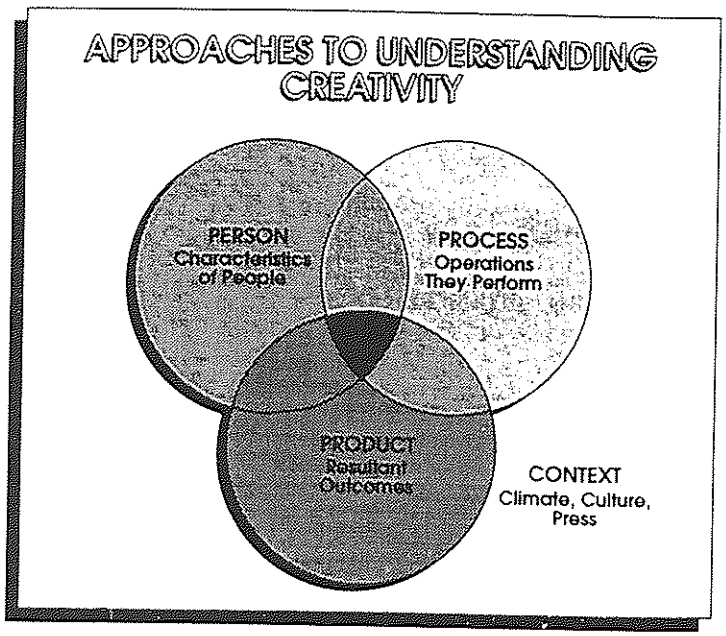
> ...discovering how the organization is a psychologically meaningful environment for individual organization members (p.1126).

Their findings revealed factors that ranged from encouragement of employee group involvement and shared decision making to an environment that minimizes blocks to creative thinking. Other factors included leadership roles that promote facilitation (Isaksen, 1983 & 1986; Parnes, 1985) and mentorship (Frey & Noller, 1986).

The connection between creativity and climate was made through a broad framework established by Rhodes in 1961. Rhodes attributed the word "Press" to the environmental attributes that promote or impede creative behavior. In this framework, creativity is viewed by many as a multi-faceted phenomenon which results in the production of new and useful ideas (e.g., Isaksen, Puccio, & Treffinger, 1993). These facets emerge when one looks at how they are reflected in human artifacts, how they are expressed through people, what the processes are that describe how this phenomenon manifests itself, and how environmental conditions nurture and support this

phenomenon. When these facets interact they formulate a conceptual framework of creativity (see Figure 2.4).

Figure 2.4 Approaches to Understanding Creativity



Source: Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (1994). *Creative approaches to problem solving.* Dubuque, IA: Kendall/Hunt. Reprinted with permission.

Gibb (1972) also bridged the concepts of creativity and climate by suggesting that organizational factors that influence creativity are meaningful in any social theory of creativity.

Isaksen, Murdock, Lauer, Dorval, & Puccio (1995) used the following definition for Creative Climate:

> The conditions and recurring patterns of behavior that interact with other variables (i.e., culture, leadership resources, structure and others) and have an impact on the creativity of individuals and groups within that particular setting. (p. 6.8)

There are plenty of factors to describe the creative climate; however, it is important to consider that creative climate is a complex combination of many different factors that influence ordinary and daily interactions with family, friends, and co-workers (Isaksen et al., 1995).

Profiling

This section describes the concept of profiling. It also provides the reader a rationale for using the questionnaire as part of a profiling or interactionist approach to assessing creativity.

Profiling is a method that is used to develop a multi-dimensional framework to help understand and predict Creative Problem Solving (CPS) performance. In other words, this approach utilizes several methods to obtain an objective and comprehensive profile of information. This framework is a collection of cognitive, metacognitive, and personality characteristics; dimensions of a situation, such as climate and culture; elements of the task; process behaviors; and product or outcome qualities (Isaksen et al., 1993).

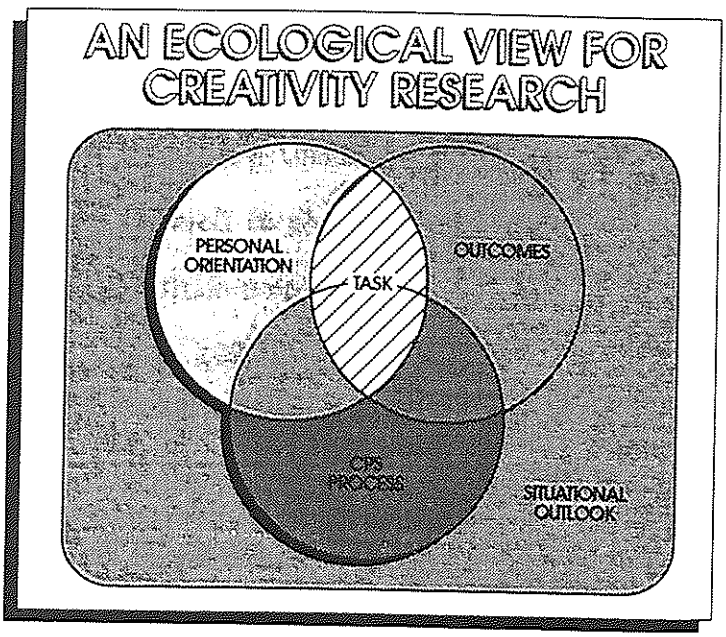
Figure 2.5 represents a graphic depiction of five major arenas from which the collection of creative variables fall and interact. The arenas also represent a set of potential independent variables for future research.

The press dimension in this graphic is represented by the Situational Outlook category. It is within this domain that the CIQIVA examines a portion of the press dimension, referred to as organizational climate, through the psychological aspects of the work environment.

The interactionist approach to understanding creativity underscores the point that creative performance does not come about only as a result of what is or is not present within the individual; it is influenced by time, other people,

places, and settings (Isaksen, Puccio, & Treffinger, 1993). By understanding how a setting influences creative performance, the CIQIVA considers this interaction as part of its foundation.

Figure 2.5 An Ecological View for Creativity Research



Source: Isaksen, S. G., Dorval, K. B., & Treffinger, D. J. (1994). *Creative approaches to problem solving*. Dubuque, IA: Kendall/Hunt. Reprinted with permission.

The ecological or interactionist approach has been supported by Stein (1975). Although primarily concerned with method and techniques, he stated the following:

> In the final analysis, we need to know what kinds of people should use what kinds of techniques with what kinds of problems under what kinds of conditions. This is an important challenge for future research to fulfill. (p. 283)

Profiling, therefore, is best used as a way to help identify an individual's strengths and talents for a particular goal or task, in a particular context and circumstances, for specific outcomes (Isaksen et al., 1993). It establishes a foundation for more authentic or genuine assessment (Wiggins, 1989). A more comprehensive and inclusive conception and understanding of creativity may result from consideration of the five dimensions of the ecological framework (Figure 2.4) and their interactions (Isaksen et al., 1993). The CIQ is one of the many ingredients that can be used to comprehensively assess creativity. Thus, this targeted approach to profiling can lead to better assessment and greater comprehension of the complex and important human resource called "creativity" (Isaksen et al., 1993).

Intervention

Isaksen et al., (1993) see this approach to assessing climate for creativity to be consistent with an ecological framework for creativity research:

> If we are to improve our understanding of what works for whom under what circumstances, we will need to have good measures and approaches to understanding the context and place for creative activity. (p. 49)

This understanding must also be coupled with a practical focus. For example, at the Center for Studies in Creativity (CSC) and Creative Problem Solving Group-Buffalo (CPS-B) the current methodology of choice for creativity and change is Creative Problem Solving. This method includes an emphasis on Task Appraisal (see Appendix F) which helps an individual to discern the key

people involved in the change initiative (personal orientation), an understanding of the task (desired outcome), an understanding of the situation in which change will take place (situational outlook), and the change method (methodology) to be employed for any given task (Isaksen et al., 1995). It is in this area of Task Appraisal that the use of the CIQ becomes a tool for supporting the planning, organization, and implementation of change.

The CIQ is one measure which increases our understanding of the climate that influences a task and can provide some insights into how to improve it for creativity and change (Isaksen, et al., 1995). The measure is executed in combination with information obtained from investigating the Task Appraisal areas.

Organizational designers are also becoming increasingly aware of how people's perceptions of their climate in the workplace affects organizational and psychological processes. In order for them to succeed as interventionists, they need to find ways to assist organizations to understand and value the diversity in people so that climates can be established that supports creativity and innovation (Isaksen et al., 1993). Specifically, organizational designers have to address the issues of how an organization influences its performance and the satisfaction of its members (Isaksen et al., 1993). Needless to say, a validated CIQ would be an invaluable assistance to this endeavor because the demands of the external environment, internal social systems, and technical systems have to be considered when organizational design decisions are made (Pasmore, 1988).

This is critical because if future work stemming from this study can examine the CIQ's theoretic dimensions and can relate it to how it influences what kinds of process strategies work best for what kinds of people and under different circumstances, then facilitation of creativity in settings where these

variables exist should be more predictable and targeted (Isaksen et al., 1993). As a result, guidelines and support materials that are empirically based would provide assistance to practitioners that are concerned with intervention and Creative Problem Solving (CPS) training in organizational settings.

This section provided support for the measurement of creative climate. It also discussed the rationale for the methods that were used to examine the reliability and factor structure of the CIQ.

CONCEPTUAL ISSUES INVOLVING CLIMATE

The purpose of this section is to review the conceptual issues surrounding the climate questionnaire. The conceptual issue examines the debate involving the definition of climate. This section provides support for the importance of this research study by looking at some definitional issues involving climate. By clarifying them it facilitates the selection of methods to be used in this study.

Subjectivistic/objectivistic approaches to define climate

The basic conceptual issues range from those who see climate as something that is entirely phenomenological and subjectivistic (James & Jones, 1974; Joyce & Slocum, 1982, 1984; Schneider & Reichers, 1983) to those who see climate as being entirely realistic and objectivistic (Guion, 1973; Forehand & Gilmer, 1964; Friedlander & Margulies, 1969; Ashforth, 1985).

According to the subjectivistic view, the organizational climate is regarded as a perceptual and cognitive structuring of the organizational situation common to the members of the organization (Ekvall, 1987).

Webster's (1988) defines subjectivistic as "an ethical theory holding that personal attitudes and feelings are the sole determinants of moral and aesthetic values." Essentially the issue is that climate is whatever the people perceive it to be. Moran and Volkwein (1992) coined this definitional subscription as the "perceptual approach" to addressing this conceptual issue. This is one side of the conceptual spectrum.

According to the objectivistic view, climate exists as a reality in the organization. Climate is viewed as an attribute of the organization that exists independently of the organizational members' perceptions (Ekvall, 1987). The climate exists whether organizational members choose to see it or not; it is realistic and objectivistic. Webster's (1988) defines objectivistic as, "any of various philosophical doctrines that stress the external, independent existence of what is perceived or known; an ethical theory maintaining that the validity of ethical assertions can be determined objectively." Moran & Volkwein (1992) coined this definitional subscription as the "structural approach" to addressing a conceptual issue. This is the other side of the conceptual spectrum.

Theoretically speaking, the range of approaches has been clear, especially when considering the approaches at the extreme ends of the conceptual spectrum. However, on the empirical side it has not been held as distinct (Ekvall, 1987). In fact, Ekvall (1987) reports various research articles that have authors alternating between the subjectivistic and objectivistic points of view. For example, some organizational climate studies utilize questionnaires in which the individual is asked to describe the climate by answering what is usually a large set of questions about conditions in the organization. Whether or not the researcher has subscribed to a subjectivistic or a objectivistic point of view, the questions have remained the same (Ekvall, 1987).

The subjectivistic measure includes questions which help organization members to report their experiences and to describe the organization as they see it. For example, a typical question (Ekvall, 1995) is phrased : "Most people here think (or agree) that it is possible to take initiatives here ." (p. 11)

The objectivistic measure includes observations of behaviors. The person taking the measure is addressed as an observer of the life in the organization and asked to tell how people at the workplace usually behave (Ekvall, 1995). The respondent is not to report his or her own behavior, nor personal feelings. That is why there is no "I" or "me" found in the questions (Ekvall, 1995). An example of a objectivistic question (Ekvall, 1995) is phrased: "It is common here that people take initiatives of their own ." (p. 11)

Ekvall (1983) adopted the realistic/objectivistic model of behavior in organizational climates. This model assumes that organizational climate is independent of organization member perceptions (Ekvall & Tångeberg-Andersson, 1986). Although Ekvall asserts that climate exists independent of people's perception of it, he utilizes their perceptions of it in his assessment of climate. Ekvall states that organizational climate can consequently be studied through these perceptions. However, this should not be confused with viewing climate as *being* these perceptions; the organizational climate can likewise be studied by external observers (Ekvall, 1983).

The developers of the CIQ adopted Ekvall's assumptions and address the conceptual morass by subscribing to Ekvall's (1995) definition of organizational climate:

> ...a conglomerate of attitudes, feelings and behaviours which characterize life in the organization. The climate has originated, evolved and continues to develop in the ongoing interactions

> between individuals and the organizational setting (p. 2)... Organizational climate originates in the interplay between the people in the organization and the structure and the environment that obtain there. Then, by way of the individual's perception of it, the organizational climate will produce a variety of effects on profitability, on job satisfaction, on innovativeness, and so on. (p. 4)

Since climate has such moderating power (Ekvall, 1995) on so many variables, and on different levels of abstraction, then it is a natural starting place for practitioners to specify what is meant by climate. This is important because a loosely defined concept can be confused with other domains such a culture, organizational structure, and values.

Interactive approach to define climate

There are other approaches. Interactive theorists (Blumer, 1969; Joyce & Slocum, 1982; Poole & McPhee, 1983; Schneider et al., 1983; Terborg, 1981) respond to this tension by contending that the interaction of organization members in responding to their situation fosters the shared concurrence of what climate is within the organization (Moran et al., 1992). In other words, organizational members monitor, cease, regroup, and transform their perceptions of occurrences based on the interactions they have with other organizational members (Schneider et., 1983). Both the interactive and the perceptual approaches are considered subjectivistic and/or phenomenological because they exist in the subjective consciousness of the organization member. However, what distinguishes them is the way the approach derives its reality. The perceptual approach derives its reality from the subjective

feelings of the organization member. The interactive approach derives its reality from the interaction between objective conditions and subjective awareness (Moran et al., 1992).

Cultural approach to define climate

Cultural theorists answer the tension (Allaire & Firsirotu, 1984; Ashforth, 1985; Moran et al., 1992) by subscribing to the notion that organization climate is formed by a group of interacting organization members that forge a common sense of history, values, and purpose through collective interpretation (Moran et al., 1992). In essence the cultural approach considers the degree to which perceptions and interactions are influenced by the organizational culture. They included cultural items such as values, norms, and beliefs into the climate concept of behaviors, attitudes, and feelings.

Confusion around the definition of climate

Despite the large number of research studies on climate, the construct remains badly defined and muddled (Moran et al., 1992). Environment, for example, may be deemed synonymous with climate as a definition. If one argues that environment is a larger or more general construct, it would in fact be confused with climate. The key point is that when people use the word environment instead of climate, or vice versa, they are promoting a great deal of confusion. They are using different words and are not being clear about their definition.

Webster's (1988) defines environment as: "All the conditions, circumstances, and influences surrounding, and affecting the development of, an organism or group of organisms." Webster's (1988) defines climate as: "Any prevailing conditions affecting life, activity, etc." In comparing both

definitions, environment does not have specific conditions with recognized boundaries; climate does. Environment is too broad and ambiguous (Glick, 1985). This is an important point because there is no single unit theory of climate research (Glick, 1985). Thus, if a concept is too general it opens itself to a variety of interpretations or misinterpretations.

Given the conceptual clarification that has been identified by Ekvall, there are a whole set of methodological constraints that stem from his definition. The next section discusses these constraints that places the CIQ in a particular approach with how climate is managed.

This section examined the definitional issues involving climate. Most important, it provided a conceptual definition that is bound within the CIQ. The goal was to provide the reader with a better understanding of and orientation to the foundations of the CIQ.

METHODOLOGICAL ISSUES IN THE ASSESSMENT OF ORGANIZATIONAL CLIMATE

This section provides support for the measurement of creative climate. It also discusses the rationale for the methods that are used to examine the reliability and factor structure of the CIQ. By clarifying them it facilitates the process of inquiry especially when it relates to quantifying and/or qualifying complex concepts such as creative climate (Isaksen et al., 1994). Assessment is important because it permits a better understanding of what is being measured. Moreover, as stated by Isaksen et al., (1994):

> Measurement permits researchers to generate more precise descriptions of human behavior through analytic procedures that

> verify, predict, or explain. Without reliable and valid means of measuring complex variables, researchers are unable to refine or test their theories and hypotheses. Moreover, measurement allows researchers to extend their work by generating new and meaningful information. (p. 9)

This section specifically covers issues such as reliability of response, and selection of factor rotation. Finally, this section examines how the CIQ is used as a tool for intervention.

To aggregate or not to aggregate

The approach that a researcher selects, as an understanding to how climate is formed, brings about a whole set of methodological constraints. For example, if climate is in fact what people say it is--it is more of a matter of individual perception (phenomenological/ subjectivistic)--then the researcher or interventionists operate on changing people's perception. In this case it is not suitable to aggregate these perceptions and refer to them as an attribute of the organization (Koester & Burnside, 1992). Whereas if it is objectivistic and the construct is being measured through people's perceptions, then it would be appropriate to aggregate the perceptions. The interventionist looks at what most people think it is. Thus, once a good picture of the climate is obtained, the interventionist changes the climate to see how the *perception* changes.

Broad or narrow definition of climate

The developers of the CIQ suggest that there is more promise when a specific kind of climate is examined as opposed to a general one (Isaksen et al., 1994). The contention is that the more a researcher can narrowly define the

variable to be measured, the easier it is to select an assessment method (Isaksen et al., 1994). Moreover, Isaksen et al., (1994) contend that it's impossible to make an appropriate decision without a focused definition of what is to be measured or assessed. They also suggest that the measure reveals individuals' perceptions of climate variables that promote or hinder the creative behavior of organizational members and, consequently, the innovativeness of the organization as a whole (Ekvall, 1983).

The CIQ is constructed based on some principles that are also found within Ekvall's original version of the CCQ. According to Ekvall (1987) the creative climate measure is an organizational measure not an individual one. He also states the following:

> Since people vary as regards to their personalities and their experiences in the organization..., it is assumed that descriptive differences depending on these things will tend to cancel each other out when the descriptions are aggregated to produce organizational measures... The aggregation of the dimensions scores of the respondents to an organization score is achieved by the mean score. This mean score assumes to reflect the real climate, which in turn the individual member has to evaluate with his/her preferences and react to. (p. 180)

With respect to these construction principles, some observers may in fact perceive and rate the same behaviors differently. However, these biases are counterbalanced by the direction and strength of the members' ratings.

Conceptually, how climate is defined in effect supports the methods that are selected to validate a measure. A wide spectrum has already been

provided of how climate can be perceived. These families of approaches most likely coagulate on various places of the spectrum upon which they bring together method with concept.

If a construct such as environment is defined loosely, is it likely that the factor structure of a measure will show a large principle component (see glossary) followed by other components? Or, is it more likely that basic independent factors will be seen early on? In the case of KEYS™, a measure designed to assess all the work environment dimensions important in empirical research and theory on creativity and innovation (Amabile, Conti, Coon, Lazenby, & Herron, 1995), a higher order primary factor will not be seen. However, what will be seen are three factors: enviornmental stimulants to creativity, environmental obstacles to creativity, and assessment scales.

Planned or random selection of sample

The samples in this study were not randomly selected. In fact, a sample can contain several groups of organization members that were employed by the same organization. One way to examine a potential effect of such a sample type is to conduct a distribution of respondent scores. This method looks at how an aggregate of respondents scored their questionnaire items. In this case the desired outcome is to obtain a normal distribution of scores that represents well the theoretical midpoint of 150 (Jaeger, 1983).

Related items measure same or different dimensions

Another methodological issue involves the extent to which items that are designed to measure one dimension (i.e., idea support) relate to each other more than they relate to other items (item-to-item coorelation). This is important to consider because if the items relate to other items that do not

measure the same dimension then that dimension and its respective items can be construed as suspect and invalid. Based on this notion, the item-to-dimension method is employed to examine the item-to-dimension relationships.

Creative climate as one construct or several

The desired state for the CIQ is to have a very strong notion that the factor does hold together as one construct and in addition has subscales within the measure. This is important because it indicates that the construct is tightly bound. It also answers the questions does the questionnaire measure what it is suppose to measure and do the items load where they are suppose to load. Finally, it facilitates the appropriate selection of a method to determine the factor structure. Initially, an oblique rotation method (see glossary for definition) conceptually made more sense because one would anticipate a high correlation result of the matrices. However, the CIQ is theorized to have one principle component with several subscales that measure the same construct. Based on this notion, the principle component model also makes sense. Thus, both methods are utilized as an ecological approach to examine the internal factor structure of the measures.

Creative climate is assessed by some or all dimensions

Another methodological issue involves the internal reliability of each theoretic dimension. The following questions underscore this issue: Is the construct of creative climate being assessed reliably by each dimension? If so, are the assessments reliable over time? In this study statistical methods such as Cronbach alpha, Gutmann split-half, and Spearman-Brown were carried out to determine the degree of reliability. However, test re-test reliability was not conducted in this study and thus should be explored in the future.

These methodological issues are important as they allow researchers and practitioners to sort through competing approaches to determine what truly works. To accomplish this desired state, assessment methods are used and serve as tools that make certain kinds of information explicit and therefore more useful (Isaksen et al., 1994). In addition, assessment methods facilitate effective practice by providing a means to track, manage, and impact human behavior in a reliable manner (Isaksen et al., 1994).

SUMMARY

Chapter One presented a statement of the problem that is addressed in this study. It also examined the rationale for this study by presenting the major questions and sub-questions in this study. In this chapter the historical, psychological, and philosophical foundations of the CIQ and the CIQIVA were reviewed. Thus, working definitions of profiling, creativity, climate, creative climate, and change were provided and how they related to the current measure. Chapter Two also examined conceptual and methodological issues involving climate that are bound within the CIQ. Subsequent to this examination, the methodology to be used in examining the reliabilities and factor structure of the climate measures and other related issues were presented. Chapter Three will describe the methods and procedures used in this study.

CHAPTER 3

METHODS & PROCEDURES

OVERVIEW

The previous chapter reviewed the literature that is relevant to this study. The review centered on conceptual and methodological issues involving the CIQIVA. The examination contained in Chapter Two was an extension of earlier work (Lauer, 1994) that determined an adequate support for the constructs of creative climate assessed by the CIQ.

The purpose of this chapter is to summarize the methodology and procedures used to address the major question and sub-questions in this study. Chapter Three also presents a description of the three versions of the climate measure and changes made to improve its structure.

METHOD

This section and sub-questions examine the three versions of a creative climate questionnaire and their developments. Each section describes the subjects who were administered the climate questionnaire; identifies the instrument used in the study; and describes the procedures used to collect and analyze the data. This study stems from Lauer's (1994) work which suggested the CCQ be used as a research tool pending further study and possible modification.

According to Lauer's (1994) description, the CCQ was a 50 question pen-and-paper self-report instrument. Subjects respond to each question using a four point Likert-type scale that ranges from 'Not at all applicable' to 'Applicable to a high degree'. The 50 questions were randomly arranged.

Questions were stated positively. Each of the CCQ's dimensions were composed of five questions. The range of scores were zero to three. Scores for the appropriate questions were summed and then divided by five to provide an average score for each dimension. Scores on the questionnaire were tabulated both as individual feedback and aggregated to provide a total score for the group, department or organization being measured. The questionnaire was hand-scored and was designed by Ekvall to be easily scored by the respondent. The next section describes the modifications made to the CCQ as a means to develop the questionnaire known as CCQIIA.

Creative Climate Questionnaire IIA (CCQIIA)

This section describes the development of the CCQIIA; the subjects who were administered the climate measure; the instrumentation used in the study; and describes the procedures used to collect and analyze the CCQIIA data.

Development of the CCQIIA

The purpose of this section is to detail the modifications made to the CCQ. The initial translation of the CCQ included 50 items on ten dimensions. The first revision occurred in 1989, and it involved editing some items, changing the order of some items, and adding an omnibus item. The omnibus item was designed to give an overall impression regarding what extent is the respondents' climate conducive to creativity. The end result of the revision yielded a 51 item questionnaire that was designed to measure ten dimensions of creative climate.

The revision was initiated through the use of statistical analysis and expert evaluation of the CCQ. The techniques used included item and dimension distributions, item and dimension correlations, internal and factor

structure analysis. The results revealed a somewhat scattered factor structure and low Cronbach alphas. Additional modifications (e.g., realignment of items based on factor analysis, deletion of items based on item-to-item correlations) were made to the most problematic items. After the modifications, two Swedish researchers, who were fluent in both English and Swedish examined the original translation of the questionnaire to validate the translation.

As with any translation, the Swedish translators noted some differences from the initial translation. Their examination identified some discrepancies and these were taken into consideration for the revision. This process was then reversed and problem items were again identified. Specifically, this process is referred to as back translation with "decentering." Materials prepared in the source language (Swedish) are translated by bilinguals into the target language (English). A second bilingual independently translates the measure into the source language. Then, the two source language versions are then compared, and the discrepancies are adjusted (Bontempo, 1993). The items that did not translate well also revealed poor internal reliability.

Approximately 75% of the items were reworded. The residual items were reworded negatively. Items that contained two concepts (e.g., There is a good deal of *tension* here due to *prestige* conflict) were modified so that only one concept appeared in each item. Items that contained double negatives were also modified. Items that were confusing to answer based on the Likert scale, were also modified (e.g., There is *no fear* of being stabbed in the back). Other items were made more simple and direct. To reduce response bias some items were also counterbalanced. Finally, some adjectives were removed from items that confused the question (e.g., "The atmosphere here is exciting" changed to

"The atmosphere here is compelling."). Deliberate efforts were made to maintain the measure at 50 items, five items per dimension.

After the above modifications to the CCQ were completed, its internal reliability and factor structure were examined. The results of that analysis are replicated in Chapter Four of this study. In 1991 when enough data was compiled, the revised questionnaire (CCQIIA) was used by Isaksen as a research instrument.

The purpose of this section was to describe the development of the CCQIIA. A detailed descriptions of the modifications made to the measure are presented.

Subjects for CCQIIA

The focus of this section is to describe the subjects who were used to determine the reliability of the instrument.

