AN EXAMINATION OF THE DIMENSIONALITIES AND COMMON CONSTRUCTS OF SELECTED ADULT COGNITIVE LEARNING STYLE INSTRUMENTS

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(ABSTRACT)

Though a widespread advocacy exists for the use of learning style instruments in adult education, accurate measurement and interpretation using existing instrumentation have proven problematic. Additionally, relatively little attempt has been made to empirically reconcile the different theoretical and conceptual frameworks underlying these instruments.

The purpose of this study was to examine the dimensionality, reliability, and construct validity of a cognitive learning style semantic differential instrument, the Cognitive Preference Pattern Indicator (CPPI), and at the same time to examine three instruments commonly used with adults for assessing cognitive learning style, the Myers-Briggs Type Indicator (MBTI), the Success Style Profile (SSP), and the Gregorc Style Delineator, with respect to factor structure and shared learning style constructs. Over 1900 protocols from 1411 adults were used in the analyses.

The examination of the CPPI produced clearly acceptable internal reliability coefficients on all scales and relatively strong evidence of construct validity in the internal and comparative factor analyses. Separate internal factor structures were examined for each instrument. Though not all of the other instruments' internal structures completely supported their respective theoretical bases, enough internal structures emerged for an analysis of common constructs. A combined factor analysis of the four instruments yielded a robust three factor solution which was consistent with an information processing model framework for clearly describing individual differences in regard to cognitive learning styles. The clear relationships of this model revealed strong empirical support to the theoretical bases of the CPPI and offered the adult education community a simple, valid, and profound conceptualization of cognitive learning styles.

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Jack and Hazel Butler, Carl Hardy, and Reagan Hardy, they let me know they were proud.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

Introduction

"It takes two to speak the truth....
One to speak, and another to hear."
Thoreau

Though the importance of learning styles has been well documented (Dunn,1982), learning style definitions, theories, and assessments are diverse and controversial (Bonham, 1988a). However, the learning style literature, regardless of the critiques, reviews, and recommendations, has several very definite themes:

1. Individuals are unique and learn differently,
2. Individual styles can be determined,
3. Facilitators have a responsibility to consider learning style during preparation and delivery of instruction,
4. Students' self-awareness of their own learning styles are helpful in optimizing their learning and selecting their best learning strategies,
5. Issues of alignment, the matching or mismatching of learning style with lesson format and delivery have significant implications in learning activities and learning (Gorham, 1986).

Many early learning style instruments were (and still are) plagued

with instrument construction, reliability, and other psychometric problems (Ferrell, 1983). Additionally, many instruments used to measure learning style require expensive certification workshops, training, materials, scorings, and an inordinate amount of time to administer, score, and provide feedback. For many educators, the costs alone make it prohibitive. For example, the Myers-Briggs Type Indicator (MBTI) qualification workshop in Fairfax, Virginia which trains and entitles the educator to administer and acquire scoring materials from Consolidated Psychological Press, is currently $895 per week. Scoring and material costs are as much as $6.00 per administration.

Moreover, cognitive learning style instruments, such as the Jungian MBTI, are based on complex psychological theories and interpretations. For the educator to try to link theory to practice, these instruments require lengthy introductory theoretical lessons. The administration of the instruments also require instructional time which tends to be cumbersome and impracticable in many adult learning situations. The instruments' theoretical complexity and lack of expertise on the part of the facilitators in the utilization of learning style instruments also are problematic. Due to these realistic and practical constraints, it is not surprising that many educators and trainers, though recognizing the benefit, do not administer them.

In spite of past controversies and practical impediments, there is some new hope for the educators and trainers. Competing theoretical bases (from which cognitive learning style instruments are derived), such

as Jungian typology, brain lateralization (location), cognitive style, and the modern cognitive psychology and emergent information processing model, are all similar in a broad cognitive conceptualization of learning style and could be empirically tested and compared. Each attempts to describe learning style as being manifested by preferences for acquiring and processing information (McCaulley, 1981, and Ashcraft, 1994).

Within these theories and the context of a teaching-learning activity, an effort to assess and utilize learning style represents an orientation emphasizing the importance placed on the adult learner and their individual differences in the ways they prefer to acquire and process information (Gorham, 1986). If a strong empirical relationship between Jungian, location, cognitive style, and other cognitive theories exists, then it is reasonable to expect that the common conceptualizations of acquiring and processing information, or an information processing model, could be useful in clearly distilling and explaining learning style to adult learners. This model is analogous to the functioning of computers and has the inherent advantages of simplicity and familiarity in regard to a cognitive model. An instrument primarily based on this distillation, Figure 1, could be widely utilized, understood, and accepted.