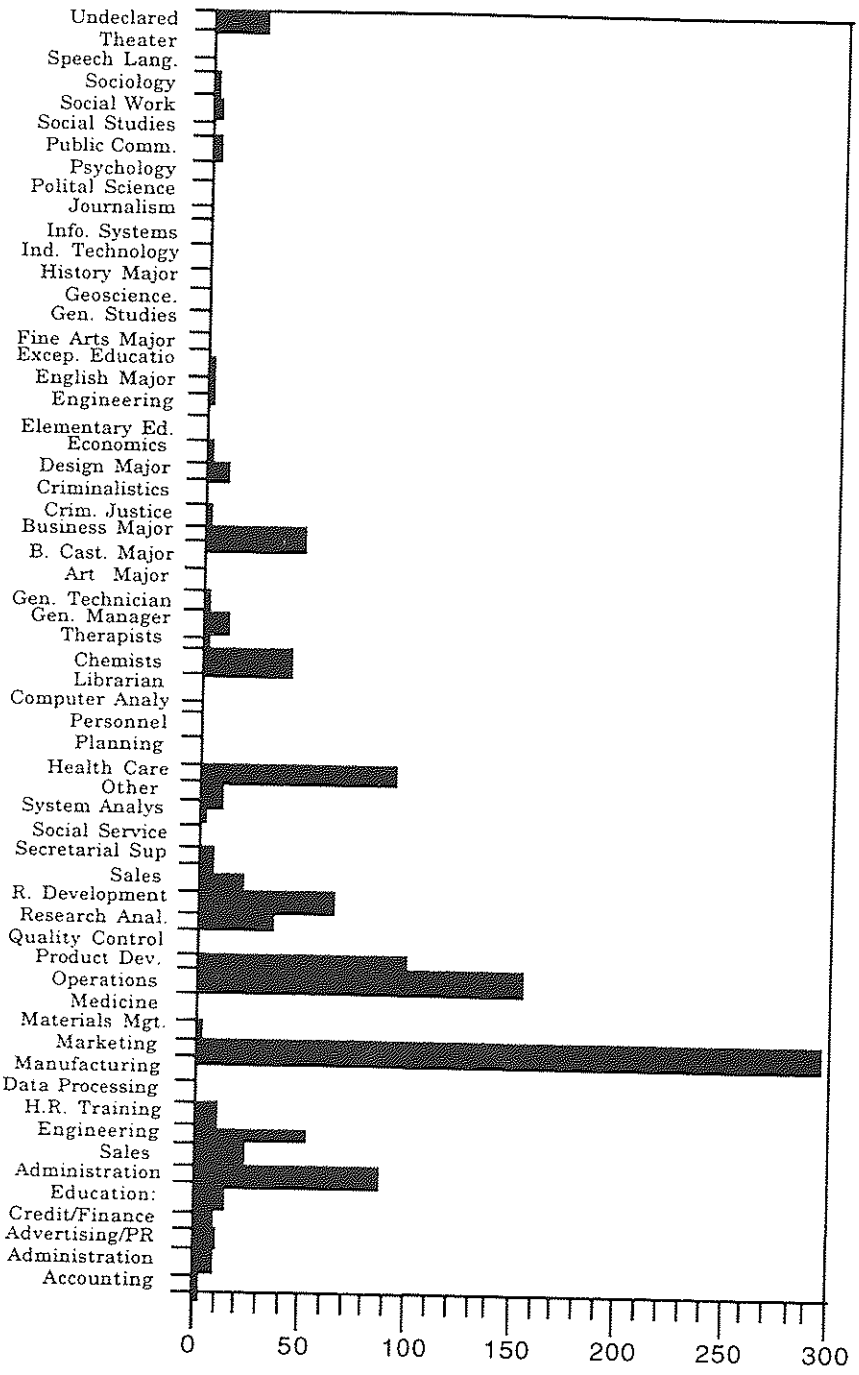
The data for the first revision of the Creative Climate Questionnaire (CCQIIA) was gathered from 1831 subjects. This sample set came from organizations that contracted with Isaksen for training programs in Creative Problem Solving (CPS). The data was collected from August, 1989 to November, 1991. The subjects were comprised of 769 (41.7%) men and 635 (34.4%) women. From 100% of the subjects, 23.9% did not state their gender. The age of the subjects ranged from 17 to 64 years. The educational levels of the subjects were as follows: (a) high school (n=21), (b) some college (n=134), (c) bachelors degree (n=250), (d) some graduate (n=22), (e) masters degree (n=177), and doctorate (n=159). 1081 subjects that did not report their educational levels.

Table 3.1 shows the occupational areas from which the CCQIIA sample originated. The occupational areas that are not reflected on the bar graph on

Table 3.1 were for subjects totaling less than four people (e.g., theater, speech language, psychology).

Table 3.1

Occupational areas and academic majors within the CCQIIA Sample (n=1844)



The educational level of the sample (Table 3.2) ranged from completed high school (n=21) to doctorate (n=159). 58.6% of the subjects did not complete this demographic question (n=1081). Most of the subjects had either a bachelor's degree (n=250) or a master's degree (n=177). Other subjects stated they had some college (n=134). The remaining subjects (n=22) listed their educational status as some graduate.

Table 3.2

Sample for CCQIIA: Subjects and Frequency Percentages

Organization	Subjects (n)	Frequency %
Educational Samples		
Creative Studies Classes	65	3.5
Special Administration Educational Conferences	162	8.8
Education Group Total	**227**	**12.3**
Business Samples		
International Household Product Manufacturer Conference	503	27.3
Oil Company	756	41.0
Chemical Company	46	2.5
Business Group Total	**1305**	**70.8**
Other Samples		
Two-day Creative Problem Solving programs	30	1.6
Instructional Research Project	157	8.5
Dissertation Research	92	5.0
Missing	33	1.8
Other Sample Total	**312**	**16.9**
Overall Total	**1844**	**100%**

In regards to the organizational levels, they ranged from hourly employees (n=78) to senior executives such as president, chief executive officer, and operating officer (n=5). The majority of the subjects identified their organizational levels as middle (n=235), which consists of titles such as office managers, professional staff, mid level managers, and first level (n=232) which consisted of foremen, crew chiefs, section supervisors, faculty, and staff.

The remaining subjects identified themselves as executives (n=25) which consisted of vice presidents, directors, board-level professionals, and

upper middle (n=25) which consisted of department executives, plant superintendents, plant managers, senior professional staff, deans, associated brand managers, assistant directors, brand managers and section heads.

Some subjects were cleared from the data analysis in Chapter Four due to incomplete responses. The number to be excluded was contingent upon the type of statistical analysis utilized and whether the analysis used the 51 items of the CCQIIA, or the accumulation of these items into one of the CCQIIA's 10 dimensions (Lauer, 1994).

The purpose of this section was to describe the sample used in the study. The subject's age, education level, gender, and occupation were described in this section. Tables were used to describe the subject's group make-up and occupational areas.

CCQIIA Design

The purpose of this section is to describe the CCQIIA. The CCQIIA was a 51 question pen-and-paper self-report instrument that asked how the respondents see an item in their work environment. Instructions required subjects to respond to each item using a Likert type scale from zero to three. All items were stated in the affirmative. Each item ranged from "Not at all applicable" to "Applicable to a high degree." There was no neutral point. A copy of some of the CCQIIA items are included in the Appendix C.

Each item pertained to one of ten theoretical creative climate dimensions as described below (Table 3.3). All items were randomly arranged (Lauer, 1994).

Each dimension on the measure contained five items that were summed and divided by five to provide a mean for the dimension (Lauer, 1994). If one of the five items was missing, dimensional scores were still tabulated; the four

items were totaled and divided by four. Any dimension having less than four items was determined as incomplete and a mean was not calculated (Lauer, 1994).

Table 3.3

CCQIIA Dimensions, Description, and Items

DIMENSION	DESCRIPTION	ITEMS
Challenge/Motivation	The degree to which organizational members are involved with its daily operations and long-term goals.	1,11,21,31,41
Freedom	The behavioral independence organizational members demonstrate.	2,12,22,32,42
Idea Support	Involves the way new ideas are treated by the organization.	3,13,23,33,43
Dynamism/Liveliness	The degree of activity or eventfullness that exists within an organization.	4,14,24,34,44
Playfulness/Humor	The spontaneity and ease displayed within the workplace.	5,15,25,35,45
Debates	The occurrence of encounters and disagreements between viewpoints, ideas, and differing experiences and knowledge.	6,16,26,36,46
Trust/Openness	The emotional safety in relationships.	7,17,27,37,47
Conflicts	The presence of personal and emotional tensions.	8,18,28,38,48
Risk-Taking	The tolerance of uncertainty and ambiguity exposed in the workplace.	9,19,29,39,49
Idea Time	The amount of time people can use, and do use, for elaborating new ideas.	10,20,30,40,50

Ekvall originally designed the Creative Climate Questionnaire (CCQ), which later evolved into CIQIVA, to be hand-scored. Both individual and group scores were calculated (Lauer, 1994).

The purpose of this section was to describe the CCQIIA. It presented information about the measure's items, how they are scored, arranged, and tabulated.

CCQIIA Procedures

The focus of this section is to describe the procedures used to collect the data for the CCQIIA.

A sample size of 1844 subjects for the CCQIIA was included in the data analysis. Data were gathered from subjects of organizations that contracted

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with Isaksen for training programs in Creative Problem Solving (CPS) and students enrolled in creative studies courses. Completion instructions for the instruments, demographic questions, and a code of ethics (see Appendix D) were mailed to the organizations or handed to each participant.

Participation was voluntary and respondents were assured that their answers would be held confidential. Respondents were informed that data were being gathered for research purposes and to assist their organization in its change efforts. Moreover, they were informed that the purpose of the CCQIIA was to develop a better understanding of their personal perceptions of the climate in which they work and to assess their readiness for change. Course participants were asked to return the instrument to Isaksen in sealed envelopes.

Only the completed instruments were scored. The results were tabulated on an individual, group, and/or organization level (Lauer, 1994). The scores that were tabulated as an aggregate is referred to as the "overall" group (n=1831). All instruments were scored by trained individuals.

The purpose of this section was to describe the procedures utilized to collect the data. The next section describes the modifications made to the CCQIIA as a means to develop the questionnaire known as CIQIIIA.

Climate for Innovation Questionnaire IIIA (CIQIIIA)

This section describes the development of the CIQIIIA; describes the subjects who were administered the climate measure; identifies the instrument used in the study; and describes the procedures used to collect the data.

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Development of the CIQIIIA

The purpose of this section is to document the modifications made to the CCQIIA. After analyzing 1,500 responses to the CCQIIA, a third version of the climate assessment was developed in 1991. This revision entailed some editing of items, changing the order of items, removing the omnibus item and increasing the number of items from 50 to 60.

The initial change made to the CCQIIA was the addition of 9 items to make it a 60 item measure; the additional items made it easier to reduce the items to a 50 item questionnaire. Thirteen older items were dropped, twenty two new items were developed, ten items were reworded, and six items were negatively worded. The descriptions of the dimensions were re-written, and three open response questions were designed to allow for qualitative analysis.

1. What is the most helpful aspect of your working environment that supports your innovation and creativity?

2. What is the most significant aspect of your working environment hindering your innovation and creativity?

3. What is the most important action you would take to improve the climate for innovation and creativity in your working environment?

This addition originated from Isaksen's observation that respondents sometimes added comments to expand or justify their responses. These questions provided data on respondents' perceptions of what supports or

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impedes their creativity. It also provides data on what they might do to change their climate.

The CCQIIA was also renamed the Climate for Innovation Questionnaire as a way to clarify the purpose of the instrument.

The revision was done in part through the use of statistical analysis of the CCQIIA. The techniques used included item and dimension distributions, item and dimension correlations, assessments of the internal reliability and factor structure analysis.

Analysis by Isaksen, Kaufmann, Joniak, Lauer, Murdock, Dorval, and Puccio identified some concerns with the language of the items. This group of researchers also felt that the results of the statistical analysis of the CCQ and the CCQIIA could be used in tandem (Isaksen, et al., 1995). In effect, the cross comparison identified the best items and dimensions from each of the previous instruments and this provided a basis for the modifications that produced the CIQIIIA.

The ensuing CIQIIIA included items from the risk-taking dimension of the CCQ since these items had acceptable distributions and the dimension had a higher internal reliability than the items used for the CCQIIA. The descriptions of some the CIQIIIA dimensions were also re-written to clarify what the items, used to assess it, were measuring. The CIQIIIA items were then randomly arranged.

The purpose of this section was to describe the development of the CIQIIIA. A detailed descriptions of the modifications made to the CIQIIIA were presented.

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Subjects for CIQIIIA

The purpose of this section is to describe the subjects of the study. The majority of subjects were individuals (n=1297) from organizations that contracted with Isaksen for Creative Problem Solving (CPS) training and students enrolled in creative studies courses at Buffalo State College.

The data were collected from September, 1991 to April, 1994. The sample consisted of 849 (65.5%) men and 397 (30.6%) women. There were 51 (3.9%) subjects that did not state their gender. The age of the subjects ranged from 20 to 61 years. The educational level of the subjects were as follows: (a) high school (n=171), (b) some college (n=200), (c) bachelors degree (n=424), (d) some graduate (n=6), (e) masters degree (n=276), and doctorate (n=129). Ninety one subjects chose not to report their educational levels.

From the sample size (n=1297), 297 subjects were from an international household product manufacturer; 289 subjects were from an oil company; 133 subjects from a chemical company; 96 subjects from the banking industry; and 149 subjects from the auto industry.

Table 3.4

Sample for CIQIIIA: Subjects and Frequency Percentages

Organization	Subjects (n)	Frequency %
Educational Samples		
Creative Studies Classes	244	18.7
Special School District Programs	89	6.9
Education Group Total	**333**	**25.6**
Business Samples		
International household product manufacturer--conference	297	22.9
Oil Company Programs	289	22.3
Chemical Company Programs	133	10.3
Bank Industry	96	7.4
Auto Industry	149	11.5
Business Group Total	**964**	**74.4**
Overall Total	**1297**	**100%**

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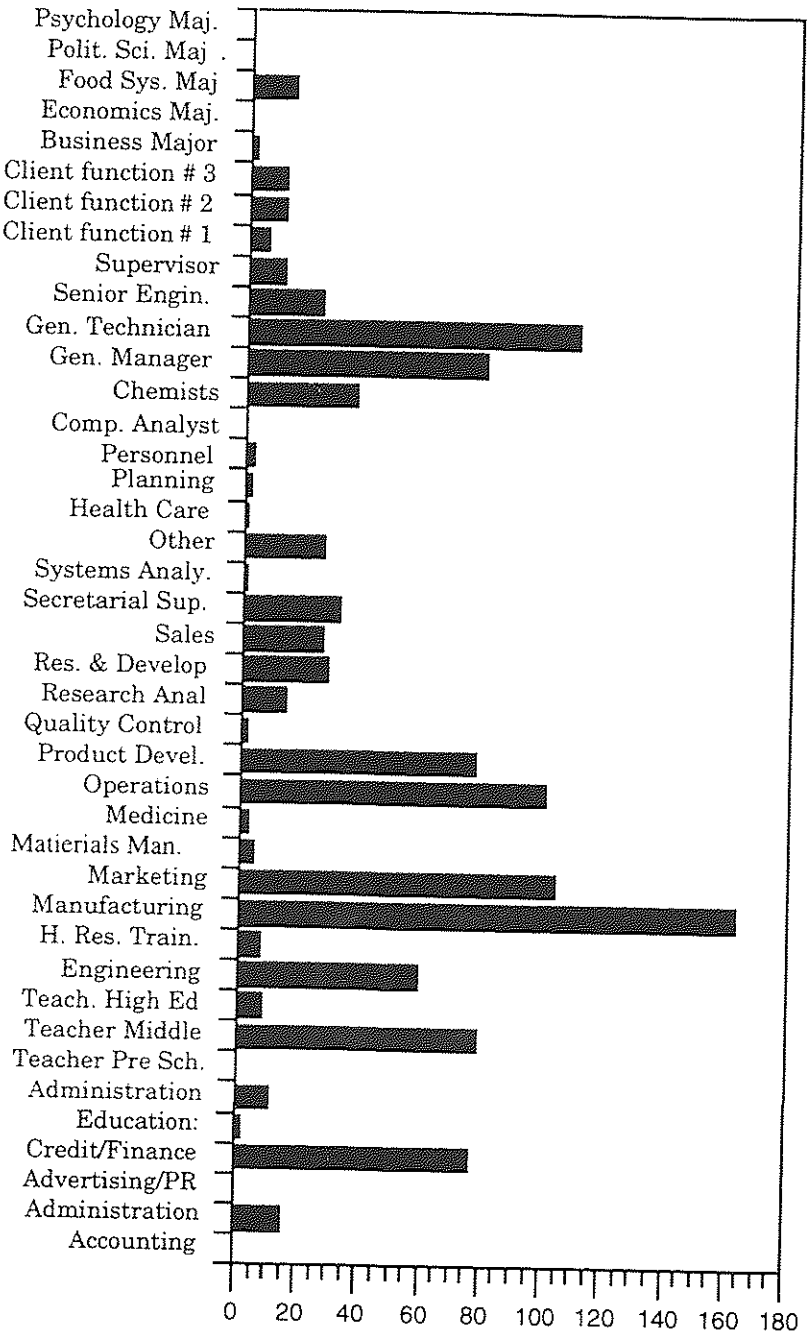
The organizational levels ranged from hourly employees (n=178) to top executives such as vice presidents, directors, board-level professionals (n=3). Some subjects identified their organizational levels as upper middle (n=38) such as department managers, plant superintendents, and plant managers.

Table 3.5

Occupational areas and academic majors for the CIQIIIA Sample (n=1297)



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The majority of subjects identified themselves as middle managers (n=197) which consisted of office managers, mid-level administrators, and department chairs, and first level (n=200) which consisted of foremen, crew chiefs, section supervisors, faculty, and staff. Several subjects (n=681) did not report their level within the organization.

Again, some subjects were dropped from the data analysis in Chapter Four due to incomplete responses to CIQIIIA items. The number excluded was contingent upon the type of analysis used and whether the analysis used the 60 items of the CIQIIIA or the accumulation of these items into one of the CIQIIIA's 10 dimensions (Lauer, 1994).

The occupational areas are also included on Table 3.5. The occupational areas on Table 3.5 that did not show a bar graph totaled less than four (e.g., psychology major, political science major, economics major).

The purpose of this section was to describe the sample that was used. The subject's age, education level, gender, and occupation were described in this section. Other tables in this section described the subject's group make-up and occupational areas.

CIQIIIA Design

The purpose of this section is to describe the measure used in this study. It presents information that concerns the measure's items, how they are scored, arranged, and tabulated.

The CIQIIIA was a 60 question pen-and-paper self-report instrument. Instructions required subjects to respond to each item using a Likert type scale from zero to three, as to how they see an item in their work environment. All items were stated in the affirmative. Each response ranged from "Not at all applicable" to "Applicable to a high degree" (there was no neutral point).

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The items pertained to one of ten theoretical creative climate dimensions as described below. All items were randomly arranged within the CIQIIIA (Lauer, 1994).

Each dimension (Table 3.6) contained six questions that were summed and divided by six to provide a mean score for each dimension (Lauer, 1994). If one of the six question items was missing, dimensional scores were still tabulated; the five items were totaled and divided by five. However, if any dimension had less than four items, then they were determined as incomplete and hence, were not calculated (Lauer, 1994).

Table 3.6

CIQIIIA Dimensions, Description, and Items

DIMENSION	DESCRIPTION	ITEMS
Challenge	The degree to which organization members are involved with its daily operations and long-term goals.	14, 20, 22, 30,34,47
Freedom	The behavioral independence organization members demonstrate.	6,21,27,41,48,50
Dynamism	The degree of activity or eventfullness that exists within an organization.	2,22,7,35,53,57
Trust/Openness	The emotional safety in relationships.	42,54,58,8,15,28
Idea Time	The amount of time people can use, and do use, for elaborating new ideas.	3,16,23,36,43,60
Playfulness/Humor	The spontaneity and ease displayed within the workplace.	9,17,24,37,44,51
Conflicts	The presence of personal and emotional tensions.	4,10,31,38,52,55
Idea Support	Involves the way new ideas are treated by the organization.	11,18,33,45,56,29
Debates	The occurrence of encounters and disagreements between viewpoints, ideas, and differing experiences and knowledge.	5,12,25,39,46,59
Risk-Taking	The tolerance of uncertainty and ambiguity exposed in the workplace.	19,32,40,49,13,26

The purpose of this section was to describe the CIQIIIA. It presented information that concerned the measure's items, how it is scored, arranged, and tabulated.

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CIQIIIA Procedures

The focus of this section is to describe the procedures used to collect and analyze the data in this study.

Subjects were obtained from organizations that contracted with Isaksen for training programs in Creative Problem Solving (CPS). Completion instructions for the instruments, demographic questions, and a code of ethics (see Appendix D) were mailed to the organizations.

Participation was voluntary and respondents were assured that their answers were confidential. Respondents were informed that the data is being gathered for research purposes and to assist their organization in its change efforts. Moreover, they were informed that the purpose of the CIQ was to develop a better understanding of their personal perceptions of the climate in which they work. Course participants were asked to return the instrument to Isaksen in sealed envelopes.

Only the completed instruments were scored. The results were tabulated on an individual, group, and/or organization basis (Lauer, 1994). The scores that were tabulated as an aggregate are referred to as the "overall" group (n=1297). This information was used in each CPS program. All instruments were scored by trained individuals. The original scoring scale was used for the CIQIIIA data.

The purpose of this section was to describe the procedures utilized to collect and analyze the data in the study of the CIQIIIA. The next section examines the development of the CIQIVA and explores its reliability and factor structure.

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Climate for Innovation Questionnaire IVA (CIQIVA)

This section describes the development of the CIQIVA; describes the subjects; identifies the instrumentation; and describes the procedures used to collect the data.

Development of the CIQIVA

The purpose of this section is to detail the modifications made to the CIQIIIA by Isaksen, Lauer, Puccio, Joniak, & Murdock.

The first step involved performing an item-to-item correlation. The results suggested that in some instances items had low correlations coefficents with other items theoretically assigned to that dimension. Although the coefficients were low, they still exceeded the .001 level of significance. The items and their dimensions deemed suspect were: 49 risk-taking, 37 dynamism, 53 dynamism, and 54 trust. The Cronbach alphas for each dimension are presented on Table 3.7.

Table 3.7

Cronbach alphas for the changes made to the CIQIIIA

Dimension	Cronbach alpha
Challenge	.86
Freedom	.84
Dynamism	.72
Trust	.74
Idea/Time	.88
Play/Humor	.88
Conflicts	.84
Idea Support	.89
Debates	.87
Risk-Taking	.77

Note: n= 1250; six items per dimension

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The Cronbach alphas were considered acceptable; however, the item-total statistics suggested that the reliability could be increased if items 53 (dynamism) and 49 (risk-taking) were deleted.

The results of the factor analysis, albeit tainted by high intercorrelation of the 60 items of the CIQ, derived 10 factors based on an Eigenvalue ≥ 1.0. A review of the rotated factor matrix revealed only nine factors that were represented by these items. These nine factors suggested strong support for the CIQIIIA's ability to measure nine fairly distinct aspects of creative climate. Dynamism was the factor that did not derive a distinct loading; it overlapped with challenge (three items), risk-taking (two items), and playfulness (one item). Half of the items designed to measure trust loaded together to form a dimension however the other three items loaded strongest on the challenge (one item) and playfulness (two items) dimensions. Although the CIQIIIA performed well, Isaksen et al., (1993) concluded that the measure could perform better.

Subsequent to this analysis, the first modification attempted on the CIQIIIA was the deletion of items 49, 53, and 54 since these items had low inter-item correlations with other items designed to be part of their dimensions. However, these actions did not produce a significant improvement in the factor structure.

In addition to the deletion of items 49, 53, and 54, item 1 was also removed as a result of its high mean (2.62) and low standard deviation (.57). The result may have suggested a response bias. Additional items were removed: items that reduced a Cronbach alpha for the dimension were removed from each of the six remaining dimensions. The results of the factor analysis were viewed as promising by Isaksen et al., (1993). Seven more items were removed as a result of a loading greater than .25 on dimensions that are

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not "associated" to the items. The result was an eight factor solution that was deemed by the revision team to have a weak structure and some unacceptable alphas.

A sequence of six progressively different item combinations were analyzed using factor analysis. The first attempt excluded items 28 and 41. The third attempt excluded items 1,8,13,15,26,35, and 53. The sixth attempt excluded 1,7,8,13,15,19,26,28,29,35,53, and 57. Excluding the alpha for the risk-taking dimension (.62), the latter factor analysis seemed acceptable. A subsequent factor analysis was performed omitting item 19.

The final factor analysis of the CIQIIIA showed that a 49 item questionnaire was acceptable with nine distinct factors that accounted for 62.4% of the variance. This resulted in the CIQIVA. The estimated or theoretical Cronbach alphas were: challenge .86 (seven items); freedom .84 (three items); trust .67 (three items); idea/time .88 (six items); playfulness/humor .88 (six items); conflicts .84 (six items); idea support .89 (five items); debates .87 (six items); and risk-taking .69 (four items). The loading of item 19 fell below the generally accepted .30 at point .29. These results were considered sufficiently acceptable to make the CIQIVA a 50 item instrument with nine dimensions (one lead question that is not scored).

The quantitative analysis indicated that the dimension of dynamism was a weak concept in the CIQ. A reason maybe that the concept of dynamism in Sweden is the pace and liveliness that exists within the workplace; and after several modifications for North American samples, it still loaded under the dimension of challenge. It seems that North Americans perceive the concept as part of challenge.

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Table 3.8

Theoretical Reliability of the CIQIVA
Derived from Changes of the CIQIIIA

Dimension	Cronbach alpha
Challenge/Involvement	.85 (7 items)
Freedom	.84 (6 items)
Trust	.67 (3 items)
Idea/Time	.88 (6 items)
Play/Humor	.88 (6 items)
Conflicts	.84 (6 items)
Idea Support	.89 (5 items)
Debates	.87 (6 items)
Risk-Taking	.77 (4 items)

Note: n = 1250

Thus, the dimension was modified and three of its items were left in the quantitative instrument; however, three of the six items designed to measure the dimension consistently loaded on challenge (correlations were significant). Isaksen et al., (1993) decided to expand the concept of challenge to become challenge/involvement. This was developed by highlighting the key words of the items of the dimension and determining their common theme

Three open ended questions designed for qualitative analysis were also maintained because of their power and ability to highlight issues that may have been neglected in the quantitative piece of the measure. The 3 questions were modified slightly in the new version to stress the respondents' written responses.

The purpose of this section was to describe the development of the CIQIVA. A detailed description of the modifications made to the measure were presented.

Subjects for the CIQIVA

The purpose of this section is to describe the sample that was used in the study. The respondent's age, education level, gender, and occupation are

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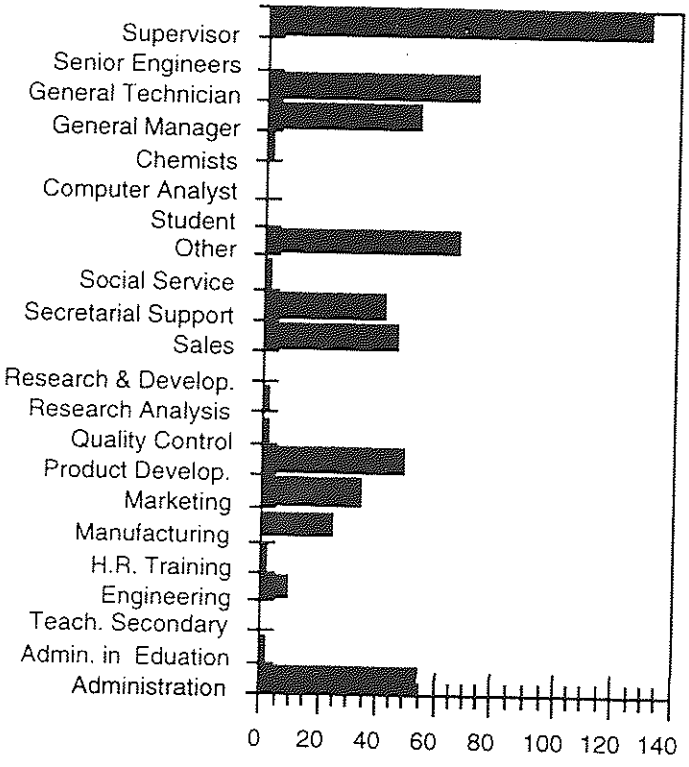
described in this section. Moreover, tables are also used to describe the respondent's occupational areas and academic majors.

The data for the Climate for Innovation Questionnaire (CIQIVA) was gathered from subjects (n=639) of organizations that contracted with Isaksen for training programs in Creative Problem Solving (CPS). The data was collected between September, 1991 to April, 1994. These respondents were comprised of 144 (22.5%) men and 108 (16.9%) women. Three hundred eighty seven respondents (60.6%) did not state their gender.

Table 3.9

Occupational areas and academic majors for the CIQIVA Sample (n=639)



The age of the respondents ranged from 23 to 52 years. The educational level of the subjects were as follows: (a) some college (n=4), (b) bachelors degree

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(n=21), (c) some graduate (n=8), (e) masters degree (n=8), and doctorate (n=17). 581 respondents did not report their educational levels.

From the sample size (n=639), 44 respondents were from a manufacturing household products business; three respondents were from the service industry; 271 respondents were from an industrial company; 143 respondents were from a food manufacturing company; 172 respondents were from a health care company; and six respondents were from educational settings. The occupational areas are also included on Table 3.9. The occupational areas on Table 3.9 that did not show a bar graph totaled less than four.

Regarding the organizational levels, respondents ranged from top executives (n=4) such as president, chief executive officer, and chief operating officer to upper middle executives such as department executives, superintendents, plant managers, senior professional staff, and deans (n=99). The remaining subjects were executives (n=31) such as vice presidents, directors, board level professionals, and assistant superintendents. From the sample size, 505 respondents did not report their organizational level.

The purpose of this section was to describe the sample that was used in this study. The respondent's age, education level, gender, and occupation were described in this section. Moreover, tables were also used to describe the respondent's occupational areas and academic majors.

CIQIVA Design

The purpose of this section is to describe the measure used in the study. It presents information that concerned the questionnaire's items, how they are scored, arranged, and tabulated.

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The CIQIVA is a 50 item, pen-and-paper self report questionnaire. Instructions required respondents to respond to each item using a Likert type scale from zero to three, as to how they see their work environment. All items were stated in the affirmative. Each item ranged from "Not at all applicable" to "Applicable to a high degree" (there was no neutral point). Item one is a omnibus question. Example items are included in the Appendix B section of this study.

The items on the measure pertained to one of nine theoretical creative climate dimensions as described below (Table 3.10). All items were randomly arranged within the CIQIVA (Lauer, 1994).

Table 3.10

CIQIVA Dimensions, Description, and Items

DIMENSION	DESCRIPTION	ITEMS
Challenge/Involvement	The degree to which people are involved in daily operations, long-term goals, and visions	2,11,16,18,23,27,39
Freedom	The behavioral independence organization members demonstrate.	6,17,22,33,40,42
Idea Support	Involves the way new ideas are treated by the organization.	9,14,26,37,47
Playfulness/Humor	The spontaneity and ease displayed within the workplace.	7,13,20,29,36,43
Debates	The occurrence of encounters and disagreements between viewpoints, ideas, and differing experiences and knowledge.	5,10,21,31,38,49
Trust/Openness	The emotional safety in relationships.	34,45,48
Conflicts	The presence of personal and emotional tensions.	4,8,24,30,44,46
Risk-Taking	The tolerance of uncertainty and ambiguity exposed in the workplace.	15,25,32,41
Idea Time	The amount of time people can use, and do use, for elaborating new ideas.	3,12,19,28,35,50

Note: Question 1 on the CIQ is a distracter item and is not scored.

Each dimension had its respective number of items--answered by respondents--that were summed and divided by the appropriate number of

questions. For example, the freedom dimension had six questions that were divided by six to provide the mean score for its dimension (Lauer, 1994). If one of the six items was missing, dimensional scores were still tabulated; the five items were summed and divided by five.

The purpose of this section was to describe the measure used in this study. It presented information that concerned the questionnaire's questions, how they are scored, arranged, and tabulated. The next section describes the procedures used to collect and analyze the data in the study.

CIQIVA Procedures

The focus of this section is to describe the procedures used to collect and analyze the data in this study.

A sample size of 639 for CIQIVA were included in this data analysis. The data were gathered from respondents who participated in a Creative Problem Solving training program. Completion instructions for the instruments, demographic questions, and a code of ethics (see Appendix D) were mailed to the organizations for distribution to the individuals.

Participation was voluntary and respondents were assured that their answers were confidential. Respondents were informed that data were being gathered for research purposes and to assist their organization in its change efforts. Moreover, they were informed that the purpose of the CIQ is to develop a better understanding of their personal perceptions of the environment in which they work. Course participants were asked to return the instrument to Isaksen in sealed envelopes.

Only the completed instruments were scored. The results were tabulated on an individual, group, and/or organization level (Lauer, 1994). The scores that were tabulated as an aggregate is referred to as the "overall" group

(n=639). This information was used in each CPS program. All instruments were scored by trained individuals. Original scoring scale was used for CIQIVA (see Appendix A for scale descriptions).

The purpose of this section was to describe the procedures used to collect and analyze the data in this study. The next section describes the major question and sub-questions examined in the study.

PLAN FOR DATA ANALYSIS

The purpose of this section is to describe the statistics that were used to examine the reliability and the factor structure of the climate questionnaires.

The present study is designed to investigate the reliability of the CCQIIA, CIQIIIA, and the CIQIV instruments. This section presents the plan for data analysis which includes descriptive statistics, Pearson-Product Moment correlations, Spearman-Brown, Guttman split half, Cronbach alpha, and factor analyses using both principle component and maximum likelihood methods.

The quantitative analysis of the three creative climate measure versions conducted in this study are exploratory. The hypothesis tested is that as a result of the revisions, the CIQIVA would show an improvement over the previous versions and potential weaknesses that may be modified in the future. Thus, this study examines the factor structure and reliability of the three creative climate questionnaires to determine if there is an improvement from each previous versions.

Frequencies for each dimension are computed to examine any concerns related to abnormal distributions (Lauer, 1994). Pearson r correlations are computed to examine the nature of the relationship between items, as well as the dimensions of the instruments. This same analysis is used to determine

the reliability of each dimension--items did not lower the Cronbach alpha of the dimension.

The correlational matrices in this study uses a listwise method (Lauer, 1994) of removing a case from the calculation of a correlational coefficient when it has missing values for one of the items (Vogt, 1993). The correlational matrices are computed as a way to provide a base for *a posteriori* factor analyses.

The Pearson r correlations for each of the three measures use a pairwise deletion method as way to preserve cases (Lauer, 1994). The relationship between items and dimensions are reported at a $p \leq .05$ or $p \leq .01$ significance level.

One way to ascertain the accuracy and the reliability of a measure is to examine it quantitatively by using statistical procedures commonly known as factor analysis and Cronbach alpha. When factor analysis is applied on the internal structure of the CIQ it permits items to align along dimensions. This procedure provides an evaluation of the theoretical structures that underlie its dimensions. Also, an evaluation allows for corollary support of CIQ theory. Specifically, factor analysis can examine redundancy among CIQ variables. This is important because redundancy may weaken the empirical validity of the CIQ.

Exploratory factor analysis is used to examine the internal structure of each questionnaire. Gorsuch (1974) recommends a subjects-to-items ratio of at least 5:1 to be more confident in the stability of a factor solution. This ratio was met for the CCQIIA (1831/51= 35.9:1), CIQIIIA (1297/60= 21.6:1), and the CIQIVA (639/50= 12.8:1). The factor analysis procedure first examines the relationship of the items based upon their inter-item correlations. Then, the procedure groups the number of items into factor loadings.

An oblique rotation for a factor analysis method makes more sense than the orthogonal rotation because one would anticipate a high correlation resulting from the matrices. The oblique rotation does not force the rotated factors to be orthogonal (Paivio & Harshman, 1983). Given that creative climate is considered a complex combination of many factors (Isaksen et al., 1995), that interact with each other, an oblique rotation would more accurately represent the complexity of the climate because constructs in the real world are rarely uncorrelated (Harmon, 1976).

However, the principle component model (Harman, 1976) is also used because it addressed the need the study has in maximizing the ability to explain the variance of the observed variables (Tucker, 1966) and to insure no pertinent data, regarding the selection of an appropriate solution, is not overlooked.

The standard used in this study extracts factors with an Eigenvalue criterion greater or equal to one (Kaiser, 1960). The solutions function by first examining the relationship of the items based upon their inter-item correlations. Then, the solutions reduce the number of questionnaire items into factor loadings.

Other statistical techniques used are the Cronbach alpha, Spearman-Brown and the Guttman split half which are measures of internal reliability or consistency of the climate dimensions (Vogt, 1993). Cronbach alphas range from 0 to 1.0 and indicate how much the climate dimensions are measuring the same thing (Vogt, 1993). If the alpha is greater than or equal to .70 (Hair, Anderson, Tatham, & Black, 1992), then it is determined as being acceptable.

The statistical procedures Spearman-Brown and Guttman split-half are also used to ensure that no pertinent data, regarding the determination and examination of internal reliability, are overlooked. The Guttman split half

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statistical procedure investigates reliability by examining how well one half of all the items of a questionnaire correlate with the other half (Vogt, 1993). Finally, the Spearman-Brown procedure predicts the approximate gain in reliability of a measure if one were to increase the number of observations (Vogt, 1993). Although a multi-statistical approach is used to examine reliability, the Cronbach alpha is used as a base for analysis; Pedhazur et al., (1991) argues:

> ...split half methods are seriously flawed, because a measure may be split in many different ways, thereby potentially leading to many different estimates of its reliability. Because alpha is based on the notion of splitting a measure into as many parts as its number of items, this problem is avoided. (p. 101)

Since the CSC and CPS-B staff members have used the climate questionnaire to examine creative press and its relationship to such variables as creative product, person, and process, it becomes more critical to have a measure that is validated and structurally established (Isaksen & Kaufman, 1990). This is an important point because the perceptions, interpretations, and value the Americans and the Swedish place on each dimension in Ekvall's Creative Climate Questionnaire may differ. Thus the construct designed for the Swedish culture may need to be sensitized to meet the culture concepts of the United States. This is also significant because for an individual, a team, and/or organization to benefit from an understanding of climate it is essential to get an "accurate" reading of the employees' aggregate perception of the organization's climate before disseminating feedback or promoting change.

The data analysis plan is focused on identifying the relationship between the questionnaire items and the dimensions of the CCQIIA, CIQIIIA, and the CIQIVA. Moreover, it is focused on identifying the internal structure of the climate measures instruments through factor loadings. It also described the procedures used and the questions they addressed.

The purpose of this section was to describe the hypothesis explored in this study and the statistics that were implemented to investigate the reliability and the factor structure of the climate measures. The rationale for their use and a description of how they were used were provided.

SUMMARY

This section examined the three versions of a creative climate questionnaire. The purpose was to document the revisions made to these measures and determine their effect on the current version subsequently called the CIQIVA. Each section documented the development of questionnaire; described the subjects that were administered the climate questionnaire; identified the instrumentation used in the study; and described the procedures used to collect and analyze the instrumentation data. Chapter Four will present the results of this study.

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Review of Part I

The purpose of Part I was to present the results of the quantitative analysis of three climate questionnaire versions: the CCQIIA, CIQIIIA, and CIQIVA. The results of the quantitative analyses were divided into five sections of statistical procedures used in this study. The first section presented the means and standard deviations for the CIQ items and dimensions. The second section examined the results obtained from the frequencies of the CCQIIA dimensions. The third section presented and examined the correlational analysis of the 50 CCQIIA items and the CCQIIA's dimensions. The fourth section focused on the presentation and discussion of the results obtained from the factor analysis of the CCQIIA. The analyses consisted of a principle component and maximum likelihood rotation. The fifth focused on the presentation and discussion of the results obtained through the statistical procedures known as Cronbach alpha, Guttman split half, and Spearman-Brown. The same format was utilized to discuss the results of the CIQIIIA and CIQIVA.

PART II
DISCUSSION OF RESULTS

The purpose of this section is to compare the results from the three versions of a climate questionnaire. Specifically this section answers the central question of the study. The comparisons are made by examining the distribution of scores, inter-item and inter-dimensional correlations, factor analyses, and internal reliabilities of the three climate measures.

Measure of Central Tendency Comparison

The purpose of this section is to compare the measures of central tendency to determine an improvement of the CIQIVA. The mean, median, and

mode scores were tabulated to facilitate the comparison.

The results on Table 4.50 showed the measure of central tendency for the three versions of the climate measure designed to measure risk-taking. When the mean scores were compared, it appeared that the CCQIIA was very close to the hypothetical mean of 150. However, it appeared the CIQIIIA did not improve when compared to the CCQIIA. In regards to the CIQIVA, it also did not improve in its distribution of respondents' scores. In fact, when compared to the CIQIIIA, over time it shifted further away from the theoretical midpoint. Nevertheless, a mean score of 106 for the CIQIVA was still considered skewed towards the negative.

Table 4.50

Risk-Taking

	CCQIIA	CIQIIIA	CIQIVA
Mean	156	126	106
Median	160	117	100
Mode	160	100	100

The results shown on Table 4.51 show the measure of central tendency for the three versions of the climate measure designed to measure idea time. When the mean scores were compared, it appeared that the CCQIIA was closer to the hypothetical mean of 150. However, it appeared the CIQIIIA did not improve when compared to the CCQIIA. In regards to the CIQIVA, it also did not improve in its distribution of respondents' scores. Over time, when compared to the CIQIIIA, it shifted further away from the theoretical midpoint. A mean score of 93 for the CIQIVA was still considered skewed towards the negative.

Table 4.51

Idea Time

	CCQIIA	CIQIIIA	CIQIVA
Mean	138	125	93
Median	140	117	100
Mode	140	100	100

The results shown on Table 4.52 show the measure of central tendency for the three versions of the climate measure designed to measure debates. When the mean scores were compared, it appeared that the CCQIIA and the CIQIIIA were further away from the hypothetical mean of 150. With regard to the CIQIVA, it did improve over time in its distribution of respondents' scores. However, a 169 mean score for the CIQIVA was still considered too skewed towards the positive.

Table 4.52

Debates

	CCQIIA	CIQIIIA	CIQIVA
Mean	187	187	169
Median	200	200	167
Mode	200	200	200

The results shown on Table 4.53 show the measure of central tendency for the three versions of the climate measure designed to measure playfulness/ humor. When the mean scores were compared, it appeared that the CIQIVA was very close to the hypothetical mean of 150. The CIQIIIA also improved over time when compared to the CCQIIA. However, the CIQIIIA was not closer to the theoretical point than the CIQIVA. In fact when the median and then mode was considered, it matched the hypothetical midpoint while the CIQIIIA distanced itself further at 187 for the mode score.

Table 4.53

Playfulness/Humor

	CCQIIA	CIQIIIA	CIQIVA
Mean	165	161	143
Median	160	167	150
Mode	160	183	150

The results shown on Table 4.54 show the measure of central tendency for the three versions of the climate questionnaire designed to measure conflicts. When the mean scores were compared, it appeared that the CCQIIA was closer to the hypothetical mean of 150. However, it appeared the CIQIIIA did not improve when compared to the CCQIIA. In regards to the CIQIVA, it also did not improve over time, but it did approach the midpoint closer than the CIQIIIA in its distribution of respondents' scores. Although the CCQIIA's mean was closer to the midpoint, its mean score of 180 was still considered too skewed towards the positive. When the mode scores were considered, the CIQIVA shifted closer to the midpoint while the CCQIIA shifted away. All scores did not cluster close together under the theoretical midpoint of 150.

Table 4.54

Conflicts

	CCQIIA	CIQIIIA	CIQIVA
Mean	180	107	118
Median	180	100	117
Mode	220	100	133

The results shown on Table 4.55 show the measure of central tendency for the three versions of the climate measure designed to measure idea support. When the mean and median scores were compared, it appeared that the CCQIIA

and the CIQIIIA were further away from the hypothetical mean of 150. Over time, the CIQIIIA did improve when compared to the CCQIIA. With regard to the CIQIVA, it did improve over time in its distribution of respondents' scores. However, when the mode scores were considered for all versions, they distanced themselves considerably from the hypothetical midpoint.

Table 4.55

Idea Support

	CCQIIA	CIQIIIA	CIQIVA
Mean	184	175	142
Median	180	183	140
Mode	200	200	100

The results on Table 4.56 show the central tendency scores for the three versions of the climate measure designed to measure challenge. When the mean scores were compared, it appeared that the CIQIVA shifted closer to the midpoint than the CCQIIA and the CIQIIIA. However, it appeared the CIQIIIA did not improve when compared to the CCQIIA. Over time the CIQIVA shifted closer to theoretical midpoint. Its previous version (CIQIIIA) was clustered around higher scores. Nevertheless, a 197 mean score for the CIQIVA was still considered too skewed towards the positive.

Table 4.56

Challenge

	CCQIIA	CIQIIIA	CIQIVA
Mean	209	231	197
Median	220	233	200
Mode	200	300	214

The results shown on Table 4.57 show the measure of central tendency for the three versions of the climate questionnaire designed to measure freedom. When the mean scores were compared, it appeared that over time the CCQIIIA did shift closer to the midpoint. In regards to the CIQIVA, it did improve over time in its distribution of respondents' scores when compared to the CIQIIIA. However, a 136 mean score for the CIQIVA was still considered skewed too much towards the negative.

Table 4.57

Freedom

	CCQIIA	CIQIIIA	CIQIVA
Mean	191	167	136
Median	200	167	133
Mode	180	200	117

The results on Table 4.58 show the measure of central tendency for the three versions of the climate questionnaire designed to measure trust/openness. When the mean scores were compared, it appeared that the CIQIIIA was closer to the hypothetical midpoint of 150. In fact, the CIQIII's median and mode scores matched the midpoint. In regards to the CIQIVA, it did not improve in its distribution of respondents' scores; its mode score shifted significantly to 100.

Table 4.58

Trust/Openness

	CCQIIA	CIQIIIA	CIQIVA
Mean	162	158	128
Median	160	150	133
Mode	180	150	100

In summary, it appeared that the CIQIVA overall did improve in its distribution of respondent scores. All dimensions improved with only three exceptions. These exceptions were the trust/openness, risk-taking, and idea time dimensions.

The purpose of this section was to compare the central tendency scores of the three measures to determine an improvement of the CIQIVA. The mean, median, and mode scores were tabulated to facilitate the comparison.

Inter-item Correlation Comparison

This section compares the results obtained from the correlational analysis of the climate measures. These results will be presented and discussed.

The overwhelming majority of the intercorrelations of each climate measure item with the rest of the measure were less than .50. This applied for the three versions of the climate questionnaire. Of these correlations 99% (1829 of 1831) were significant at a level of at least $p \leq .05$ for the CCQIIA. The correlations for the CIQIIIA were also at 99% (1285 of 1297) with a significant level of at least $p \leq .05$. The correlations for the CIQIVA were at 95% (611 of 639) with a significant level of at least $p \leq .05$. The CIQIVA item 41 generated 19 non-significant scores. It is clear that item 41 was a problem item. Despite the problem item, the CIQIVA suggested that the significant items are similar.

The purpose of this section was to compare the results obtained from the correlational analysis of the climate measures. These results were presented and discussed.

Factor Analysis Comparison

The purpose of this section is to compare the results obtained from the factor analyses of the climate questionnaires. These results are presented and

discussed. The CIQIVA is compared in a table format (Table 4.59).

The results of the factor analyses on the CCQIIA did not conform closely to factor analysis. In visually scanning the analysis one can see the overlap among many of its items across several dimensions (Table 59). Conversely, the CIQIIIA and the CIQIVA factor analyses demonstrated a tighter factor structure especially when the maximum likelihood solution was carried out. The exceptions were found in the risk-taking and trust dimensions. In general, it appeared the factor structure of the CIQIVA improved significantly when compared to the CCQIIA. However when compared to the CIQIIIA it showed similar accounts of variance: CIQIIIA (60.2%) to CIQIVA (61.6%).

The purpose of this section was to compare the results obtained from the factor analyses of the three climate measures to determine an improvement of CIQIVA. These results were presented and discussed.

Internal Reliability Comparison

The purpose of this section is to describe and compare the internal reliabilities of the climate measures. Specifically, this section examines the Cronbach alphas for each of the dimensions.

The results in Table 4.60 of the CIQIIIA Cronbach alphas were promising when compared to the CCQIIA. With the exception of the dynamism dimension, all alphas increased. The alphas were all greater than or equal to .70 which signifies that the construct is being assessed reliably (Lauer, 1994). It also suggests that the modifications that were made to the CCQIIA (i.e., transfer of risk-taking items from CCQ) had a positive effect on the CIQIIIA's alpha's.

Table 4.59

Principal Component Analysis of CCQHA Items: Entire Sample (n = 1831)

Dimension	Factors 1	2	3	4	5	6	7
Debates 46	.613					.508	
Idea Sup 33	.599				.317		
Play/Hum 45	.593		.350				
Live/Dyn 44	.583						
Live/Dyn 4	.581	.343					
Idea Sup 23	.568			.311	.344		
Idea Sup 13	.564						
Trust/Open 27	.561				.359		
Challenge 31	.531	.493					
Risk-Tak 49	.516			.306			
Freedom 32	.515	.423					
Freedom 22	.509	.345					
Risk-Tak 19	.445			.321			.264
Challenge 11		.717					
Challenge 1		.656					
Freedom 12		.541					
Risk-Tak 39		.487					
Live/Dyn 34		.487	.444				
Idea Sup 3		.420			.319		
Play/Hum 5			.750				
Play/Hum 35			.688				
Live/Dyn 14		.361	.655				
Live/Dyn 24		.447	.538				
Play/Hum 25			.521		.378		
Freedom 42			.427	.381			.246
Idea Time 30				.729			
Idea Time 10				.717			
Idea Time 50				.714			
Idea Time 20	.332			.692			
Idea Time 40				.603			
Idea Sup 43		.383	.332	.394	.320		
Conflict 28					.672		
Conflict 8					.571		
Conflict 48	.389				.566		
Trust/Open 17					.550		
Conflict 18		.384			.478		
Trust/Open 47		.363			.457		
Trust/Open 37		.388	.332		.420		
Trust/Open 7					.337	.314	
Debates 26						.762	
Debates 6						.734	
Debates 36			.315			.669	
Debates 16		.322				.546	
Risk-Tak 9		.331					.640
Risk-Tak 29		.313				.301	.245
% Variance	31.9	6.9	4.7	3.7	3.5	2.6	2.2
Eigenvalues	16.9	2.9	2.3	1.3	1.7	1.3	1.1

Principal Component Analysis of CIQHIA Items: Entire Sample (n= 1297)

Dimension	Factors 1	2	3	4	5	6	7	8	9	10
Challenge 47	.772									
Challenge 20	.736									
Challenge 1	.701									
Challenge 30	.640									
Challenge 14	.629									
Dynamism 2	.578									.334
Challenge 34	.578					.344				
Trust 28	.460				.425					
Idea Time 23		.778								
Idea Time 36		.771								
Idea Time 60		.771								
Idea Time 43		.714								
Idea Time 3		.626								
Idea Time 16		.572								
Play/Hum 44			.761							
Play/Hum 37			.734							
Play/Hum 24			.727							
Play/Hum 9			.682							
Play/Hum 51			.657							
Play/Hum 17			.549							
Dynam 35	.421		.507							
Trust 15			.383							
Debates 25				.772						
Debates 12				.730						
Debates 39				.701						
Debates 46				.696						
Debatse 5				.675						
Risk-Tak				.435		.302		.338		
Debates 59				.421		.362			.314	
Conflict 38					-.736					
Conflict 10					-.722					
Conflict 31					-.704					
Conflict 55					-.686					
Conflict 52					-.684					
Conflict 4					-.608					
Idea Sup 56						.611				
Idea Sup 18						.607				
Idea Sup 33						.598				
Idea Sup 11						.590				
Idea Sup 45						.565				
Idea Sup 29	.372					.524				
Dynam 53						.386		.370		
Dynam 57						.358				
Risk-Tak 19						.332		.303		
Freedom 21							.690			
Freedom 41							.689			
Freedom 48							.685			
Freedom 27							.623			
Freedom 6							.620			
Freedom 50						.385	.411			
Risk-Tak 49								.681		
Risk-Tak 40								.571		
Trust 54									.771	
Trust 42					.301				.703	
									.614	
Dynam 7	.318									.493
Trust 8			.372							.439
Challenge 22	.394									.404
Risk-Tak 13				.319						.340
% Variance	32.1	6.1	4.3	3.5	3.4	2.8	2.4	2.1	1.8	1.7
Eigenvalues	19.2	3.6	2.6	2.0	2.0	1.6	1.4	1.2	1.0	1.0

Principal Component Analysis of CIQIVA Items Entire Sample (n=639)