Statement of the Problem

Regardless of theoretical bases-- if the considerable value of learning style (and its instrumentation) is to be routinely used, valid, efficient and

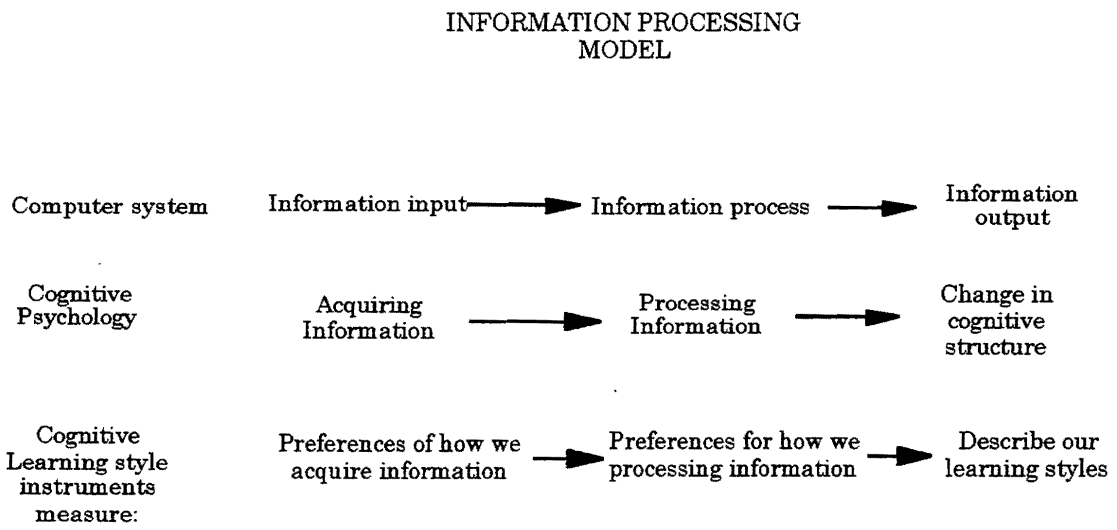

Figure 1. The Information Processing Model and Cognitive Learning Syles

economical instruments must be available to the majority of teachers, educators, and trainers. Additionally, more current and helpful research, through comparative studies as to what is actually being measured (construct validity) using the latest cognitive instruments and factor analytic methods, should be encouraged, supported, and publicized. To educators and trainers, factor analytic techniques to perform these comparative studies are more available in the last few years due to the tremendous advances in hardware and software innovations on micro-computers (Kline, 1993).

In addition to the statistical technological advances and advantages brought about with the proliferation of personal computers and their enhanced capabilities rivaling and making all but obsolete main frame computers, our general body of knowledge has recently converged from different disciplines. For example, the information processing model of modern cognitive psychology was derived and built upon on complementing research efforts on memory, cognition, computer technology, and neuroscience advances in regard to brain functioning (Ashcraft, 1994). This convergence has been enhanced by our recent information access capabilities which make accessible from many different disciplines separate research on how the mind learns, what happens to the brain, and what ways can we enable learners to learn (Ashcraft, 1994; Boucouvalas,1988; Kosslyn & Koinig, 1992; Gur, 1987; Hart, 1983; and Levy, 1983).

D'Amato (1992), Gregg (1989), Bonham (1987), and Curry (1983) have provided indepth reviews of existing learning style instruments. According to their critiques, most of the existing instruments available, such as the Herrmann Brain Dominance Instrument, the Dunn LSI, and the Kolb LSI, are at best marginally reliable and possess little psychometric rigor and soundness. Consistent with these strong affidavits for caution in their use and the resulting recommendations from Bonham (1987, 1988a) for additional learning style research, it was important from both a theoretical and practical basis to develop an alternative, useful and sound learning style instrument, the Cognitive Preference Pattern Indicator (CPPI). In this regard and since learning style instruments previously available to adult educators had proven to be problematic (Bonham, 1988a), it was prudent to examine all new instruments for psychometric soundness. A new instrument, based on understandable theory and capable of producing evidences of psychometric soundness, would immediately be useful in employing learning style into the adult class room. In order to test its construct validity, it was necessary to critically examine two recent and widely used cognitive learning style instruments, the Success Style Profile--SSP and the Gregorc Style Delineator and to compare them to each other, the MBTI, and the CPPI.