Dimension	Factors 1	2	3	4	5	6	7	8	9
Idea Time 35	.800								
Idea Time 19	.780								
Idea Time 28	.757								
Idea Time 50	.756								
Idea Time 3	.698								
Idea Time 12	.664								
Conflict 30		-.760							
Conflict 24		-.738							
Conflict 44		-.736							
Conflict 46		-.732							
Conflict 8		-.671							
Conflict 4		-.666							
Debates 10			.772						
Debates 21			.766						
Debates 38			.744						
Debates 31			.727						
Debatse 5			.632						
Chal/Invol 39				.762					
Chal/Invol 16				.714					
Chal/Invol 23				.702					
Chal/Invol 11				.637					
Chal/Invol 27				.632					
Chal/Invol 2				.571					
Chal/Invol 18				.391				.381	
Play/Hum 20					.760				
Play/Hum 36					.751				
Play/Hum 29					.751				
Play/Hum 7					.721				
Play/Hum 43					.600				
Play/Hum 13					.554				
Idea Sup 9						.627			
Idea Sup 47	.302					.581			
Idea Sup 14						.573			
Idea Sup 37			.327			.547			
Idea Sup 26	.311					.525			
Debates 49			.424			.430			
Freedom 42	.340					.391	.346		
Freedom 33							.739		
Freedom 40							.683		
Freedom 17	.312						.574		
Freedom 22							.548	.342	
Freedom 6							.444	.312	
Risk-Tak 25								.610	
Risk-Tak 15								.567	
Risk-Tak 32								.519	
Risk-Tak 41						-.366		.397	.333
Trust 45									.704
Trust 48		.371							.568
Trust 34									.487
% Variance	31.4	6.5	5.7	4.6	3.4	2.9	2.8	2.2	2.1
Eigenvalues	15.3	3.1	2.7	2.2	1.6	1.4	1.3	1.0	1.0

Table 4.60

A Comparison of the CIQ's Statistics

Dimensions	Cronbach alpha					Guttman			Spearman		
	CCQ[1] 1987	CCQIIA 1989	CIQIIIA 1994	CIQIVA* 1994	CIQIVA 1995	CCQIIA 1989	CIQIIIA 1994	CIQIVA 1995	CCQIIA 1989	CIQIIIA 1994	CIQIVA 1995
Challenge	.80	.81	.85	.85	.83	.80	.85	.79	.82	.85	.81
Freedom	.72	.69	.84	.84	.81	.72	.84	.81	.74	.84	.81
Dynamism	.77	.77	.72	n/a	n/a	.75	.72	n/a	.78	.72	n/a
Trust	.79	.71	.74	.67	.61	.71	.59	.60	.71	.60	.64
Idea Time	.78	.81	.88	.88	.88	.80	.85	.86	.82	.85	.86
Playfulness/Humor	.77	.78	.88	.88	.87	.71	.85	.85	.75	.85	.85
Conflicts	.81	.72	.84	.84	.86	.68	.84	.85	.72	.84	.85
Idea Support	.87	.83	.89	.89	.90	.84	.89	.86	.86	.89	.89
Debates	.73	.82	.87	.87	.88	.80	.84	.86	.82	.84	.86
Risk-Taking	.78	.52	.77	.69	.59	.54	.74	.57	.54	.74	.57
Sample size	n=431	n= 1844	n= 1297	n=1297	n=639	n=1844	n=1297	n=639	n=1844	n=1297	n=639

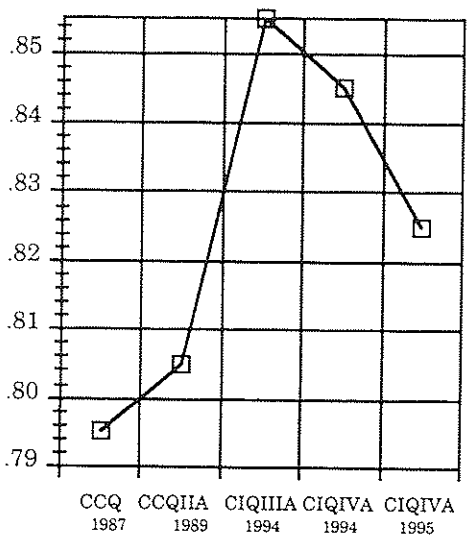
*Note: Cronbach alphas for CIQIVA are based upon adjustment to CIQIIIA to improve inter-item correlations
*Note: CIQIIIA, 1994 and CIQIVA 1994 shared the same sample.
[1] Lauer (1994)

When the CIQIVA and CIQIIIA were compared, the alphas were similar with the exception of the dimensions of trust and risk-taking. The alphas of these dimensions decreased below the .70 acceptable level. These results may be attributed to the reduction of items and/or the sample differences.

When the Guttman split half and the Spearman-Brown statistical procedures were considered, the adverse results were obtained for the trust and risk-taking dimensions. Nevertheless, the internal reliability results continued to fall below the .70 acceptable level. The Guttman split half was considered to determine how well scores on one half of the measure correlate with those on the other half. The Spearman was considered to compensate for the underestimation caused by split half procedures. These statistical procedures were considered as ways to ecologically approach the examination of the measure's internal reliability.

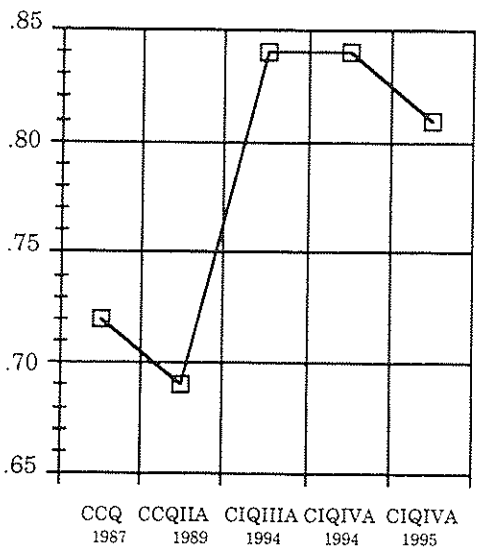
In this section, the Cronbach alphas were visually presented to accentuate the results when comparing the climate measures since the first translated version of 1987.

Table 4.61



Challenge

Table 4.62



Freedom

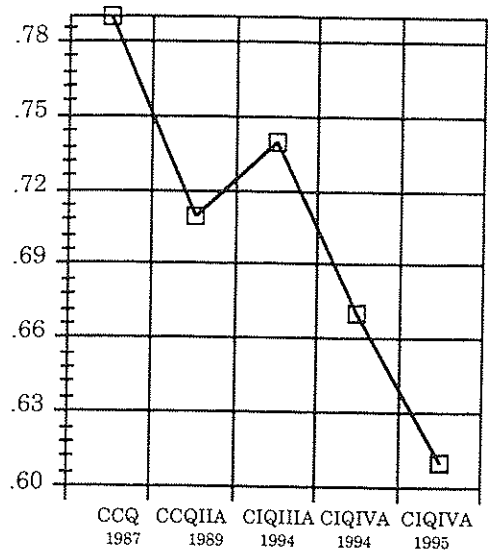
In Table 4.54, the results showed that the challenge dimension responded well to its modifications (e.g., deletion of items based on low item-to-item correlation, realignment of items based on factor analysis, deletion of items based high and low standard deviations).

Although its Cronbach alpha decreased slightly when compared to its previous version, the alpha coefficient for the current version was considered an acceptable level.

In Table 4.55, the results showed that the freedom dimension for the current version of the climate measure responded well to its modifications (e.g., deletion of items based on item-to-item correlation, realignment and/or deletion of items based on factor analysis). It compared extremely well to its translated version. However, when the CIQIIIA was considered, the results showed a slight decrease in its alpha. Nevertheless, the CIQIVA's Cronbach alpha was still considered an acceptable level.

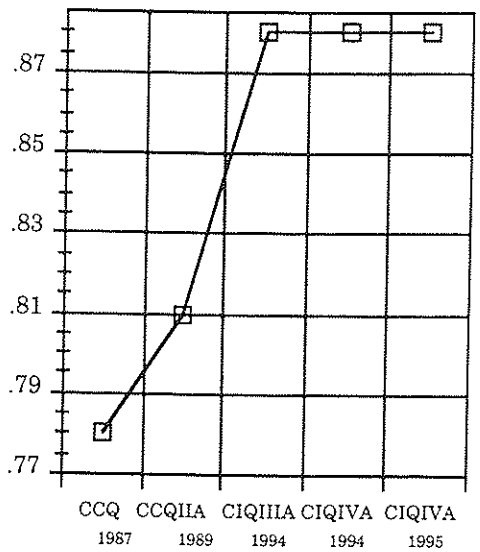
In Table 4.62, the results showed that the trust dimension for the current version of the climate measure responded poorly to its modifications (e.g., deletion of items based on item-to-item correlation, realignment and/or deletion of items based on factor analysis). It did not compare well to the CIQIIIA's acceptable alpha score. Its alpha coefficient fell below the acceptable score of 70. It is not surprising that the scores for trust were so low in the CIQIVA since there were only three items. Generally, the more items that are available for each dimension, the higher the reliability.

Table 4.63



Trust

Table 4.64

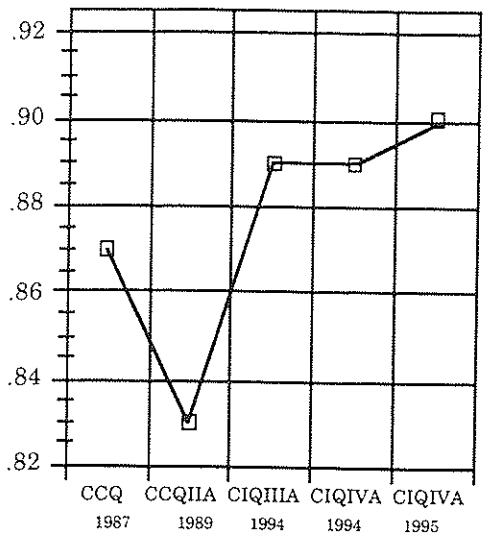


Idea Time

In Table 4.64, the results showed that the idea time dimension for the current version of the climate questionnaire responded well to its modifications (e.g., deletion of items based on high mean and low standard deviation, realignment and/or deletion of items based on factor analysis). It compared well to its translated version. When the CIQIIIA was considered, the current version results showed exact scores. The CIQIVA's Cronbach alpha was considered an acceptable score for its internal reliability. When the translated version was considered, the current version compared very well.

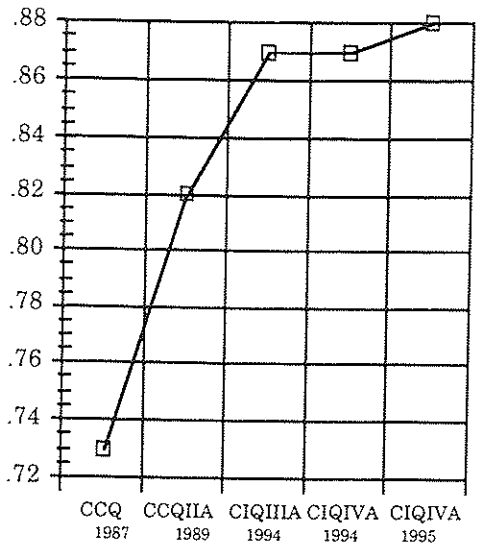
In Table 4.65, the results showed that the idea support dimension for the current version of the climate measure responded well to its modifications (e.g., deletion of items based on item-to-item correlation, realignment and/or deletion of items based on factor analysis). It compared extremely well to its translated version. When the CIQIIIA was considered, the results showed a slight increase in its alpha. The CIQIVA's Cronbach alpha was considered acceptable.

Table 4.65



Idea Support

Table 4.66



Debates

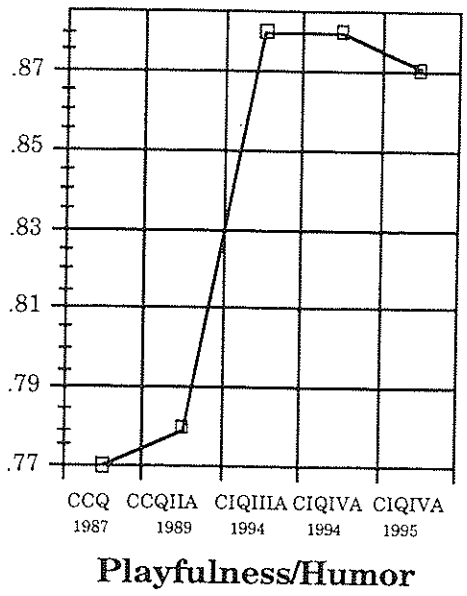
In Table 4.66, the results showed that the debates dimension for the current version of the climate questionnaire responded well to its modifications. It compared extremely well to its translated version. When the CIQIIIA was considered, the results showed a slight increase in its alpha. The CIQIVA's Cronbach alpha was considered to be an acceptable alpha, which is above .70.

In Table 4.67, the results showed that the playfulness/humor dimension for the current version of the climate measure responded well to its modifications. It compared extremely well to its translated version. When the CIQIIIA was considered, the results showed a slight decrease in alpha for the current version of the measure. The CIQIVA's Cronbach alpha was considered acceptable.

In Table 4.68, the results showed that the conflicts dimension for the current version of the climate measure responded well to its modifications (e.g., deletion of items based on item-to-item correlation, realignment and/or deletion of items based on factor analysis). It compared extremely well to its translated

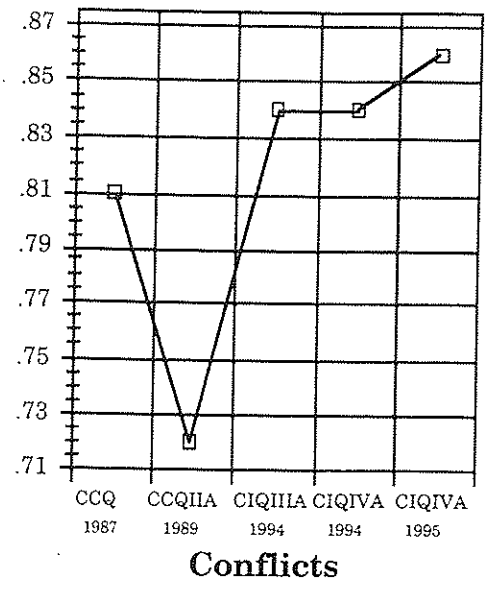
version. When the CIQIIIA was considered, the results showed a slight increase in its alpha for the current version. The CIQIVA's Cronbach alpha was considered acceptable, above .70.

Table 4.67



Playfulness/Humor

Table 4.68



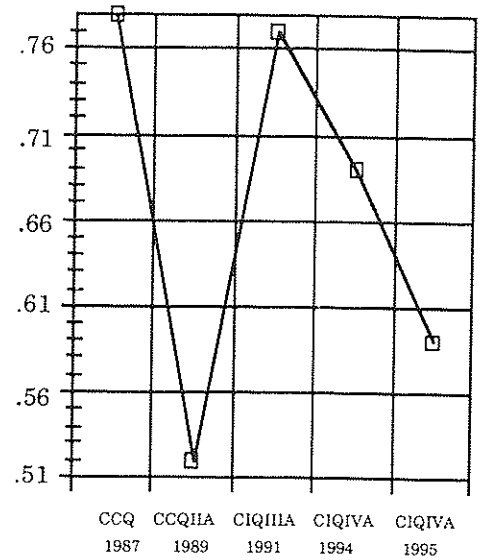
Conflicts

In Table 4.69, the results showed that the risk-taking dimension for the current version of the climate measure responded poorly to its modifications (e.g., deletion of items based on item-to-item correlation, realignment and/or deletion of items based on factor analysis). It did not compare well to the CIQIIIA's acceptable. Its alpha fell significantly below the acceptable level of .70.

An interesting finding was the number of non-significant item-to-item correlations (19) found on item 41 for the CIQIVA. This may explain the low alpha found in the risk-taking dimension since item 41 was designed to measure risk-taking. It appeared that the original translated version, CCQ, had the better Cronbach alpha. In contrast, the CIQIVA had the lowest alpha that fell below the acceptable .70.

With the exception of the trust and risk-taking alphas, it can be concluded that the measure was consistent, since the dimensions of the current version were internally reliable.

Table 4.69



Risk Taking

The purpose of this section was to describe and compare the internal reliabilities of the three climate measures to determine an improvement of the current measure. Specifically, this section looked at the statistical procedure referred to as Cronbach alpha.

Review of Part II

The purpose of Part II was to compare the results across the three versions of a climate measure. Specifically Part II answered the central question and related questions to the study. The comparison was made by examining the distribution of scores, item-to-item and item-to-dimension correlations, factor analyses, and internal reliabilities of the three climate measures.

SUMMARY

The purpose of this chapter was to present the results of three versions of a climate questionnaire that were developed from a version created in 1987 translated from Swedish. Three distinct forms of statistical procedures were performed to distinguish whether the CIQIVA had improved in its reliability as a result of modifications made by Isaksen and colleagues. A comparison was made to its prior versions including the original translated version investigated by Lauer (1994).

The results suggested that the dimensions of the CIQIVA are internally reliable when Cronbach alphas were considered. Not included in this suggestion were the dimensions of trust and risk-taking. The developmental steps that were taken to "tighten" the CIQIVA's internal factor structure were effective when the statistical procedure maximum likelihood was considered. When the trust and risk-taking loadings were not considered the CIQIV produced a slightly "tighter" structure when compared to the CIQIIIA. This was indicated by the decreased overlap of items.

The next chapter examines the implications of this study and suggests future areas of research that could develop around the current version of the climate measure.

CHAPTER 4
PRESENTATION OF FINDINGS

OVERVIEW

Chapter Three presented the subjects, instruments, procedures and plan for data analysis used in the examination of the CCQIIA, the CIQIIIA, and the CIQIVA. The purpose of this section is to present the results of the data analyses. These results are presented in Part One of this chapter. Part Two discusses the interpretations of these results as it relates to the central question of this study. Chapter Five presents a more elaborate interpretation of the results. Also, the implications and limitations of the study are reported.

INTRODUCTION

The purpose of this chapter is to present the results of the quantitative analysis of three climate questionnaires: the CCQIIA, the CIQIIIA, and the CIQIVA. The results of the quantitative analyses are presented in four sections. The first section presents the means and standard deviations for the CIQIIA items and dimensions. The second section examines the frequency distributions of the CCQIIA dimensions. The third section examines the correlational analysis of the 50 CCQIIA items and the CCQIIA's dimensions. The fourth section discusses the results obtained from the factor analysis of the CCQIIA. The analyses consists of a principle component and maximum likelihood rotation. The fifth section focuses on the presentation and discussion of the results obtained through the statistical procedures known as Cronbach alpha, Guttman split half, and Spearman-Brown. These remaining sections are divided in the same way when discussing the results for the CIQIIIA and CIQIVA versions.

PART I
THE CCQIIA RESULTS

This section is divided into five sub-sections. The first section presents the descriptive tables for the measure's items and dimensions (e.g., mean and standard deviation). The second section discusses the distribution of respondents' scores for each dimension. The third sub-section discusses the item-to-item and item-to-dimension correlational analyses. The fourth sub-section discusses the factor structure analysis. The final sub-section discusses the internal reliability scores of each dimension.

Means and Standard Deviations

This section presents the means and standard deviations for the overall sample. The purpose is to present a set of scores that show group performance and indicate whether most of the scores cluster closely around their mean or are spread out along the dimension.

Table 4.1

CCQIIA Dimensions: Means and Standard Deviations

CCQIIA Dimension	Mean	Std. Dev.
Challenge	209.11	63.04
Freedom	191.02	55.10
Idea Support	193.08	65.40
Dynamism	184.89	63.57
Playfulness/Humor	166.00	61.47
Debates	187.71	60.59
Trust/Openness	162.66	57.40
Conflicts	180.46	63.41
Risk-Taking	156.68	47.10
Idea Time	138.69	62.90

Note: n = 1844 for all dimensions

Notwithstanding the idea time dimension, all other dimensions fall above the theoretical midpoint of 150.

Table 4.2

CCQIIA Items: Means and Standard Deviations

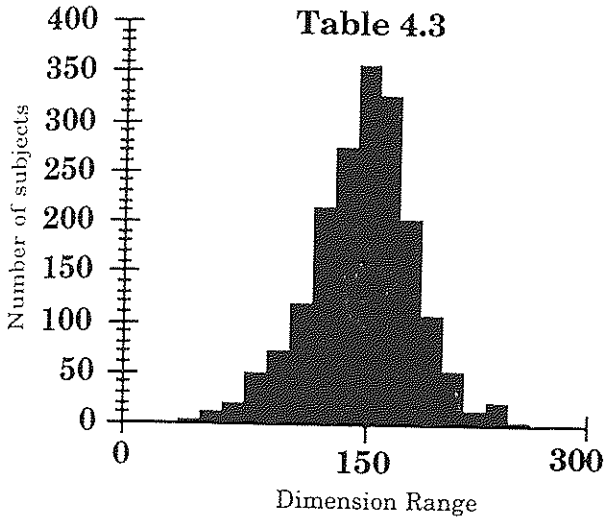
Overall		
CCQIIA Item	**Mean**	**Std. Dev.**
1	2.16	.78
2	1.71	.80
3	1.69	.81
4	2.40	.82
5	1.16	.84
6	1.79	.77
7	1.45	.84
8	1.88	.91
9	1.42	.82
10	1.31	.81
11	2.17	.78
12	2.11	.78
13	2.05	.89
14	1.68	.90
15	1.45	.81
16	1.83	.82
17	1.19	.91
18	1.90	.99
19	1.63	.83
20	1.61	.87
21	1.99	.88
22	2.10	.83
23	2.19	.81
24	1.48	.91
25	1.54	.92
26	1.72	.77
27	2.23	.77
28	1.62	1.02
29	1.33	.81
30	1.01	.76
31	2.23	.84
32	2.01	.82
33	2.18	.85
34	1.49	.89
35	1.79	.86
36	1.75	.82
37	1.58	.87
38	1.67	.83
39	1.58	.77
40	1.44	.85
41	1.93	.86
42	1.62	.86
43	1.56	.82
44	2.21	.87
45	2.37	.78
46	2.28	.77
47	1.66	.80
48	1.93	.81
49	1.85	.77
50	1.55	.86
51	1.62	.90

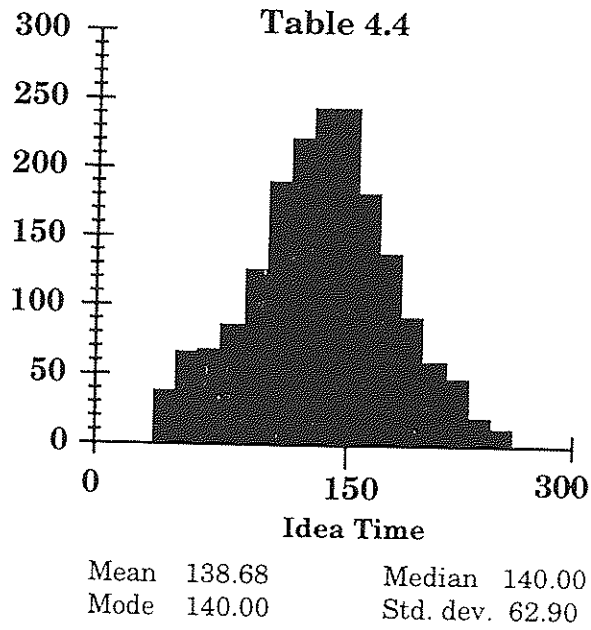
Note: n = 1831 for each item

Distribution of Scores

The purpose of this section is to describe the dimension distribution results of the CCQIIA. These results are presented and interpretations are discussed. The distributions of the CIQIIA dimensions are given in Tables 4.3 to 4.12.

The risk-taking dimension showed a leptokurtic distribution. This distribution indicated that the majority of the respondents selected the middle items (one or two) on the Likert scale of the CCQIIA. The hypothetical midpoint of the CIQ is 150. Although the Likert scale on the CCQIIA ranged from zero to three, the average scores are presented as numbers between zero and 300. CPS-B found it to be easier to present the results in the hundreds as opposed to decimals. The distribution reflected a leptokurtic distribution with a mean of 156.68, a median of 160.00, and mode of 160.00.

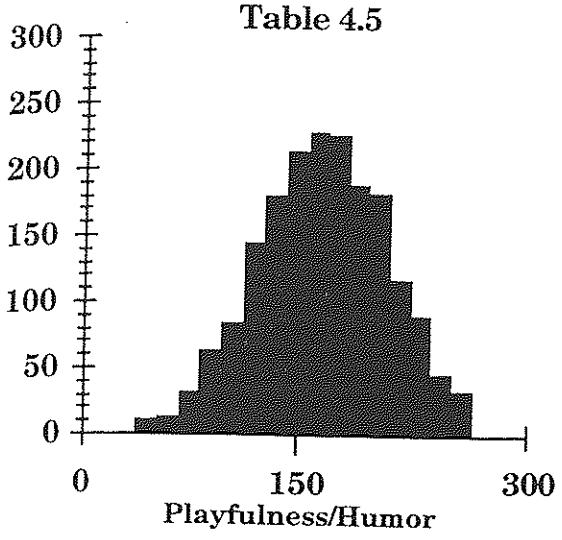




The distribution of respondents' scores for idea time (Table 4.4) yielded a mean of 138.68, a median score of 140.00 and a mode score of 140.00.

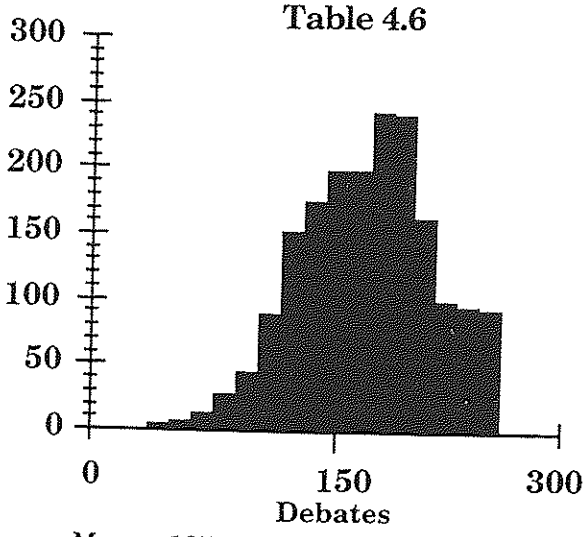
The playfulness/humor dimension (Table 4.5) yielded a mean score of 165.99, median 160.00, and a mode score of 160.00.

Table 4.5



Mean 165.99 Median 160.00
Mode 160.00 Std. dev. 61.47

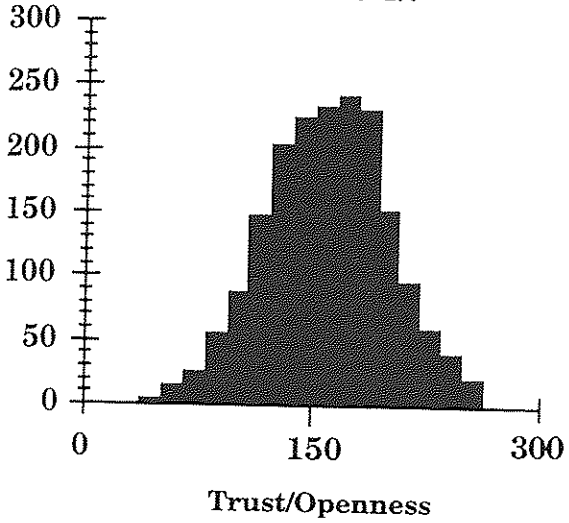
Table 4.6



Mean 187.71 Median 200.00
Mode 200.00 Std. dev. 60.58

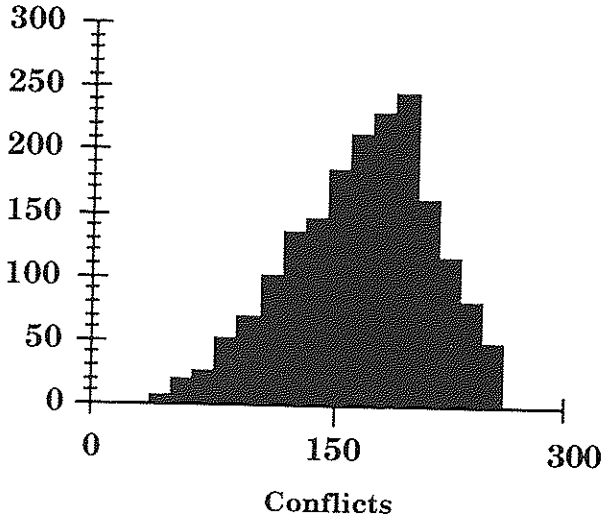
However, the debates dimension yielded a negatively skewed distribution. Its measures of central tendency scores were a mean of 187.71, a mode of 200.00, and a median score of 200.00. These scores reflected a tendency for the respondents to select higher scores on the CCQIIA for the debates dimension.

Table 4.7



Mean 162.65 Median 160.00
Mode 180.00 Std. dev. 57.40

Table 4.8



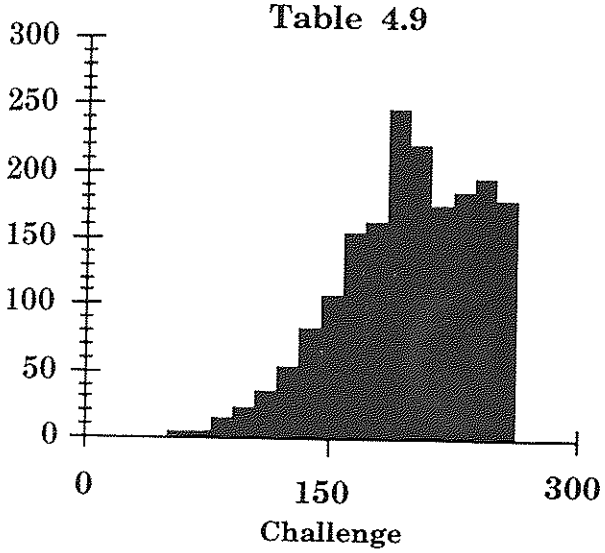
Mean 180.45 Median 180.00
Mode 220.00 Std. dev. 63.40

The trust/openness dimension (Table 4.7) yielded a fairly normal distribution with a mean score of 162.65, median 160.00, and a mode score of 180.00. In this table there were several average scores with a few high and low scores on each side.

However, the conflicts dimension (Table 4.8) yielded a negatively skewed distribution. Its measures of central tendency yielded a mean of 180.45, a mode of 220.00, and a median score of 180.00. These frequencies reflected a tendency for the respondents to select higher scores on the CCQIIA for the debates dimension.

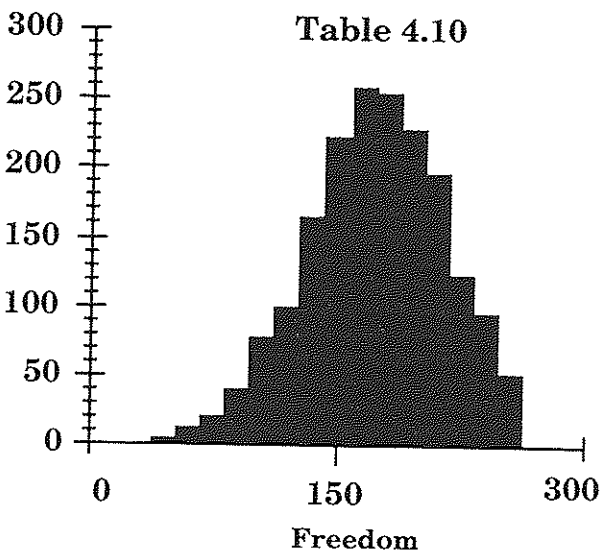
The challenge dimension (Table 4.9), yielded a negatively skewed distribution. Its measures of central tendency yielded a mean of 209.10, a mode of 200.00, and a median score of 220.00. These scores reflected a tendency for the respondents to select higher scores on the CCQIIA for the challenge dimension. These scores were highest when compared to any other frequency scores of the CCQIIA dimensions.

Table 4.9



Mean 209.10 Median 220.00
Mode 200.00 Std. dev. 63.40

Table 4.10

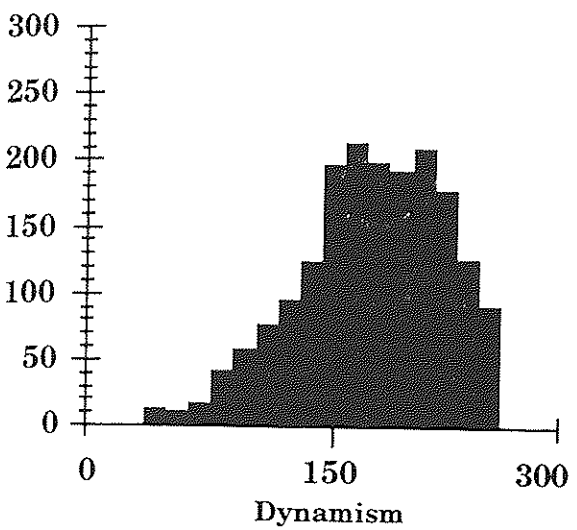


Mean 191.02 Median 200.00
Mode 180.00 Std. dev. 55.10

The freedom dimension (Table 4.10) yielded a fairly normal distribution with a slight negative skew. The measures of central tendency yielded a mean score of 191.02, a median of 200.00, and a mode score of 180.00.

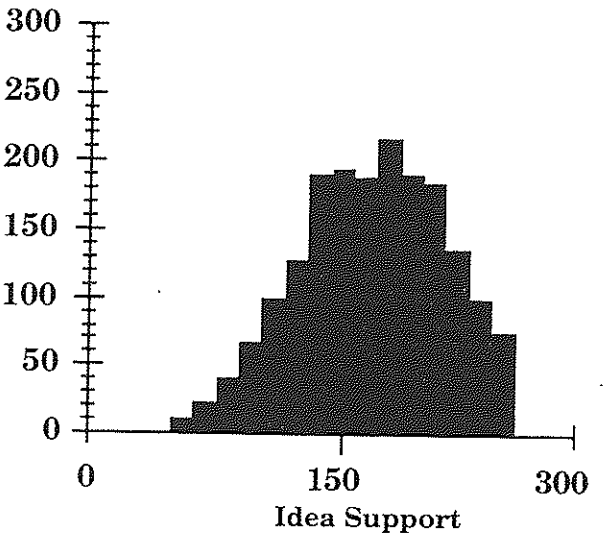
The dynamism (Table 4.11) dimension yielded a negatively skewed distribution. Its measures of central tendency resulted in a mean of 193.08, a median of 200.00, and a mode score of 180.00. The idea support dimension (Table 4.12) yielded a fairly normal distribution with a slight negative skew. Its central tendency scores resulted in a mean of 184.89, a median of 180.00, and a mode score of 200.00.

Table 4.11



Mean 193.08 Median 200.00
Mode 180.00 Std. dev. 65.39

Table 4.12



Mean 184.89 Median 180.00
Mode 200.00 Std. dev. 63.56

The distribution of respondents' scores is important and useful. They help solve a variety of problems in inferential statistics. For example they help characterize dimensions that may be deemed too skewed. In this case one may investigate further the specific items, within its respective dimension, that influence the skewed results. Hence, an item may be eliminated or modified as a rationale to improve the internal consistency of the measure.

Table 4.14
Inter-Correlations among CCQIIA Items for Total Sample (n = 1831)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1.00																									
2	.27	1.00																								
3	.46	.38	1.00																							
4	.35	.15	.30	1.00																						
5	.15	.29	.34	.11	1.00																					
6	.16	.25	.28	.08	.28	1.00																				
7	.24	.28	.40	.17	.30	.32	1.00																			
8	.17	.10	.28	.21	.17	.08	.26	1.00																		
9	-.22	-.06	-.20	-.14	-.01	-.04	-.09	-.04	1.00																	
10	.21	.25	.36	.08	.22	.23	.28	.20	-.18	1.00																
11	.53	.25	.42	.34	.14	.18	.30	.15	-.25	.27	1.00															
12	.36	.35	.36	.28	.17	.18	.24	.14	-.13	.22	.47	1.00														
13	.34	.26	.51	.36	.25	.17	.31	.35	-.17	.36	.31	.27	1.00													
14	.39	.34	.49	.32	.51	.29	.42	.20	-.13	.32	.38	.32	.41	1.00												
15	.38	.35	.50	.26	.52	.32	.38	.25	-.10	.39	.40	.32	.43	.66	1.00											
16	.36	.28	.51	.23	.30	.42	.37	.20	-.18	.35	.37	.35	.39	.47	.51	1.00										
17	.22	.20	.25	.11	.16	.10	.24	.19	-.03	.14	.19	.16	.22	.25	.23	.23	1.00									
18	.32	.16	.32	.24	.13	.13	.25	.21	-.08	.16	.30	.26	.28	.28	.27	.30	.38	1.00								
19	.21	.30	.39	.26	.26	.20	.30	.28	.02	.29	.22	.26	.47	.35	.38	.34	.18	.20	1.00							
20	.18	.17	.35	.15	.20	.19	.20	.24	-.07	.50	.18	.16	.45	.27	.35	.32	.13	.14	.42	1.00						
21	.40	.27	.43	.43	.20	.15	.27	.29	-.17	.31	.44	.34	.52	.43	.44	.37	.19	.27	.44	.40	1.00					
22	.35	.21	.33	.35	.14	.15	.17	.21	-.11	.16	.31	.30	.38	.28	.28	.26	.15	.24	.29	.24	.46	1.00				
23	.26	.23	.38	.33	.18	.18	.26	.27	-.13	.28	.25	.22	.55	.31	.34	.33	.12	.21	.36	.35	.42	.33	1.00			
24	.39	.36	.48	.32	.38	.26	.37	.18	-.13	.35	.43	.34	.40	.63	.61	.46	.20	.25	.38	.29	.51	.29	.34	1.00		
25	.13	.27	.32	.07	.39	.23	.31	.31	.01	.30	.16	.21	.28	.40	.45	.31	.20	.16	.28	.28	.23	.13	.26	.34	1.00	
26	.23	.23	.31	.18	.24	.53	.30	.13	-.08	.25	.26	.22	.23	.36	.38	.51	.15	.18	.22	.22	.23	.19	.21	.35	.30	1.00
27	.29	.20	.35	.37	.18	.15	.24	.29	-.13	.17	.28	.27	.46	.33	.33	.32	.20	.25	.32	.26	.43	.37	.39	.30	.23	.19
28	.20	.20	.38	.20	.21	.09	.31	.44	-.05	.25	.17	.20	.43	.31	.31	.27	.28	.26	.37	.31	.32	.20	.34	.29	.37	.12
29	.21	.25	.28	.12	.26	.25	.25	.09	-.04	.29	.23	.24	.21	.30	.30	.32	.18	.21	.25	.19	.21	.17	.18	.35	.20	.31
30	.17	.26	.30	.07	.22	.19	.23	.17	-.11	.53	.21	.18	.27	.27	.37	.33	.13	.12	.28	.44	.28	.16	.24	.36	.32	.26
31	.39	.19	.31	.41	.08	.08	.17	.14	-.20	.14	.46	.31	.36	.27	.27	.25	.12	.22	.25	.17	.43	.38	.31	.32	.07	.18
32	.35	.33	.38	.38	.14	.19	.27	.19	-.13	.24	.37	.34	.39	.36	.33	.34	.17	.25	.39	.27	.47	.42	.35	.37	.13	.25
33	.30	.24	.46	.37	.19	.17	.29	.33	-.16	.28	.30	.28	.62	.36	.37	.40	.17	.27	.44	.39	.47	.35	.59	.37	.27	.25
34	.39	.36	.45	.26	.34	.27	.33	.13	-.14	.30	.40	.32	.36	.55	.50	.45	.22	.26	.33	.26	.41	.29	.27	.63	.26	.37
35	.22	.27	.32	.17	.52	.30	.29	.15	-.01	.19	.21	.23	.24	.49	.50	.36	.14	.20	.22	.18	.23	.17	.24	.40	.37	.26
36	.29	.27	.44	.21	.32	.49	.39	.21	-.11	.34	.29	.28	.36	.46	.47	.61	.19	.21	.31	.30	.32	.24	.29	.47	.35	.63
37	.39	.35	.57	.31	.29	.25	.42	.34	-.19	.36	.42	.36	.47	.52	.52	.50	.27	.35	.40	.33	.47	.30	.40	.50	.41	.34
38	.26	.16	.36	.30	.18	.04	.22	.34	-.14	.21	.25	.22	.43	.27	.32	.25	.24	.26	.32	.28	.39	.29	.33	.31	.26	.07
39	.37	.34	.43	.30	.25	.21	.36	.19	-.14	.26	.40	.34	.32	.44	.42	.39	.21	.26	.35	.25	.36	.29	.29	.45	.25	.28
40	.26	.23	.35	.14	.19	.19	.28	.20	-.10	.45	.28	.22	.31	.33	.38	.34	.19	.20	.25	.44	.29	.22	.26	.33	.32	.28
41	.52	.26	.42	.31	.14	.16	.29	.17	-.20	.24	.60	.39	.30	.40	.39	.37	.23	.32	.22	.17	.43	.29	.25	.45	.21	.26
42	.23	.43	.41	.14	.35	.25	.31	.24	-.05	.36	.28	.32	.34	.43	.46	.38	.24	.17	.36	.31	.33	.21	.26	.42	.51	.30
43	.40	.37	.57	.26	.33	.29	.41	.27	-.17	.44	.40	.36	.52	.50	.53	.52	.27	.31	.43	.38	.45	.29	.43	.53	.42	.37
44	.21	.14	.25	.35	.17	.19	.18	.14	-.07	.15	.24	.18	.33	.30	.27	.28	.07	.16	.28	.22	.39	.28	.32	.37	.14	.23
45	.23	.19	.32	.35	.31	.20	.25	.30	-.05	.19	.24	.23	.43	.39	.39	.31	.13	.24	.35	.31	.41	.29	.40	.33	.33	.28
46	.21	.16	.31	.34	.17	.37	.24	.25	-.06	.20	.22	.21	.44	.26	.30	.40	.09	.16	.35	.32	.36	.32	.41	.28	.20	.43
47	.38	.26	.48	.27	.26	.24	.37	.29	-.17	.28	.39	.32	.38	.43	.45	.45	.29	.34	.33	.27	.38	.27	.32	.44	.36	.30
48	.27	.17	.33	.30	.16	.00	.23	.33	-.13	.14	.28	.24	.42	.28	.28	.23	.27	.30	.29	.21	.36	.27	.35	.27	.22	.09
49	.34	.28	.42	.34	.24	.16	.34	.28	-.07	.32	.33	.28	.52	.39	.41	.36	.20	.23	.47	.39	.46	.38	.44	.40	.26	.24
50	.10	.15	.27	.07	.18	.14	.21	.23	-.05	.45	.10	.11	.31	.19	.28	.25	.09	.08	.32	.35	.28	.14	.30	.25	.26	.18
51	.37	.36	.53	.25	.32	.29	.38	.25	-.14	.46	.40	.35	.47	.49	.53	.48	.24	.30	.41	.40	.45	.29	.39	.57	.41	.36

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

Table 4.14 continued

Inter-Correlations among CCQIIA Items for Total Sample (n = 1831)

Item	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
26	1.00																									
27	.19	1.00																								
28	.12	.38	1.00																							
29	.31	.12	.12	1.00																						
30	.26	.13	.23	.34	1.00																					
31	.18	.35	.20	.14	.12	1.00																				
32	.25	.38	.26	.28	.23	.47	1.00																			
33	.25	.47	.40	.21	.24	.36	.44	1.00																		
34	.37	.25	.24	.39	.32	.31	.38	.30	1.00																	
35	.36	.25	.20	.29	.21	.16	.20	.25	.41	1.00																
36	.63	.28	.26	.37	.34	.19	.32	.35	.49	.47	1.00															
37	.34	.18	.47	.31	.37	.31	.39	.45	.47	.39	.48	1.00														
38	.07	.41	.47	.09	.18	.32	.31	.39	.25	.15	.20	.39	1.00													
39	.28	.28	.29	.29	.23	.31	.38	.32	.46	.32	.38	.49	.31	1.00												
40	.28	.20	.23	.27	.49	.15	.26	.27	.33	.24	.36	.40	.24	.37	1.00											
41	.26	.28	.22	.25	.20	.44	.36	.30	.41	.23	.32	.45	.27	.43	.31	1.00										
42	.30	.23	.33	.33	.38	.17	.28	.32	.49	.35	.40	.46	.26	.35	.42	.33	1.00									
43	.37	.33	.42	.39	.40	.29	.38	.48	.49	.38	.53	.60	.37	.49	.43	.46	.54	1.00								
44	.23	.31	.19	.19	.11	.31	.33	.32	.32	.24	.27	.26	.21	.25	.16	.21	.18	.27	1.00							
45	.28	.46	.33	.17	.18	.33	.34	.45	.27	.40	.32	.39	.35	.29	.23	.23	.29	.36	.42	1.00						
46	.43	.41	.22	.19	.16	.33	.36	.44	.26	.27	.45	.32	.24	.22	.18	.19	.24	.31	.38	.47	1.00					
47	.30	.39	.42	.25	.29	.27	.34	.37	.41	.35	.43	.59	.39	.44	.33	.33	.39	.51	.25	.36	.28	1.00				
48	.09	.41	.45	.09	.12	.35	.32	.40	.22	.15	.18	.38	.51	.26	.16	.29	.22	.33	.21	.38	.24	.37	1.00			
49	.24	.46	.36	.28	.26	.36	.44	.48	.37	.26	.35	.46	.37	.43	.31	.32	.33	.49	.34	.42	.36	.37	.40	1.00		
50	.18	.18	.30	.17	.48	.13	.24	.31	.20	.15	.25	.28	.24	.19	.39	.10	.28	.33	.18	.24	.24	.24	.19	.38	1.00	
51	.36	.33	.37	.36	.42	.28	.38	.44	.50	.37	.50	.57	.34	.46	.43	.43	.50	.63	.31	.35	.33	.52	.31	.44	.37	1.00

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

The purpose of this section was to describe the distribution of respondents' scores of the CCQIIA dimensions. These results were presented and discussed. The distribution of the CCQIIA dimensions were given in Tables 4.3 to 4.12.

Correlational Analysis

The purpose of this section is to describe the results from the correlational analysis of the CCQIIA dimensions and items. These results are presented and some of their meanings are discussed.

Table 4.13 shows the correlations among the dimensions for the entire sample (n=1844). The level of significance for each correlation was high at $p \leq .01$. The results showed that the dimensions have a positive relationship to each other. The correlational coefficients ranged from .33 to .69.

Table 4.13

Inter-dimensional correlation of the CCQIIA

Dimension	1	2	3	4	5	6	7	8	9	10
					n = 1844					
Challenge	**1.00**									
Freedom	.64	**1.00**								
Idea Support	.62	.64	**1.00**							
Dynamism	.67	.63	.65	**1.00**						
Play/Humor	.41	.53	.58	.63	**1.00**					
Debates	.43	.51	.57	.57	.57	**1.00**				
Trust/Openness	.59	.61	.68	.62	.60	.56	**1.00**			
Conflicts	.48	.48	.63	.46	.47	.33	.68	**1.00**		
Risk-Taking	.44	.58	.58	.56	.51	.47	.55	.45	**1.00**	
Idea Time	.36	.46	.54	.41	.45	.44	.45	.38	.47	**1.00**

Notes: 1. All correlations significant at the $p \leq .01$
2. Coefficients for conflicts dimension were reversed.

Table 4.14 shows the inter-item correlations of the CCQIIA's 51 questions for the entire sample (n=1831). Of these correlations 99.7% (1827 of 1831) were

significant at a level $p \leq .05$. This indicates that the factors measured by these items are similar. This poses a concern if the similarity is too strong because this makes it challenging if not impossible to distinguish how the dimensions have their separate effects on the climate.

As can be seen in Table 4.14, respective items of the CCQIIA were found to be highly correlated. The next section of this chapter explores the factor structure of the CCQIIA. The rationale is to evaluate the theoretical structures that underlie its ten dimensions. Specifically, exploratory factor analysis examines the redundancy among CCQIIA variables. This is important because redundancy may weaken the validity and jeopardizes the identity and integrity of the dimensions. Some items may need to be modified or deleted in order to strengthen the questionnaire so they associate more with the items designed to measure the same dimension (Lauer, 1994).

Factor Analysis

The purpose of this section is to describe the results from the factor analysis of the CCQIIA 51 items measured in this study. The discussion of results focuses on how well the responses reduce to Ekvall's 10 dimensions.

Table 4.15 shows the results of a principle component (varimax rotation) analysis which yielded seven factors, accounting for approximately 54.6% of the variance. The first factor (challenge) accounted for 31.9 % of the total variance; the second factor (freedom) accounted for 5.9%; the third factor (idea support) 4.7%; the fourth factor (dynamism) 3.7%; the fifth factor (playfulness/humor) 3.5%; the sixth factor (debates) 2.6%; and the seventh factor (trust/openness) 2.3%. The only four-item factor that appears on Table 4.15 corresponds to the dimension of debates. Idea time also appeared to load properly; it yielded a five-item factor.

Table 4.15
Principal Component Analysis of CCQIIA Items:
Entire Sample (n = 1831)

Item	Theoretic Scale	Factors 1	2	3	4	5	6	7
46	Debates	.613					.508	
33	Idea Support	.599				.317		
45	Playfulness/Humor	.593		.350				
44	Liveliness/Dynamism	.583						
4	Liveliness/Dynamism	.581	.343					
23	Idea Support	.568			.311	.344		
13	Idea Support	.564						
27	Trust/Openness	.561				.359		
21	Challenge	.559	.389					
31	Challenge	.531	.493					
49	Risk-Taking	.516			.306			
32	Freedom	.515	.423					
22	Freedom	.509	.345					
19	Risk-Taking	.445			.321			.364
11	Challenge		.717					
41	Challenge		.707					
1	Challenge		.656					
12	Freedom		.541					
39	Risk-Taking		.487					
34	Liveliness/Dynamism		.487	.444				
3	Idea Support		.420			.319		
5	Playfulness/Humor			.750				
35	Playfulness/Humor			.688				
14	Liveliness/Dynamism		.361	.655				
15	Playfulness/Humor		.302	.631				
24	Liveliness/Dynamism		.447	.538				
25	Playfulness/Humor			.521		.378		
42	Freedom			.427	.381			.346
30	Idea Time				.729			
10	Idea Time				.717			
50	Idea Time				.714			
20	Idea Time	.332			.692			
40	Idea Time				.603			
43	Idea Support		.383	.332	.394	.320		
28	Conflicts					.672		
8	Conflicts					.571		
48	Conflicts	.389				.566		
17	Trust/Openness					.550		
38	Conflicts	.371				.530		
18	Conflicts		.384			.478		
47	Trust/Openness		.363			.457		
37	Trust/Openness		.388	.332		.420		
7	Trust/Openness					.337	.314	
26	Debates						.762	
6	Debates						.734	
36	Debates			.315			.669	
16	Debates		.322				.546	
9	Risk-Taking		-.331					.640
2	Freedom		.366	.301				.385
29	Risk-Taking		.313				.301	.345
	% Variance Accounted for by Factors	31.9	5.9	4.7	3.7	3.5	2.6	2.3
	Eigenvalues	15.9	2.9	2.3	1.8	1.7	1.3	1.1

However, a number of items, such as 23, 19, 42, 43, 37, and item 29, loaded on theoretical dimensions outside their "own" respective dimensions. These items suggest a need for revision to better fit the dimension they were intended to measure. This is because, as reflected in the factor analysis, the items had a high loading on a factor that represents a different CCQIIA dimension. For example, item 23 (idea support) fell in factors one, four, and six. These three scores had loadings $\geq .30$, which as a rule of thumb, are considered significant (Hair et al.,, 1987). Loadings higher than .50 are considered very significant (Hair et al., 1987). Another example item is 42. It loaded on three other factors at scores higher than .30.

The results of the factor analyses suggest that the 50 items of the CCQIIA assess eight factors of a larger construct. Although the analysis reflected seven factors, the remaining factor (conflicts) was found within the fifth factor as a result of its reversed scoring. The results of the factor analysis also suggested that the instrument be revised. This conclusion is supported by the quantity of overlapped items found among several dimensions in the factor analysis. Items 23, 19, 42, 43, 37, 2, and 29 loaded on three factors above the .30 acceptable score. Item 43 loaded in four factors. Items 46, 33, 45, 4, 27, 21, 31, 49, 32, 22, 34, 3, 14, 15, 24, 25, 20, 48, 38, 18, 47, 7, 36, 16, and 9 loaded in two factors also above .30.

The result of these factor analyses also highlighted the similarity of the CCQIIA's items as well as its dimensions since in many instances the items moved from one loading to another depending on the sample being presented (Lauer, 1994). This high interrelationship may also suggest that the use of factor analysis may not be the appropriate statistical technique to determine if the theoretic structure of the CCQ is being measured by the fifty items. In fact, the results of the maximum likelihood analysis was not included due to its

inability to fully rotate all items. An SPSS warning label of "11302" indicated its failure. This label means that the correlations of the items assessed are so high that the factor analysis as a technique may not be able to determine how the items relate and determine what structure underlies them.

The purpose of this section was to describe the results from the factor analysis of the CCQIIA 51 items conducted in this study. The results and some of their meaning were discussed.

Internal Reliability

This section describes the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose is to determine the internal reliability of the CCQIIA. The Cronbach alpha is used to determine the internal reliability of the CCQIIA dimensions. The alpha coefficient range from 0 to 1.0 and identifies how much the items in a questionnaire are measuring the same thing (Vogt, 1993). The Guttman split half statistical procedure investigates the reliability of a questionnaire by looking at how well the scores on one half of the items correlate with the other half (Vogt, 1993). Finally, the Spearman-Brown procedure predicts the approximate gain in reliability of a measure if one were to increase the number of observations (Vogt, 1993).

The results of the three statistical analyses as presented in Table 4.16 were all greater than or equal to .70. The exceptions were risk-taking with a Cronbach Alpha of .52, Guttman split half of .54, and a Spearman-Brown score of .54. The other exceptions were freedom which contained an alpha of .69 and conflicts which contained a split half score of .68. It can be concluded that the dimensions, in general, were being assessed when the reliability for risk-taking is not considered.

Table 4.16

CCQIIA

Theoretic Dimension	Cronbach alpha	Guttman split half	Spearman Brown
Challenge	.81	.80	.82
Freedom	.69	.72	.74
Dynamism	.77	.75	.78
Trust	.71	.71	.71
Idea Time	.81	.80	.82
Playfulness/Humor	.78	.71	.75
Conflicts	.72	.68	.72
Idea Support	.83	.84	.86
Debates	.82	.80	.82
Risk-Taking	.52	.54	.54

This section described the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose was to determine the internal reliability of the CCQIIA measure.

CIQIIIA RESULTS

This section is divided into four sub-sections. The first section presents the means and standard deviations of the CIQIIIA items and dimensions. The second section discusses the distribution of respondents' scores for each dimension. The third sub-section discusses the item-to-item and item-to-dimension correlational analyses. The fourth sub-section discusses the factor structure analysis. The final sub-section discusses the internal reliability of each dimension.

Means and Standard Deviations

This section presents the means and standard deviations for the overall sample. The purpose is to present a set of scores that show group performance and indicate whether most of the scores cluster closely around their mean or are spread out along the dimension.

Table 4.17

CIQIIIA Item Norms: Means and Standard Deviations

Overall		
CIQIIIA Item	**Mean**	**Std. Dev.**
1	2.61	.57
2	1.94	.80
3	1.41	.88
4	1.55	.97
5	2.04	.77
6	1.71	.82
7	2.28	.79
8	1.67	.76
9	2.03	.75
10	1.03	.89
11	1.74	.76
12	1.89	.74
13	1.28	.81
14	2.29	.75
15	1.60	.77
16	1.28	.86
17	1.59	.77
18	1.71	.78
19	1.55	.77
20	2.08	.78
21	1.76	.83
22	1.56	.77
23	1.19	.79
24	1.90	.78
25	1.84	.72
26	1.40	.76
27	1.56	.84
28	2.08	.76
29	2.06	.84
30	2.30	.69
31	.63	.80
32	1.05	.76
33	1.64	.72
34	2.25	.72
35	1.81	.86
36	1.25	.78
37	1.07	.86
38	1.06	.93
39	1.80	.75
40	1.25	.80
41	1.91	.81
42	1.17	.86
43	1.16	.77
44	1.76	.85
45	1.65	.80
46	1.88	.72
47	2.32	.68
48	1.45	.84
49	1.09	.78
50	1.65	.79
51	1.33	.87
52	1.41	1.00
53	1.50	.93
54	1.59	1.00
55	.81	.83
56	1.74	.82
57	1.64	.88
58	1.38	.96
59	1.77	.75
60	1.26	.76

Note: n = 1297 for all items

In Table 4.18, the idea time, conflicts, and risk-taking dimensions fell below the hypothetical midpoint of 150. The standard deviations ranged from 53.09 to 67.23.

Table 4.18

CIQIIIA Scale: Means and Standard Deviations

CIQIIIA Dimension	Mean	Std. Dev.
Challenge	231.04	53.23
Freedom	167.40	61.34
Dynamism	178.62	54.11
Trust/Openness	158.11	56.79
Idea Time	125.94	64.43
Playfulness/Humor	161.36	63.88
Conflicts	107.98	67.23
Idea Support	175.88	63.44
Debates	187.09	57.87
Risk-Taking	126.86	53.09

Note: n = 1297 for all dimensions

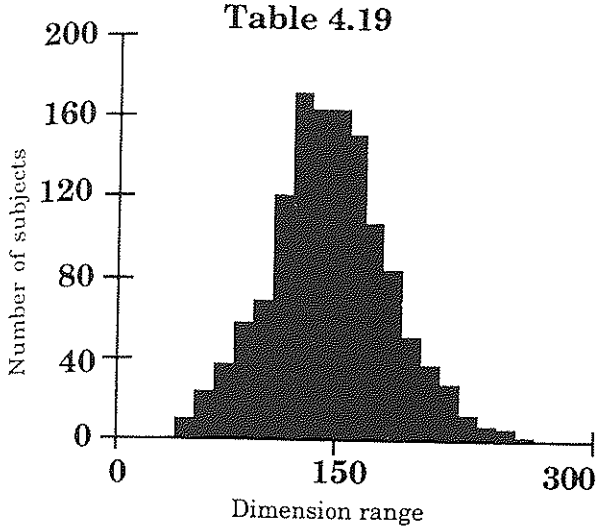
Distribution of Scores

The purpose of this section is to describe the distribution of respondents' scores of the CIQIIIA. These results will be presented and interpretations will be discussed.

The distribution of respondents' scores of the CIQIIIA dimensions is given in Tables 4.19 to 4.28. The risk-taking (Table 4.19) dimension shows a leptokurtic distribution. This distribution may signify that the respondents selected scores that were more towards the middle. The measures of central tendency yielded a mean of 126.86, a median of 117.00, and a mode score of 100.00.

The idea time dimension (Table 4.20) also showed a leptokurtic distribution with a slight positive skew. Its measure of central tendency yielded a mean score of 125.94, median score of 117.00, and a mode score of 100.00.

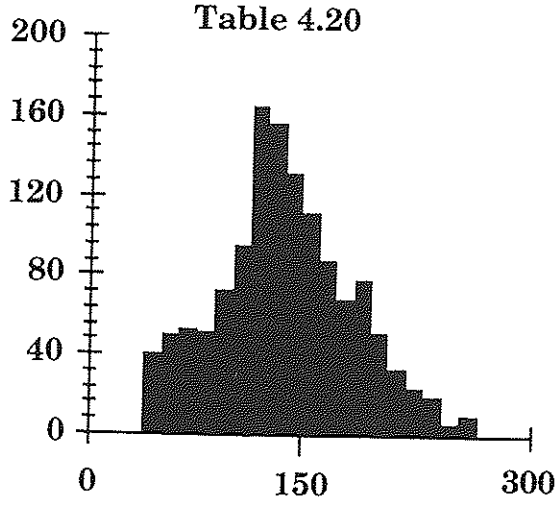
Table 4.19



Risk-Taking

Mean	126.86	Median	117.00
Mode	100.00	Std. dev.	53.08

Table 4.20

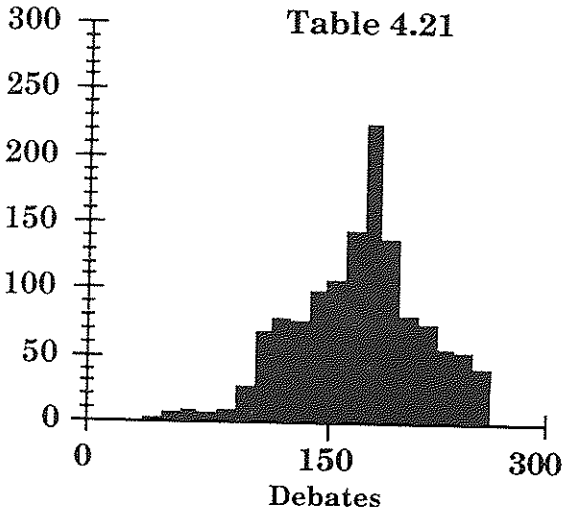


Idea Time

Mean	125.94	Median	117.00
Mode	100.00	Std. dev.	64.43

The debates dimension (Table 4.21) yielded a distribution of respondents' scores that was slightly skewed positive. The measure of central tendency consisted of a mean score of 187.08, a median score of 200.00, and a mode score of 200.00. In Table 4.21 the scores seem to vary. On the curve's left tail, it shows a number of low scores. Moreover, a score peaks sharply close to the curve's center point.

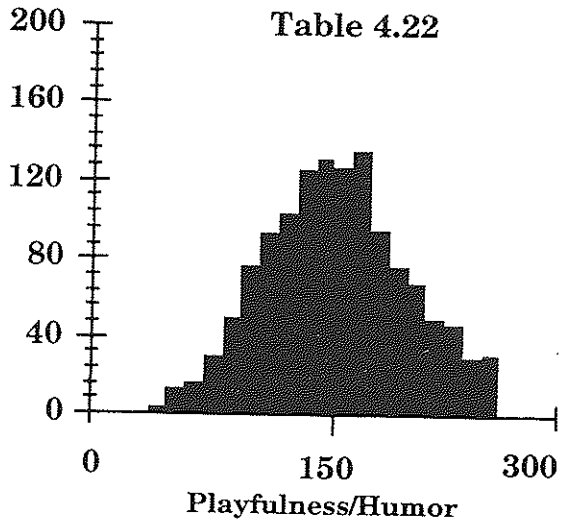
Table 4.21



Debates

Mean	187.08	Median	200.00
Mode	200.00	Std. dev.	57.87

Table 4.22



Playfulness/Humor

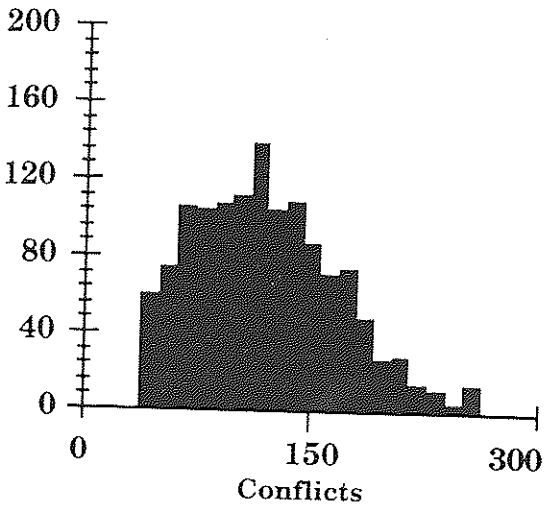
Mean	161.36	Median	167.00
Mode	183.00	Std. dev.	63.87

The playfulness/humor dimension (Table 4.22) yielded a unimodol distribution (mesokurtic) of respondents' scores. Its measure of central tendency consisted of a mean score of 161.36, a median of 167.00, and a mode score of 183.00.

The idea support dimension yielded a distribution of scores that skewed towards the negative. Moreover, its measures of central tendencies varied between 8 to 25 points. As shown on Table 4.24, the idea support dimension yielded a mean score of 175.88, a median score of 183.00, and a mode of 200.00.

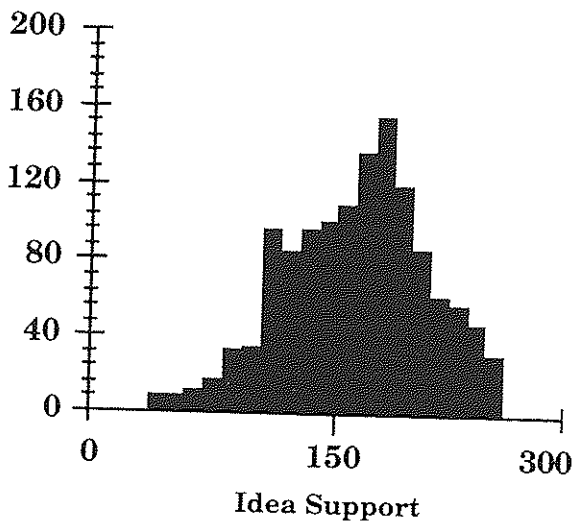
The distribution of the conflicts dimension (Table 4.23) reflected a positive skew. In other words it appears the respondents had a tendency to select lower scores on the Likert scale of the CIQIIIA to questions pertaining to the conflicts dimension. The measure of central tendency consisted of a mean of 107.98, a median of 100.00, a mode score of 100.00.

Table 4.23



Mean 107.98 Median 100.00
Mode 100.00 Std. dev. 67.22

Table 4.24



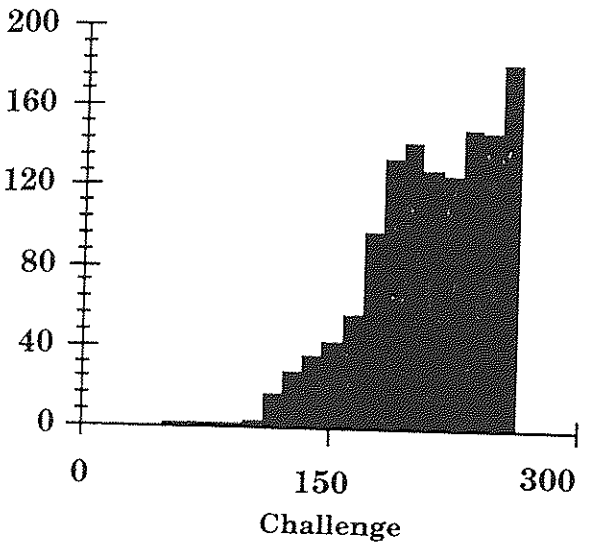
Mean 175.88 Median 183.00
Mode 200.00 Std. dev. 63.44

The distribution of respondents' scores on the challenge dimension (Table 4.25) yielded an extremely negative skew. It was clear that the respondents

selected higher scores on questions that pertained to this dimension. The measure of central tendency revealed a mean score of 231.04 which is over 80 points higher than the theoretical mean of 150.00. The mode resulted in a score of 300.00. This score indicates the value that occurs more often than any other score (Jaeger, 1990) within the challenge dimension. The median resulted in a score of 233.00.

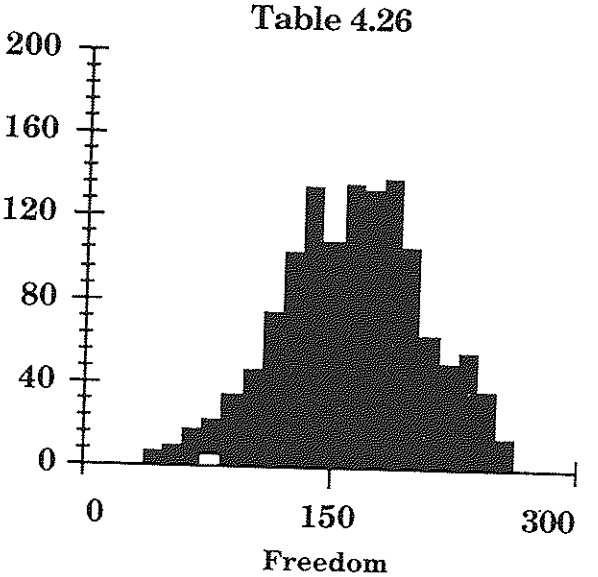
The freedom dimension (Table 4.26) yielded a fairly normal distribution of scores. The distribution of respondents' scores yielded a mean of 167.40, a median score of 167.00 and a mode score of 200.00.

Table 4.25



Mean 231.04 Median 233.00
Mode 300.00 Std. dev. 53.22

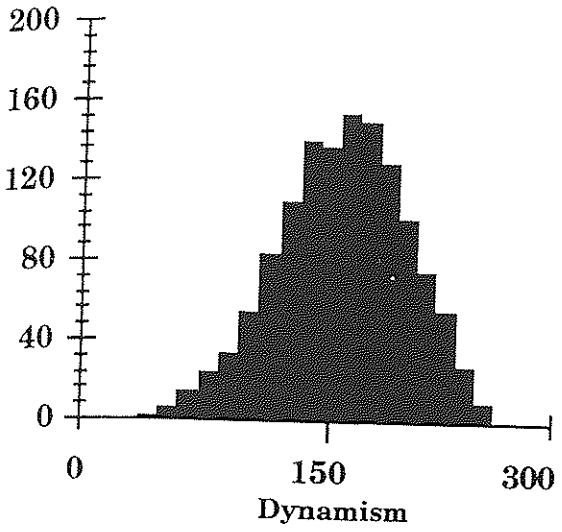
Table 4.26



Mean 167.40 Median 167.00
Mode 200.00 Std. dev. 61.34

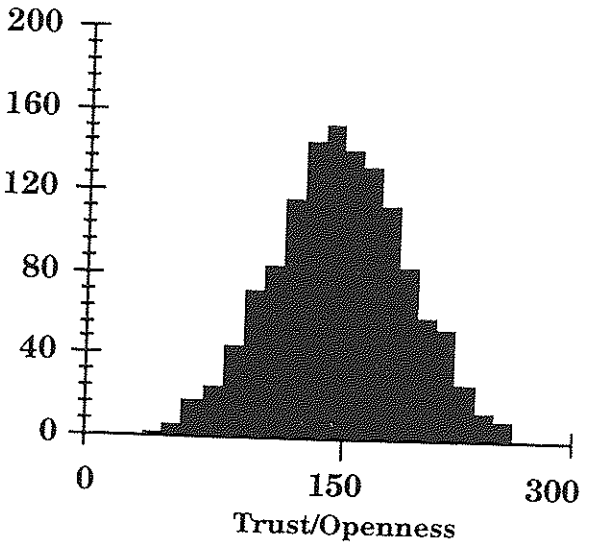
The dynamism dimension (Table 4.27) yielded a distribution of scores with a slight negative skew. Its measure of central tendency consisted of a mean score of 178.61, a median score of 183.00, and a mode score of 183.00.

Table 4.27



Mean 178.61 Median 183.00
Mode 183.00 Std. dev. 54.11

Table 4.28



Mean 158.11 Median 150.00
Mode 150.00 Std. dev. 56.78

The trust/openness dimension (Table 4.28) yielded a mesokurtic distribution. Its measure of central tendency resulted in a mean score of 158.11, a median score of 150.00, and a mode score of 150.00.

The purpose of this section was to describe the distribution of respondents' scores of the CIQIIIA dimensions. These results were presented and discussed.

Correlational Analysis

The purpose of this section is to describe the results from the correlational analysis of the CIQIIIA dimensions and items. These results are presented and some of their meanings are also discussed.

Table 4.29 shows the correlations among the dimensions for the entire sample (n=1297). Except for the conflicts dimension, the level of significance for each correlation was high at $p \leq .01$. The results showed that the dimensions had a positive relationship to each other; the only exception again was the scores to the conflicts dimension. The correlational coefficients ranged from -.58 to .65.

Table 4.29

Inter-dimensional correlation of the CIQIIIA

Dimension	1	2	3	4	5	6	7	8	9	10
					n =1297					
Challenge/Involvement	**1.00**									
Freedom	.48	**1.00**								
Dynamism	.63	.56	**1.00**							
Trust/Openness	.56	.47	.54	**1.00**						
Idea Time	.36	.58	.43	.39	**1.00**					
Playfulness/Humor	.43	.51	.52	.50	.54	**1.00**				
Conflicts	-.43	-.34	-.35	-.58	-.33	-.41	**1.00**			
Idea Support	.60	.58	.63	.60	.61	.57	-.52	**1.00**		
Debates	.44	.52	.55	.49	.51	.51	-.32	.65	**1.00**	
Risk-Taking	.39	.60	.57	.44	.57	.52	-.27	.63	.63	**1.00**

Note: All correlations significant at the $p \leq .01$

Table 4.30 shows the inter-correlations of the CIQIIIA's 60 questions for the entire sample (n = 1297). Of these correlations 98.6% (1280 of 1297) were significant at a level $p \leq .05$. This revealed that the factors measured by these items were similar. However, this may still pose a concern if the similarities are deemed to be too strong.

As can be seen in Table 4.30, the ten dimensions and respective items of the CIQIIIA were also found to be highly correlated. A way to address the problem of collinearity found in the measure was to check factor validity by using two different dimension reduction techniques such as the principle component (varimax rotation) analysis and maximum likelihood (oblimin rotation). Another rationale behind using such markedly different rotation procedures was to ensure no pertinent data regarding the selection of an appropriate solution was overlooked. Specifically, factor analysis was employed to examine the overlap among CIQIIIA items and to evaluate the theoretic structures that underlie the ten dimensions. The results of both rotations were presented. The next section of this chapter explores the factor structure of the CIQIIIA.

Table 4.30

Inter-Correlations among CIQIIIA Items for Total Sample (n = 1297)[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1.00																								
2	.45	1.00																							
3	.19	.33	1.00																						
4	-.11	-.21	-.24	1.00																					
5	.20	.28	.34	-.16	1.00																				
6	.20	.29	.41	-.18	.34	1.00																			
7	.27	.30	.16	-.02	.25	.30	1.00																		
8	.20	.32	.28	-.19	.32	.32	.29	1.00																	
9	.25	.31	.32	-.28	.30	.32	.20	.46	1.00																
10	-.27	-.26	-.14	.41	-.13	-.18	-.07	-.16	-.20	1.00															
11	.24	.35	.32	-.29	.38	.35	.24	.34	.38	-.23	1.00														
12	.10	.18	.26	-.09	.49	.24	.22	.28	.28	.02	.32	1.00													
13	.16	.29	.44	-.21	.36	.37	.21	.34	.35	-.13	.44	.14	1.00												
14	.45	.45	.28	-.22	.27	.28	.30	.29	.31	-.23	.36	.17	.30	1.00											
15	.25	.39	.33	-.32	.36	.33	.23	.52	.47	-.30	.44	.31	.40	.41	1.00										
16	.13	.21	.46	-.18	.28	.39	.19	.26	.30	-.12	.35	.24	.35	.24	.34	1.00									
17	.28	.44	.40	-.36	.36	.40	.26	.39	.53	-.25	.48	.27	.41	.40	.48	.41	1.00								
18	.27	.38	.44	-.34	.43	.36	.25	.38	.40	-.29	.68	.31	.48	.40	.49	.37	.55	1.00							
19	.29	.36	.40	-.25	.35	.39	.30	.35	.35	-.23	.45	.31	.45	.34	.42	.35	.46	.54	1.00						
20	.46	.52	.23	-.20	.26	.39	.29	.30	.32	-.23	.33	.17	.26	.52	.41	.23	.42	.40	.39	1.00					
21	.18	.31	.39	-.26	.27	.57	.21	.30	.31	-.20	.37	.23	.34	.31	.38	.39	.44	.43	.40	.41	1.00				
22	.26	.41	.27	-.08	.24	.28	.25	.26	.24	-.12	.25	.20	.30	.31	.28	.19	.33	.28	.35	.38	.31	1.00			
23	.08	.20	.59	-.23	.31	.38	.14	.24	.30	-.13	.42	.25	.37	.25	.30	.53	.40	.43	.42	.24	.38	.25	1.00		
24	.21	.32	.34	-.32	.33	.31	.17	.41	.67	-.22	.41	.29	.37	.33	.42	.29	.59	.45	.38	.32	.36	.29	.37	1.00	
25	.13	.26	.29	-.14	.51	.31	.23	.34	.31	-.08	.31	.61	.42	.21	.37	.25	.33	.34	.34	.22	.27	.25	.29	.40	1.00
26	.15	.23	.36	-.14	.37	.30	.25	.29	.28	-.13	.36	.37	.40	.22	.30	.29	.41	.41	.41	.20	.26	.24	.37	.32	.45
27	.17	.28	.36	-.17	.27	.50	.22	.24	.28	-.14	.36	.27	.39	.23	.30	.37	.34	.37	.40	.30	.53	.27	.35	.31	.31
28	.42	.44	.26	-.33	.32	.31	.23	.36	.39	-.44	.44	.18	.32	.43	.47	.25	.45	.49	.41	.52	.37	.28	.24	.37	.27
29	.28	.36	.31	-.19	.38	.29	.25	.27	.26	-.21	.45	.25	.31	.34	.35	.25	.36	.50	.41	.36	.28	.28	.34	.30	.32
30	.38	.40	.23	-.15	.29	.27	.23	.28	.32	-.19	.34	.18	.27	.48	.38	.24	.35	.37	.32	.52	.33	.30	.25	.31	.21
31	-.31	-.28	-.18	.35	-.25	-.21	-.12	-.25	-.27	.51	-.28	-.08	-.17	-.26	-.35	-.16	-.30	-.34	-.24	-.29	-.22	-.14	-.13	-.23	-.15
32	.11	.25	.38	-.17	.29	.37	.20	.27	.27	-.12	.35	.31	.46	.26	.32	.32	.35	.40	.49	.23	.34	.31	.41	.29	.33
33	.23	.34	.37	-.28	.36	.31	.21	.33	.37	-.24	.54	.30	.41	.36	.42	.34	.43	.63	.47	.34	.36	.29	.42	.40	.33
34	.41	.39	.25	-.22	.33	.27	.24	.28	.27	-.25	.37	.21	.27	.45	.38	.24	.39	.46	.39	.47	.30	.30	.24	.28	.26
35	.33	.57	.35	-.35	.37	.35	.29	.40	.52	-.29	.46	.29	.39	.41	.51	.30	.62	.49	.46	.48	.39	.40	.35	.57	.35
36	.08	.16	.50	-.30	.30	.34	.09	.26	.32	-.14	.34	.25	.34	.23	.31	.46	.40	.38	.39	.22	.37	.20	.65	.39	.29
37	.12	.25	.28	-.26	.23	.27	.12	.31	.45	-.15	.28	.21	.34	.22	.36	.24	.51	.33	.33	.21	.27	.26	.28	.55	.26
38	-.22	-.25	-.27	.46	-.25	-.24	-.07	-.25	-.28	.47	-.35	-.12	-.23	-.24	-.36	-.18	-.32	-.38	-.29	-.23	-.25	-.13	-.19	-.27	-.18
39	.17	.28	.32	-.17	.56	.36	.27	.32	.31	-.08	.39	.51	.38	.27	.40	.31	.37	.41	.40	.27	.32	.23	.35	.36	.59
40	.17	.22	.29	-.09	.31	.28	.24	.20	.20	-.11	.27	.28	.36	.23	.22	.24	.27	.33	.41	.20	.26	.22	.32	.25	.30
41	.19	.24	.21	-.12	.22	.37	.17	.13	.19	-.15	.22	.16	.21	.22	.22	.26	.28	.26	.29	.27	.46	.19	.19	.20	.20
42	.20	.25	.12	-.24	.12	.18	.13	.23	.18	-.33	.27	.10	.18	.24	.34	.14	.25	.31	.25	.28	.26	.20	.15	.19	.12
43	.11	.22	.53	-.30	.28	.38	.15	.25	.32	-.15	.44	.28	.40	.25	.32	.47	.45	.45	.43	.27	.39	.21	.64	.36	.30
44	.15	.24	.26	-.21	.25	.28	.14	.35	.58	-.15	.30	.27	.32	.22	.39	.23	.48	.32	.31	.22	.26	.19	.26	.62	.32
45	.27	.40	.43	-.33	.42	.37	.25	.41	.42	-.30	.63	.34	.47	.41	.54	.37	.51	.68	.52	.36	.40	.38	.44	.45	.39
46	.21	.30	.36	-.20	.56	.34	.27	.36	.37	-.10	.39	.52	.43	.31	.46	.34	.39	.47	.42	.30	.36	.26	.37	.41	.62
47	.53	.48	.21	-.20	.26	.30	.28	.26	.29	-.26	.33	.14	.23	.53	.37	.21	.41	.36	.37	.67	.36	.35	.22	.29	.21
48	.15	.23	.32	-.13	.19	.50	.22	.22	.27	-.11	.27	.19	.28	.25	.24	.35	.33	.28	.31	.28	.54	.24	.33	.26	.22
49	-.00	-.01	.12	.04	.07	.14	.07	.05	.07	.05	.00	.16	.16	.00	.00	.08	.09	.01	.18	.02	.07	.07	.10	.09	.13
50	.23	.37	.42	-.24	.36	.48	.27	.35	.36	-.20	.46	.31	.44	.32	.38	.35	.45	.49	.52	.34	.49	.33	.40	.40	.33
51	.12	.23	.35	-.38	.24	.29	.08	.31	.47	-.18	.38	.21	.35	.25	.41	.33	.52	.40	.34	.24	.36	.20	.36	.53	.25
52	-.19	-.26	-.25	.45	-.22	-.23	-.08	-.27	-.29	.44	-.39	-.13	-.26	-.24	-.40	-.20	-.33	-.42	-.29	-.25	-.28	-.15	-.23	-.31	-.17
53	.13	.24	.04	-.02	.10	.06	.17	.12	.09	-.04	.14	.14	.15	.12	.13	.04	.12	.15	.19	.14	.11	.22	.06	.12	.15
54	.16	.17	.07	-.06	.11	.17	.14	.16	.13	-.19	.15	.08	.11	.16	.15	.10	.18	.20	.16	.17	.15	.13	.08	.13	.12
55	-.30	-.31	-.19	.36	-.19	-.23	-.15	-.21	-.22	.49	-.28	-.04	-.17	-.30	-.30	-.16	-.26	-.32	-.29	-.30	-.26	-.18	-.16	-.20	-.14
56	.29	.40	.41	-.28	.40	.36	.23	.35	.36	-.27	.57	.30	.44	.41	.46	.34	.46	.63	.50	.38	.40	.33	.43	.42	.36
57	.17	.30	.35	-.17	.32	.36	.28	.25	.25	-.15	.38	.24	.35	.26	.29	.33	.38	.40	.42	.32	.35	.27	.40	.30	.29
58	.20	.26	.18	-.25	.18	.22	.17	.26	.22	-.32	.30	.17	.22	.27	.32	.16	.29	.34	.31	.28	.21	.20	.17	.24	.16
59	.27	.37	.36	-.28	.44	.40	.26	.38	.36	-.25	.48	.38	.41	.32	.44	.28	.43	.52	.48	.36	.37	.29	.36	.39	.43
60	.10	.20	.51	-.28	.30	.33	.10	.29	.30	-.11	.39	.27	.36	.24	.32	.47	.37	.41	.39	.25	.38	.19	.65	.36	.29

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

Table 4.30 continued

Inter-Correlations among CIQIIIA Items for Total Sample (n = 1297)[a]

Item	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
26	1.00																							
27	.38	1.00																						
28	.26	.34	1.00																					
29	.41	.30	.39	1.00																				
30	.25	.27	.43	.45	1.00																			
31	-.14	-.16	-.45	-.26	-.24	1.00																		
32	.41	.43	.26	.32	.21	-.07	1.00																	
33	.42	.38	.43	.46	.39	-.30	.41	1.00																
34	.30	.30	.49	.48	.48	-.34	.25	.47	1.00															
35	.32	.34	.50	.38	.39	-.32	.36	.47	.46	1.00														
36	.32	.35	.25	.28	.22	-.13	.36	.37	.24	.37	1.00													
37	.25	.27	.25	.21	.19	-.16	.35	.33	.16	.51	.36	1.00												
38	-.20	-.17	-.41	-.26	-.18	.52	-.15	-.31	-.29	-.35	-.21	-.17	1.00											
39	.42	.37	.32	.40	.31	-.17	.37	.42	.34	.42	.34	.30	-.18	1.00										
40	.44	.37	.24	.32	.21	-.07	.51	.37	.26	.36	.26	.24	-.13	.42	1.00									
41	.24	.40	.29	.25	.24	-.13	.25	.25	.29	.28	.19	.14	-.15	.27	.25	1.00								
42	.14	.17	.35	.20	.20	-.30	.19	.26	.25	.27	.18	.17	-.28	.15	.13	.14	1.00							
43	.36	.37	.28	.34	.26	-.14	.41	.45	.26	.38	.63	.33	-.20	.36	.36	.21	.23	1.00						
44	.27	.26	.28	.22	.23	-.17	.27	.31	.21	.47	.31	.57	-.21	.29	.22	.18	.15	.34	1.00					
45	.43	.46	.49	.51	.42	-.35	.41	.62	.47	.52	.41	.35	-.39	.47	.37	.29	.32	.48	.39	1.00				
46	.44	.34	.34	.44	.35	-.21	.36	.47	.41	.45	.37	.31	-.25	.66	.37	.27	.19	.40	.36	.57	1.00			
47	.20	.30	.50	.37	.55	-.32	.21	.34	.53	.46	.18	.18	-.26	.28	.22	.30	.25	.23	.23	.38	.33	1.00		
48	.26	.45	.25	.24	.27	-.13	.33	.30	.21	.32	.32	.26	-.14	.30	.29	.42	.19	.39	.26	.31	.27	.27	1.00	
49	.18	.13	.02	.01	.04	.09	.28	.10	-.02	.07	.13	.22	.04	.13	.25	.05	.01	.15	.17	.06	.11	.00	.18	1.00
50	.36	.51	.40	.41	.33	-.23	.50	.51	.39	.46	.37	.34	-.26	.41	.40	.34	.24	.45	.34	.51	.44	.34	.44	.20
51	.22	.30	.32	.19	.23	-.22	.33	.37	.24	.46	.42	.58	-.29	.29	.20	.20	.18	.42	.48	.41	.34	.21	.28	.12
52	-.17	-.20	-.41	-.24	-.18	.47	-.18	-.38	-.27	-.33	-.22	-.22	.56	-.20	-.14	-.11	-.32	-.25	-.21	-.43	-.24	-.23	-.12	.03
53	.20	.14	.15	.16	.14	-.03	.20	.21	.16	.21	.02	.11	-.02	.15	.23	.12	.12	.05	.09	.19	.16	.13	.11	.10
54	.11	.14	.23	.10	.11	-.19	.11	.11	.18	.16	.11	.07	-.18	.11	.12	.15	.33	.12	.09	.22	.14	.22	.15	.06
55	-.18	-.17	-.45	-.28	-.22	.54	-.16	-.28	-.31	-.32	-.15	-.10	.45	-.18	-.15	-.16	-.37	-.18	-.08	-.33	-.19	-.31	-.16	.09
56	.41	.38	.45	.57	.41	-.31	.41	.59	.48	.50	.38	.33	-.33	.47	.39	.30	.28	.46	.32	.66	.51	.41	.29	.08
57	.35	.33	.29	.37	.33	-.16	.36	.41	.31	.42	.31	.27	-.19	.37	.37	.21	.18	.43	.22	.44	.39	.30	.34	.17
58	.19	.18	.38	.26	.20	-.31	.21	.31	.27	.30	.22	.20	-.30	.21	.17	.14	.46	.21	.18	.34	.21	.28	.17	.08
59	.42	.41	.43	.45	.37	-.30	.39	.48	.42	.48	.34	.27	-.35	.53	.37	.25	.31	.38	.30	.56	.55	.37	.32	.10
60	.32	.34	.25	.32	.25	-.15	.38	.41	.29	.35	.74	.31	-.22	.38	.29	.21	.20	.64	.29	.46	.43	.23	.33	.08

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

Table 4.30 continued

Inter-Correlations among CIQIIIA Items for Total Sample (n = 1297)[a]

Item	50	51	52	53	54	55	56	57	58	59	60
50	1.00										
51	.38	1.00									
52	-.26	-.33	1.00								
53	.22	.06	-.05	1.00							
54	.22	.08	-.18	.12	1.00						
55	-.24	-.16	.46	-.08	-.21	1.00					
56	.58	.37	-.37	.28	.22	-.31	1.00				
57	.47	.27	-.20	.20	.15	-.20	.51	1.00			
58	.30	.22	-.31	.12	.44	-.34	.37	.23	1.00		
59	.53	.30	-.35	.21	.29	-.32	.57	.43	.44	1.00	
60	.41	.42	-.24	.02	.11	-.16	.44	.38	.25	.43	1.00

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

The purpose of this section was to describe the results from the correlational analysis of the CIQIIIA dimensions and items. These results were presented and some of their meanings were also discussed.

Factor Analysis

The purpose of this section is to describe the results from the factor analysis of the CIQIIIA's 60 items conducted in this study. The results and some of its meanings will be discussed. In specific, the discussion focuses on how well the responses reduce to Ekvall's 10 dimensions.

Table 4.31 shows the results of the principle component analysis which yielded ten factors accounting for approximately 60.2% of the variance. The first factor (challenge/involvement), accounted for 32.1% of the total variance; the second factor (idea time) accounted for 6.1%; the third factor (playfulness/humor) accounted for 4.3; the fourth factor (debates) accounted for 3.5%; the fifth factor (conflicts) accounted for 3.4%; the sixth factor (idea support) accounted for 2.8%; the seventh factor (freedom) accounted for 2.4%; the eighth factor (risk-taking) accounted for 2.1%; the ninth factor (trust) accounted for 1.8%; and, the tenth factor accounted for 1.7% of the total variance.

Table 4.32 shows the results of the maximum likelihood analysis which yielded nine factors accounting for approximately 51.4% of the variance. The first factor (idea support) accounted for 31.3% of the total variance; the second factor (conflicts) accounted for 5.3%; the third factor (idea time) accounted for 3.5%; the fourth factor (playfulness/humor) accounted for 2.8%; the fifth factor (challenge) accounted for 2.7%; the sixth factor (freedom) accounted for 1.9%; the seventh factor (debates) accounted for 1.5%; the eighth factor (trust) accounted for 1.4%; and the ninth factor (risk-taking) accounted for

Table 4.31
Principle Component Rotation Analysis of CIQIIIA Items:
Entire Sample (n = 1297)

		Factors									
	Theoretic Scale	1	2	3	4	5	6	7	8	9	10
47	Challenge	.772									
20	Challenge	.736									
1	Challenge	.701									
30	Challenge	.640									
14	Challenge	.629									
2	Dynamism	.578									
34	Challenge	.578									.334
28	Trust	.460				.425	.344				
23	Idea Time		.778								
36	Idea Time		.771								
60	Idea Time		.771								
43	Idea Time		.714								
3	Idea Time		.626								
16	Idea Time		.572								
44	Playfulness/Humor			.761							
37	Playfulness/Humor			.734							
24	Playfulness/Humor			.727							
9	Playfulness/Humor			.682							
51	Playfulness/Humor			.657							
17	Playfulness/Humor			.549							
35	Dynamism	.421		.507							
15	Trust			.383							
25	Debates				.772						
12	Debates				.730						
39	Debates				.701						
46	Debates				.698						
5	Debates				.675						
26	Risk-Taking				.435		.302		.338		
59	Debates				.421		.362			.314	
38	Conflicts					-.736					
10	Conflicts					-.722					
31	Conflicts					-.704					
55	Conflicts					-.686					
52	Conflicts					-.684					
4	Conflicts					-.608					
56	Idea Support						.611				
18	Idea Support						.607				
33	Idea Support						.598				
11	Idea Support						.590				
45	Idea Support						.565				
29	Idea Support	.372					.524				
53	Dynamism						.386		.370		
57	Dynamism						.358				
19	Risk-Taking						.332		.303		
21	Freedom							.690			
41	Freedom							.689			
48	Freedom							.685			
27	Freedom							.623			
6	Freedom							.620			
50	Freedom						.385	.411			
49	Risk-Taking								.681		
40	Risk-Taking								.571		
32	Risk-Taking								.515		
54	Trust									.771	
58	Trust									.703	
42	Trust					.301				.614	
7	Dynamism	.318									
8	Trust			.372							.493
22	Challenge	.394									.439
13	Risk-Taking				.319						.404
											.340
	% Variance Accounted for by Factors	32.1	6.1	4.3	3.5	3.4	2.8	2.4	2.1	1.8	1.7
	Eigenvalues	19.2	3.6	2.6	2.0	2.0	1.6	1.4	1.2	1.0	1.0

Table 4.32
Maximum Likelihood Rotation Analysis
of CIQIIIA Items: Entire Sample (n = 1297)

Factors

Item	Theoretic Scale	1	2	3	4	5	6	7	8	9
18	Idea Support	.646								
11	Idea Support	.624								
45	Idea Support	.504								
33	Idea Support	.485								
56	Idea Support	.472								
29	Idea Support	.365								
10	Conflicts		.677							
38	Conflicts		.676							
31	Conflicts		.646							
55	Conflicts		.637							
52	Conflicts		.592							
4	Conflicts		.521							
60	Idea Time			-.812						
36	Idea Time			-.804						
23	Idea Time			-.734						
43	Idea Time			-.639						
3	Idea Time			-.489						
16	Idea Time			-.416						
44	Playfulness/Humor				-.747					
37	Playfulness/Humor				-.714					
24	Playfulness/Humor				-.699					
9	Playfulness/Humor				-.635					
51	Playfulness/Humor				-.582					
17	Playfulness/Humor				-.466					
35	Dynamism				-.429	.341				
8	Trust				-.270					
15	Trust				-.260					
47	Challenge					.732				
20	Challenge					.703				
1	Challenge					.638				
14	Challenge					.553				
2	Challenge					.548				
30	Challenge					.543				
34	Challenge					.442				
22	Challenge					.372				
28	Trust		-.304			.324				
7	Dynamism					.281				
21	Freedom						.748			
48	Freedom						.674			
6	Freedom						.625			
41	Freedom						.604			
27	Freedom						.590			
50	Freedom						.367			
25	Debates							-.801		
12	Debates							-.706		
46	Debates							-.693		
39	Debates							-.669		
5	Debates							-.614		
26	Risk-Taking							-.333		
59	Debates							-.323		
58	Trust								.712	
54	Trust								.607	
42	Trust								.504	
40	Risk-Taking									-.498
32	Risk-Taking									-.461
49	Risk-Taking									-.414
53	Dynamism									-.303
19	Risk-Taking									
57	Dynamism									
13	Risk-Taking									
	% Variance Accounted for by Factors	31.3	5.3	3.5	2.8	2.7	1.9	1.5	1.4	1.0
	Eigenvalues	18.7	3.1	2.0	1.7	1.6	1.1	.89	.85	.61

1.0% of the total variance.

The purpose of this section was to describe the results from the factor analysis of the CIQIIIA's 60 items. The results and some of its meanings were discussed. In specific, the discussion focused on how well the responses reduced to Ekvall's 10 dimensions.

Internal Reliability

This section describes the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose is to determine the internal reliability of the CIQIIIA measure.

The results of the three statistical analyses as presented in Table 4.33 were all greater than or equal to .70. The exceptions were trust/openness with a Guttman split half score of .59 and a Spearman-Brown score of .60. It can be concluded that the creative climate construct, in general, was being assessed.

Table 4.33

CIQIIIA

Theoretic Scale	Cronbach alpha	Guttman split half	Spearman Brown
Challenge	.85	.85	.85
Freedom	.84	.84	.84
Dynamism	.72	.72	.72
Trust/Openness	.74	.59	.60
Idea Time	.88	.85	.85
Playfulness/Humor	.88	.85	.85
Conflicts	.84	.84	.84
Idea Support	.89	.89	.89
Debates	.87	.84	.84
Risk-Taking	.77	.74	.74

This section described the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose was to determine the internal reliability of the CIQIIIA measure.

CIQIVA RESULTS

This section is divided into four sub-sections. The first section discusses the distribution of respondents' scores for each dimension. The second sub-section discusses the item-to-item and item-to-dimension correlational analyses. The third sub-section discusses the factor structure analysis. The final sub-section discusses the internal reliability scores of each dimension.

Means and Standard Deviations

This section presents the means and standard deviations for the overall sample. The purpose is to present a set of scores that show group performance and indicates whether most of the scores cluster closely around their mean or are spread out along the dimension.

Table 4.34

CIQIVA Scale: Means and Standard Deviations

CIQIVA Dimension	Mean	Std. Dev
Challenge/Involvement	197.17	53.25
Freedom	136.37	55.44
Trust/Openness	128.83	70.55
Idea Time	92.57	62.49
Playfulness/Humor	143.84	61.38
Conflicts	118.02	72.12
Idea Support	142.41	64.74
Debates	169.02	57.39
Risk-Taking	106.41	52.68

Note: n = 639

In Table 4.34, the challenge/involvement and debates dimensions fell below the hypothetical midpoint of 150. The standard deviations ranged from 52.68 to 72.12.

Table 4.35

CIQIVA Item: Means and Standard Deviations

Overall		
CIQIVA Item	**Mean**	**Std. Dev.**
1*		
2	1.82	.76
3	.98	.82
4	1.66	.98
5	1.90	.75
6	1.36	.78
7	1.89	.76
8	1.12	.93
9	1.49	.78
10	1.69	.73
11	2.24	.74
12	1.01	.92
13	1.39	.77
14	1.49	.80
15	1.34	.79
16	1.89	.82
17	1.41	.78
18	1.36	.76
19	.86	.76
20	1.68	.77
21	1.73	.72
22	1.27	.79
23	2.15	.71
24	.69	.83
25	.78	.72
26	1.45	.70
27	2.13	.74
28	.99	.76
29	.92	.78
30	1.16	.94
31	1.59	.73
32	1.05	.79
33	1.69	.79
34	1.03	.87
35	.78	.72
36	1.57	.78
37	1.35	.78
38	1.71	.70
39	2.21	.71
40	1.14	.74
41	1.07	.84
42	1.30	.74
43	1.16	.86
44	1.51	1.02
45	1.50	1.00
46	.95	.93
47	1.34	.79
48	1.33	.94
49	1.53	.74
50	.94	.74

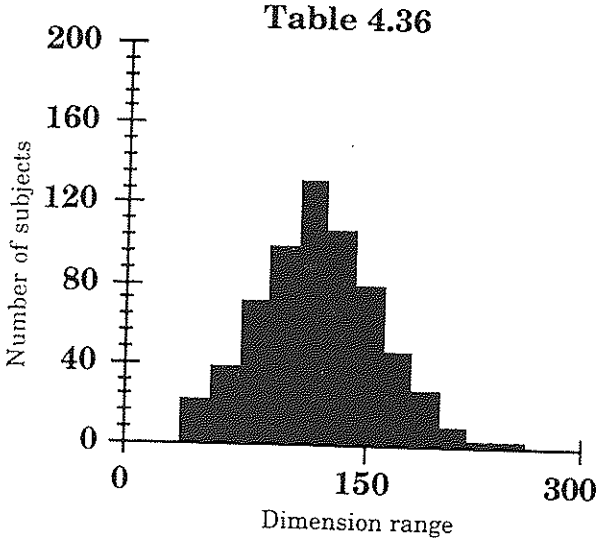
*Note: Item 1 is not scored; n= 639 for each item

Distribution of Scores

The purpose of this section is to describe the distribution of respondents' scores belonging to the CIQIVA dimensions. The intent is to determine to what extent do the responses represent a normal distribution. Such information is useful for solving a variety of problems in inferential statistics such as eliminating items that caused over-skewed results (Jaeger, 1990). These results will be presented and interpretations will be discussed.

The distribution for the risk-taking dimension (Table 4.36) produced a slight positively skewed distribution. Its measure of central tendency showed a mean of 106.41, a median of 100.00, and a mode score of 100.00.

Table 4.36



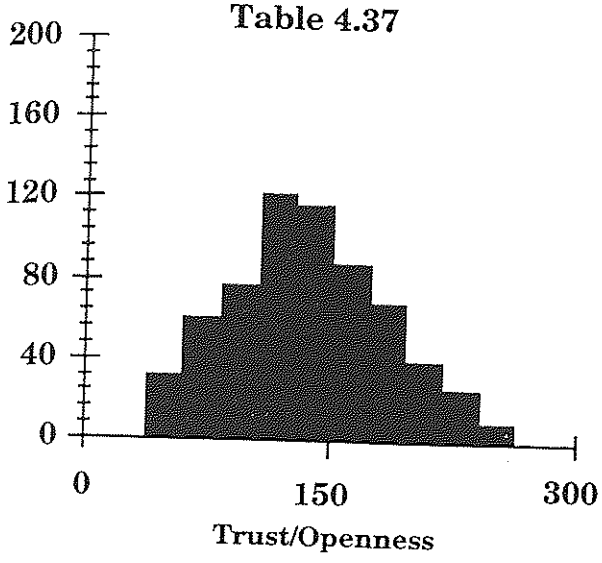
Risk Taking

Mean	106.41	Median	100.00
Mode	100.00	Std. dev.	52.68

Table 4.37 contains the distribution of respondents' scores for the trust/openness dimension. It yielded a distribution with a slight positive skew. Its measure of central tendency resulted in the mean score of 128.83, a median of 133.00, and a mode score of 100.00.

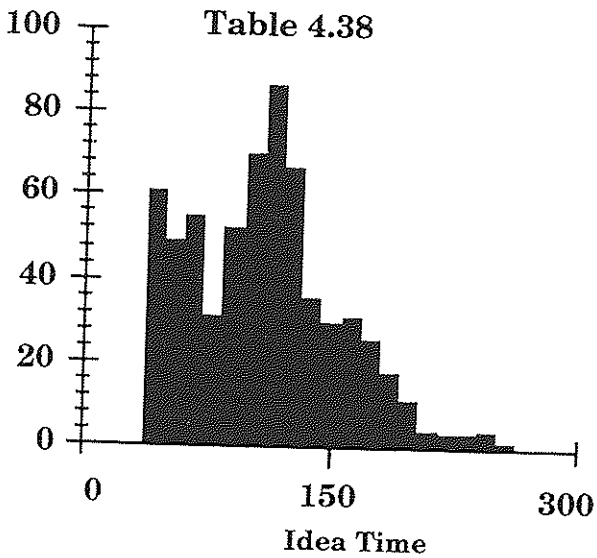
The distribution for the idea time dimension (Table 4.38) was strongly skewed positive. This distribution also appeared to have a slight bimodal shape. Its measure of central tendency resulted in a mean score of 92.57, a median of 100.00, and a mode score of 100.00.

Table 4.37



Mean 128.83 Median 133.00
Mode 100.00 Std. dev. 70.55

Table 4.38

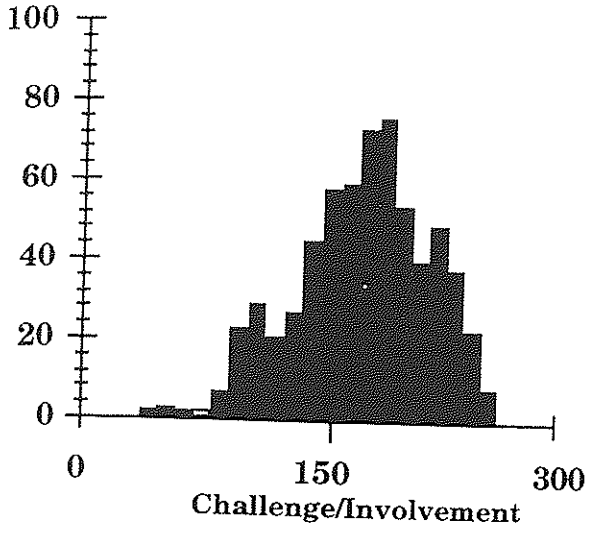


Mean 92.57 Median 100.00
Mode 100.00 Std. dev. 62.49

The challenge/involvement dimension (Table 4.39) yielded a distribution with a slightly skewed negative curve. Its measure of central tendency resulted in the mean score of 197.17, a median of 200.00, and a mode score 214.00.

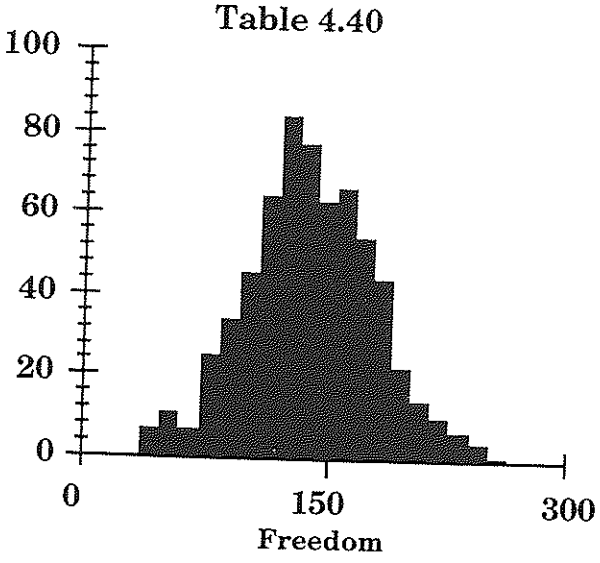
The freedom dimension (Table 4.40) yielded a distribution with a slight negative skew. Its measure of central tendency yielded a mean of 136.37, a median score of 133.00 and a mode score of 117.00.

Table 4.39



Mean 197.17 Median 200.00
Mode 214.00 Std. dev. 53.25

Table 4.40

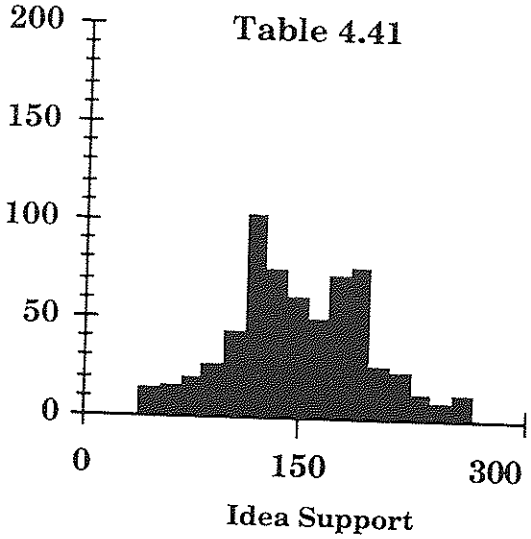


Mean 136.37 Median 133.00
Mode 117.00 Std. dev. 55.44

The idea support dimension (Table 4.41) yielded a fairly normal distribution of the respondents' scores. The distribution of respondents' scores yielded a mean of 142.41, a median score of 140.00 and a mode score of 100.00.

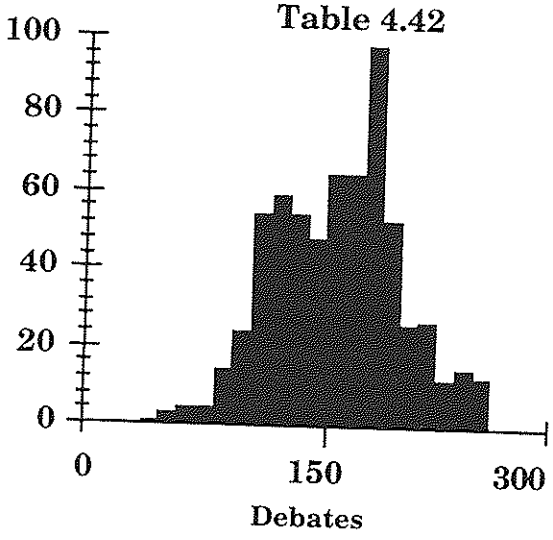
The debates dimension (Table 4.42) yielded a distribution of the respondents' scores with a slight positive skew. The peak score of 170 had a frequency of 96. The measure of central tendency yielded a mean of 169.02, a median score of 167.00 and a mode score of 200.00.

Table 4.41



Mean 142.41 Median 140.00
Mode 100.00 Std. dev. 64.74

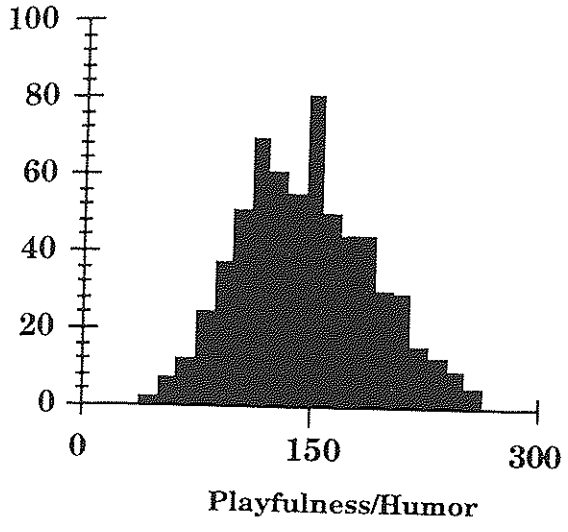
Table 4.42



Mean 169.02 Median 167.00
Mode 200.00 Std. dev. 57.39

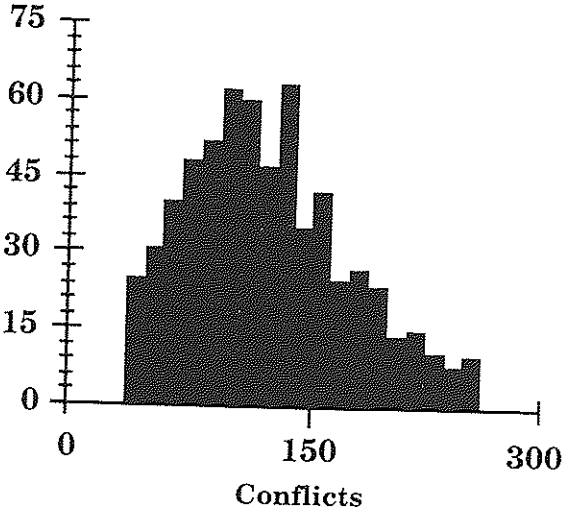
The playfulness/humor dimension (Table 4.43) yielded a fairly normal distribution of the respondents' scores. The measure of central tendency yielded a mean of 143.84, a median score of 150.00 and a mode score of 150.00.

Table 4.43



Mean 143.84 Median 150.00
Mode 150.00 Std. dev. 61.38

Table 4.44



Mean 118.02 Median 117.00
Mode 133.00 Std. dev. 72.12

The conflicts dimension (Table 4.44) yielded a negatively skewed distribution. Its central tendency scores resulted in a mean of 118.02, a median of 117.00, and a mode score of 133.00.

The purpose of this section was to describe the distribution of respondents' scores of the CIQIVA dimensions. The intent was to determine to what extent do the responses represent a normal distribution.

Correlational Analysis

The purpose of this section is to describe the results from the correlational analysis of the CIQIVA dimensions and items. These results are presented and some of their meanings are also discussed.

Table 4.45 shows the correlations among the dimensions for the entire

sample (n=639). The level of significance for each correlation was high at $p \leq .01$. The results showed that the dimensions had a positive relationship to each other except for conflicts. The correlational coefficients ranged from -.49 to .65. The first factor (idea time) accounted for 31.4% of the total variance; the second factor (conflicts) accounted for 6.5%; the third factor (debates) accounted for 5.7; the fourth factor (challenge/involvement) accounted for 4.6%; the fifth factor (playfulness/humor) accounted for 3.4%; the sixth factor (idea support) accounted for 2.9%; the seventh factor (freedom) accounted for 2.8%; the eighth factor (risk-taking) accounted for 2.2%; and the ninth factor (trust) accounted for 2.1%.

Table 4.45

Inter-dimensional correlation of the CIQIVA

Dimension	1	2	3	4	5	6	7	8	9
				n = 639					
Challenge/Involvement	**1.00**								
Freedom	.52	**1.00**							
Trust/Openness	.40	.35	**1.00**						
Idea Time	.30	.59	.26	**1.00**					
Playfulness/Humor	.40	.45	.34	.49	**1.00**				
Conflicts	-.41	-.37	-.49	-.35	-.41	**1.00**			
Idea Support	.52	.61	.44	.62	.60	-.49	**1.00**		
Debates	.50	.53	.30	.46	.53	-.33	.65	**1.00**	
Risk-Taking	.36	.54	.28	.40	.41	-.17	.51	.50	**1.00**

All correlations significant at the $p \leq .01$

Table 4.46 shows the inter-item correlations of the CIQIVA's 50 questions for the entire sample (n= 639). Of these correlations 95% (608 of 639) were significant at a level $p \leq .05$. This indicated that the factors measured by these question are similar. Of the scores that resulted in non-significance (5%) 65% stemmed from item 41.

The purpose of this section was to describe the results from the correlational analysis of the CIQIVA dimensions and items. These results were presented and some of their meanings were also discussed.

Table 4.46

Inter-Correlations among CIQIVA Items for Total Sample (n = 639)[a]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1.00																								
2	.46	1.00																							
3	.14	.28	1.00																						
4	-.08	-.16	-.29	1.00																					
5	.17	.34	.32	-.15	1.00																				
6	.22	.26	.42	-.21	.33	1.00																			
7	.12	.29	.27	-.30	.34	.30	1.00																		
8	-.20	-.25	-.17	.43	-.15	-.19	-.22	1.00																	
9	.18	.33	.43	-.31	.43	.38	.40	-.27	1.00																
10	.12	.19	.18	-.07	.47	.28	.32	-.08	.33	1.00															
11	.48	.40	.22	-.21	.29	.32	.29	-.31	.38	.25	1.00														
12	.00	.13	.47	-.21	.19	.30	.21	-.17	.35	.16	.17	1.00													
13	.17	.39	.42	-.42	.31	.37	.53	-.28	.48	.28	.34	.37	1.00												
14	.16	.35	.45	-.31	.48	.38	.44	-.33	.72	.36	.42	.32	.55	1.00											
15	.22	.25	.30	-.22	.27	.32	.25	-.21	.34	.25	.32	.23	.34	.42	1.00										
16	.47	.49	.24	-.18	.31	.32	.29	-.27	.30	.20	.50	.12	.36	.37	.37	1.00									
17	.14	.28	.38	-.22	.31	.47	.26	-.21	.32	.22	.26	.34	.37	.41	.25	.37	1.00								
18	.23	.42	.29	-.10	.31	.31	.19	-.17	.30	.23	.29	.20	.31	.38	.28	.41	.32	1.00							
19	.07	.19	.63	-.39	.26	.37	.27	-.21	.42	.18	.17	.45	.42	.44	.27	.21	.39	.27	1.00						
20	.13	.29	.26	-.26	.34	.23	.70	-.17	.38	.33	.31	.25	.57	.41	.27	.26	.25	.25	.30	1.00					
21	.11	.27	.28	-.08	.50	.27	.36	-.13	.35	.61	.28	.19	.36	.39	.31	.31	.27	.36	.28	.45	1.00				
22	.16	.28	.38	-.20	.30	.46	.22	-.19	.38	.29	.31	.29	.35	.43	.36	.30	.48	.32	.35	.24	.35	1.00			
23	.40	.32	.11	-.02	.20	.16	.18	-.21	.16	.16	.37	.08	.16	.21	.18	.42	.21	.21	.07	.15	.16	.19	1.00		
24	-.17	-.26	-.22	.45	-.25	-.23	-.31	.53	-.35	-.16	-.29	-.14	-.29	-.34	-.19	-.31	-.22	-.17	-.22	-.19	-.18	-.19	-.16	1.00	
25	.07	.16	.32	-.14	.24	.37	.25	.11	.33	.24	.18	.21	.31	.41	.41	.29	.35	.31	.38	.32	.30	.42	.10	-.08	1.00
26	.17	.26	.43	-.26	.35	.33	.34	-.29	.58	.24	.28	.27	.42	.61	.36	.32	.35	.31	.44	.32	.30	.36	.20	-.28	.41
27	.42	.36	.21	-.20	.32	.26	.24	-.25	.35	.22	.47	.09	.28	.37	.31	.47	.25	.34	.19	.27	.27	.28	.41	-.25	.20
28	.04	.17	.54	-.30	.26	.35	.30	-.13	.40	.22	.22	.43	.35	.40	.24	.18	.39	.17	.61	.27	.30	.35	.10	-.21	.29
29	.05	.24	.29	-.26	.25	.22	.50	-.17	.35	.23	.22	.29	.50	.37	.20	.18	.21	.21	.31	.56	.29	.21	.08	-.16	.25
30	-.19	-.29	-.22	.48	.28	.21	.27	.47	-.29	-.15	-.23	-.12	-.33	-.36	-.21	.26	-.23	-.18	-.24	-.21	-.15	-.22	-.09	.51	-.10
31	.11	.24	.31	-.15	.54	.35	.31	-.15	.39	.55	.30	.24	.38	.47	.30	.28	.30	.28	.30	.31	.32	.37	.62	.36	.17	.18	.35
32	.09	.22	.32	-.07	.31	.34	.24	-.12	.34	.29	.23	.22	.32	.40	.37	.31	.31	.28	.31	.27	.39	.36	.12	-.07	.43
33	.16	.20	.23	-.11	.22	.33	.17	-.14	.22	.12	.23	.17	.20	.23	.17	.23	.37	.21	.22	.19	.18	.42	.15	.17	.21
34	.15	.18	.25	-.22	.14	.22	.22	-.32	.26	.08	.21	.13	.30	.30	.19	.22	.18	.23	.22	.16	.13	.25	.12	-.29	.21
35	-.00	.16	.58	-.25	.22	.35	.28	-.16	.37	.17	.14	.44	.38	.40	.21	.15	.39	.19	.69	.29	.28	.31	.07	-.20	.32
36	.18	.21	.20	-.20	.29	.25	.58	-.15	.36	.29	.25	.18	.47	.36	.22	.18	.19	.18	.22	.63	.36	.24	.18	-.11	.24
37	.15	.40	.46	-.27	.44	.38	.42	-.30	.65	.36	.33	.30	.50	.67	.38	.32	.36	.35	.43	.44	.43	.45	.22	-.32	.40
38	.16	.28	.31	-.17	.57	.36	.37	-.19	.42	.57	.29	.23	.37	.50	.35	.31	.34	.35	.34	.42	.66	.42	.22	-.23	.33
39	.57	.42	.21	-.14	.26	.29	.25	-.25	.25	.20	.54	.06	.31	.28	.27	.63	.29	.31	.12	.26	.29	.26	.47	-.29	.19
40	.09	.21	.29	-.13	.22	.39	.24	-.15	.24	.18	.20	.27	.25	.28	.18	.28	.49	.24	.28	.19	.24	.41	.17	-.16	.29
41	-.07	-.05	.04	.04	.07	.10	.09	.02	-.02	.08	-.01	.03	.02	.03	.09	.01	.14	.04	.03	.08	.17	.16	-.03	.06	.16
42	.22	.31	.45	-.29	.35	.42	.31	-.28	.48	.20	.33	.28	.38	.54	.42	.36	.43	.35	.47	.30	.32	.49	.22	-.28	.45
43	.09	.22	.38	-.45	.24	.28	.45	-.23	.40	.15	.18	.27	.35	.40	.24	.19	.29	.20	.41	.51	.25	.30	.07	-.24	.31
44	.13	.25	.24	.48	.24	.22	.29	.47	.35	.13	.24	.13	.35	.36	.16	.26	.22	.17	.30	.21	.18	.23	.09	.58	.16
45	.22	.19	.09	-.14	.17	.15	.14	-.20	.26	.11	.19	.01	.18	.21	.19	.25	.10	.14	.10	.14	.12	.15	.16	-.26	.12
46	.24	.33	.26	.44	.28	.24	.31	.52	.32	.15	.33	.16	.39	.34	.26	.34	.20	.18	.25	.24	.21	.24	.18	.59	.14
47	.19	.33	.48	.31	.41	.39	.38	.28	.66	.27	.37	.32	.47	.66	.39	.31	.37	.35	.46	.40	.38	.45	.16	.32	.41
48	.16	.25	.21	.23	.24	.21	.23	.35	.32	.13	.27	.15	.33	.35	.22	.26	.18	.24	.20	.23	.19	.26	.13	.43	.17
49	.18	.29	.40	.29	.47	.41	.34	.27	.55	.37	.36	.29	.40	.60	.37	.35	.35	.34	.43	.37	.46	.42	.17	.34	.39
50	.06	.19	.57	.31	.27	.34	.31	.20	.42	.18	.21	.43	.39	.47	.27	.20	.37	.19	.66	.30	.26	.39	.08	.25	.33

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

Table 4.46 continued

Inter-Correlations among CIQIVA Items for Total Sample (n = 639)[a]

Item	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
26	1.00																								
27	.35	1.00																							
28	.39	.26	1.00																						
29	.30	.12	.28	1.00																					
30	-.28	-.26	-.17	-.12	1.00																				
31	.39	.33	.33	.29	-.16	1.00																			
32	.37	.25	.26	.29	-.06	.43	1.00																		
33	.23	.23	.29	.15	-.16	.23	.23	1.00																	
34	.31	.18	.14	.20	-.24	.14	.17	.11	1.00																
35	.42	.15	.62	.30	-.16	.33	.30	.22	.22	1.00															
36	.26	.21	.23	.56	-.15	.34	.28	.18	.15	.28	1.00														
37	.57	.37	.42	.39	-.29	.51	.43	.29	.24	.48	.41	1.00													
38	.37	.34	.34	.30	-.25	.70	.37	.30	.13	.32	.40	.57	1.00												
39	.27	.52	.11	.13	-.22	.29	.25	.23	.23	.12	.22	.27	.30	1.00											
40	.25	.16	.32	.21	-.14	.24	.31	.40	.18	.32	.20	.32	.28	.27	1.00										
41	.06	-.09	.06	.11	.04	.09	.19	.04	.03	.07	.13	.01	.08	.02	.17	1.00									
42	.49	.36	.45	.25	-.28	.37	.35	.33	.27	.44	.26	.52	.39	.31	.39	.10	1.00								
43	.39	.20	.38	.57	-.30	.31	.21	.15	.23	.38	.42	.46	.32	.11	.25	.06	.39	1.00							
44	-.08	-.23	-.23	-.20	.61	-.23	-.10	-.15	-.29	-.26	-.20	-.36	-.26	-.20	-.16	.08	-.31	-.31	1.00						
45	.23	.19	.09	.09	-.21	.15	.12	-.16	.28	.07	.21	.18	.14	.22	.11	.10	.20	.13	-.26	1.00					
46	.30	-.31	-.19	-.17	.52	-.19	-.17	-.15	-.33	-.21	-.16	-.30	-.24	-.29	-.18	.09	.27	-.22	.56	-.21	1.00				
47	.57	.38	.43	.35	-.33	.44	.39	.26	.30	.43	.32	.65	.45	.28	.34	.03	.59	.41	-.41	.22	-.32	1.00			
48	.37	.27	.20	.23	-.32	.23	.18	.21	.40	.23	.23	.37	.22	.26	.19	.02	.33	.26	-.41	.36	-.44	.34	1.00		
49	.51	.38	.41	.31	-.33	.55	.35	.30	.23	.40	.34	.58	.53	.31	.27	.09	.52	.39	-.37	.25	-.29	.59	.37	1.00	
50	.44	.22	.71	.33	-.22	.33	.28	.30	.17	.57	.27	.49	.35	.14	.36	.05	.48	.40	-.28	.16	-.26	.48	.25	.49	1.00

Note: Items in bold are non-significant at the .05 level. All other items are $p \leq .05$ (2-tailed).

[a] Subjects were analyzed using listwise deletion; if they failed to respond to an item they were excluded from all the correlations.

Factor Analysis

The purpose of this section is to describe the results from the factor analysis of the CIQIVA's 50 items conducted in this study. The results are discussed. The discussion focuses on how well the responses reduce to Ekvall's 10 dimensions.

Table 4.47 shows the results of the principle component analysis which yielded nine factors accounting for approximately 61.6% of the variance. The first factor (idea time) accounted for 31.4% of the total variance; the second factor (conflicts) accounted for 6.5%; the third factor (debates) accounted for 5.7; the fourth factor (challenge/involvement) accounted for 4.6%; the fifth factor (playfulness/humor) accounted for 3.4%; the sixth factor (idea support) accounted for 2.9%; the seventh factor (freedom) accounted for 2.8%; the eighth factor (risk-taking) accounted for 2.2%; and the ninth factor (trust) accounted for 2.1%.

Table 4.48 shows the results of the maximum likelihood analysis which also yielded nine factors accounting for approximately 52.7% of the variance. The first factor (idea support) accounted for 30.4% of the total variance; the second factor (idea time) accounted for 5.2%; the third factor (conflicts) accounted for 4.9; the fourth factor (playfulness/humor) accounted for 3.8%; the fifth factor (challenge/involvement) accounted for 2.6%; the sixth factor (debates) accounted for 1.8%; the seventh factor (freedom) accounted for 1.8%; the eighth factor (trust) accounted for 1.1%; and the ninth factor (risk-taking) accounted for 1.1% of the total variance.

The purpose of this section was to describe the results from the factor analysis of the CIQIVA's 50 items conducted in this study. The results and some of its meanings were discussed. In specific, the discussion focused on how well

Table 4.47
Principle Component Analysis
CIQIVA Items: Entire Sample (n = 639)

Item	Theoretic Scale	Factors 1	2	3	4	5	6	7	8	9
35	Idea Time	.800								
19	Idea Time	.780								
28	Idea Time	.757								
50	Idea Time	.756								
3	Idea Time	.698								
12	Idea Time	.604								
30	Conflicts		-.760							
24	Conflicts		-.738							
44	Conflicts		-.736							
46	Conflicts		-.732							
8	Conflicts		-.671							
4	Conflicts		-.666							
10	Debates			.772						
21	Debates			.766						
38	Debates			.744						
31	Debates			.727						
5	Debates			.632						
39	Challenge/Involvement				.762					
16	Challenge/Involvement				.714					
23	Challenge/Involvement				.702					
11	Challenge/Involvement				.637					
27	Challenge/Involvement				.632					
2	Challenge/Involvement				.571					
18	Challenge/Involvement				.391				.381	
20	Playfulness/Humor					.780				
36	Playfulness/Humor					.751				
29	Playfulness/Humor					.751				
7	Playfulness/Humor					.721				
43	Playfulness/Humor					.600				
13	Playfulness/Humor					.554				
9	Idea Support						.627			
47	Idea Support	.302					.581			
14	Idea Support						.573			
37	Idea Support			.327			.547			
26	Idea Support	.311					.525			
49	Debate			.424			.430			
42	Freedom	.340					.391	.346		
33	Freedom									
40	Freedom							.739		
17	Freedom	.312						.683		
22	Freedom							.574		
6	Freedom							.548	.342	
								.444	.312	
25	Risk-Taking									
15	Risk-Taking								.610	
32	Risk-Taking								.567	
41	Risk-Taking								.519	
							-.366		.397	.333
45	Trust									
48	Trust		.371							.704
34	Trust									.568
										.487
	% Variance Accounted for by Factors	31.4	6.5	5.7	4.6	3.4	2.9	2.8	2.2	2.1
	Eigenvalues	15.3	3.1	2.7	2.2	1.6	1.4	1.3	1.0	1.0

Table 4.48

Maximum Likelihood Analysis
CIQIVA Items: Entire Sample (n = 639)

Item	Theoretic Scale	Factors 1	2	3	4	5	6	7	8	9
9	Idea Support	.762								
14	Idea Support	.668								
47	Idea Support	.560								
37	Idea Support	.493								
26	Idea Support	.478								
49	Debates	.321								
42	Freedom	.298					-.306			
35	Idea Time		.808							
19	Idea Time		.795							
50	Idea Time		.763							
28	Idea Time		.737							
3	Idea Time		.605							
12	Idea Time		.410							
44	Conflicts			.756						
30	Conflicts			.732						
24	Conflicts			.731						
46	Conflicts			.712						
8	Conflicts			.614						
4	Conflicts			.569						
48	Trust			-.388						
34	Trust			-.292						
20	Playfulness/Humor				-.806					
36	Playfulness/Humor				-.745					
7	Playfulness/Humor				-.722					
29	Playfulness/Humor				-.683					
43	Playfulness/Humor				-.500					
13	Playfulness/Humor				-.476					
39	Challenge/Involvement					.791				
16	Challenge/Involvement					.694				
23	Challenge/Involvement					.607				
27	Challenge/Involvement					568				
11	Challenge/Involvement					.556				
2	Challenge/Involvement					.437				
18	Challenge/Involvement									
21	Debates						-.750			
38	Debates						-.745			
10	Debates						-.726			
31	Debates						-.715			
5	Debates						-.545			
40	Freedom									
17	Freedom							.622		
33	Freedom							.557		
22	Freedom							.553		
6	Freedom							.520		
41	Risk-Taking							.413		
45	Trust								.251	
25	Risk-Taking									
32	Risk-Taking									.401
15	Risk-Taking									.317
										.272
	% Variance Accounted for by Factors	30.4	5.2	4.9	3.8	2.6	1.8	1.8	1.1	1.1
	Eigenvalues	14.8	2.5	2.4	1.8	1.2	.89	.86	.52	.54

the responses reduced to 10 dimensions.

Internal Reliability

The purpose of this section is to describe the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose is to determine the internal reliability of the CIQIVA measure.

The results of the three statistical analyses as presented in Table 4.49 were all greater than or equal to .70. The exceptions were risk-taking with a Cronbach alpha of .59, a Guttman split half score of .57, and a Spearman-Brown score of .57, and trust/openness with a split half score .60 and a Spearman-Brown score of .64. It can be concluded that the creative climate construct, in general, was being assessed when the trust and risk-taking dimensions.

Table 4.49

CIQIVA

Theoretic Dimension	Cronbach alpha	Guttman Split Half	Spearman Brown
Challenge/Involvement	.83	.79	.81
Freedom	.81	.81	.81
Trust/Openness	.61	.60	.64
Idea Time	.88	.86	.86
Playfulness/Humor	.87	.85	.85
Conflicts	.86	.85	.85
Idea Support	.90	.86	.89
Debates	.88	.86	.86
Risk-Taking	.59	.57	.57

This section described the results from the following statistical procedures: (a) Cronbach alpha (b) Guttman split half, and (c) Spearman-Brown. The purpose was to determine the internal reliability of the CIQIVA measure.

Review of Part I

The purpose of Part I was to present the results of the quantitative analysis of three climate questionnaire versions: the CCQIIA, CIQIIIA, and CIQIVA. The results of the quantitative analyses were divided into five sections of statistical procedures used in this study. The first section presented the means and standard deviations for the CIQ items and dimensions. The second section examined the results obtained from the frequencies of the CCQIIA dimensions. The third section presented and examined the correlational analysis of the 50 CCQIIA items and the CCQIIA's dimensions. The fourth section focused on the presentation and discussion of the results obtained from the factor analysis of the CCQIIA. The analyses consisted of a principle component and maximum likelihood rotation. The fifth focused on the presentation and discussion of the results obtained through the statistical procedures known as Cronbach alpha, Guttman split half, and Spearman-Brown. The same format was utilized to discuss the results of the CIQIIIA and CIQIVA.

PART II
DISCUSSION OF RESULTS

The purpose of this section is to compare the results from the three versions of a climate questionnaire. Specifically this section answers the central question of the study. The comparisons are made by examining the distribution of scores, inter-item and inter-dimensional correlations, factor analyses, and internal reliabilities of the three climate measures.

Measure of Central Tendency Comparison

The purpose of this section is to compare the measures of central tendency to determine an improvement of the CIQIVA. The mean, median, and

> The pace of change is increasing along with levels of competition. Organizations need to understand better the dynamics associated with helping people to deal effectively with change in order to increase productivity and enhance their competitive position in the marketplace. All this must be accomplished with an increasing level of complexity in how businesses operate.
>
> Knowledge is exploding and becoming more and more specialized. Correspondingly, we must be able to establish a constructive climate so knowledge can be used and shared productively. Climate information helps us increase our ability to meet goals, resolve challenges, or concerns, and reach toward new opportunities. (p. 117-118)

This study provided a better understanding of the reliability and factor structure of the current version of the CIQ. In retrospect, the past ten years of research and development have had a productive impact on the measures improvement. Nevertheless, work still remains to optimize the measure's reliability.

In summary, this study represented an extension of Lauer's (1994) work to improve the reliability of the creative climate measure. Although the present study found an overall improvement of the CIQIVA, with exception to the risk-taking and trust dimensions, it still warrants further work. Some areas for this work were suggested. Finally, the rationale of the importance of organizational climate to the survival and creative growth of organizations was provided.

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