Except for the new instrument, none of the other instruments were purposely designed to measure the information processing model of modern cognitive theory, but all of them were selected for comparison

purposes for their similarity of cognitive constructs yet their diversity in regard to construction, interpretation, theory, and measurement method. Additionally, except for the MBTI, they had not been factor analyzed and as such their construct validity was suspect (Kline, 1993). To explore and understand what these cognitive based instruments seem to be measuring and attempt to overlay their separate interpretations into a comparative model, they needed to be compared through factor analytic procedures. I expected the similar descriptive constructs to show a relatedness. The results provided insight into these instruments, their validity, their empirical relationships, and what they seem to be measuring with adult learners.

Purpose of the Study

In many adult education and training settings, there is wide spread use of learning style instruments, but relatively little attempt has been made to empirically reconcile the different theoretical and conceptual frameworks underlying these instruments. The purpose of this study was to develop an alternative instrument, the Cognitive Preference Pattern Indicator (CPPI), using a semantic differential method to measure cognitive learning styles with adult populations and at the same time to examine three instruments commonly used with adults for assessing cognitive learning style, the Myers Briggs Type Indicator (MBTI), The Success Style Profile (SSP), and the Gregorc Style Delineator, with

respect to factor structure and shared learning style constructs.

Using previous factor analytic research on the Myers Briggs Type Indicator as a base line and performing initial factor analytic techniques on the remaining instruments, separate factor structures for each instrument were examined for evidence of construct validity. Then, the factor structure of the composite scores of the instruments were examined for the purpose of identifying shared common constructs.

This research has helped to provide to the adult education community a promising alternative learning style instrument, the CPPI, to fill the critical need of educators and trainers for a more efficient, economical, cost-effective, and more useful means to diagnose adults learning styles without the necessity for extensive curriculum time, complex interpretations, and expensive certification courses. Additionally, this research provided a factor analytical comparison and construct validation examination of two relatively untested instruments, the SSP and Gregorc Style Delineator. It compared all four instruments, including the Jungian based MBTI, to the constructs of a modern information processing model. Through a factor analysis exploring the common constructs of these instruments, it offered to the adult education community strong empirical evidence to better understand what is represented by these instruments and what is actually being measured.

Research Questions

1. In comparison to other cognitive learning style instruments, to

what extent would a modified semantic differential technique be successful in regard to reliability and construct validity in measuring its learning style constructs of the information processing model?

2. Are the internal factor structures in the CPPI, SSP, and Gregorc Style Delineator consistent with the intended theoretical dimensions and constructs? The MBTI factor structure has been previously demonstrated (Thompson & Borrello, 1986).

3. What are the shared common cognitive constructs among the adult learning style instruments in this study?

Assumptions

Consistent with the learning style literature, this study assumes:

1. Adults have different cognitive learning styles, based on life experiences and predispositions, which can be identified and measured with the use of adult cognitive assessment instruments.

2. The learning style cognitive components measured by cognitive learning style instruments are theoretically based on existing cognitive schemata or mental models (Ashcraft, 1994; Reed, 1992; Wiswell, 1990; and Prawat, 1982).

Limitations

The samples used in this study were from adult populations available to the researcher. The samples per instrument included: CPPI--731 adults, SSP--589 adults, Gregorc Style Delineator--467 adults,

and for the comparative analysis of the four instruments--201 adults. Age levels ranged from 17 to 72 with an average of 42. Educational levels were comprised of high school and above with the majority graduate level. Vocations were mainly professional white collar workers: managers, graduate students, administrators, educators, engineers, human resource developers, military officers, nurses, professors, program managers, writers, and college students.

Though the results of the study should only be generalized to similar populations of adults, it is hoped that the exploratory aspect of the study could be provocative and spur further research into the dimensional relationships of cognitive learning style.

The semantic differential instrument being investigated as a part of this study was intended as a learning style instrument for adults.

Definitions

For the purpose of this study, the following contextual definitions were used:

Learning Style. Though an examination of the literature regarding learning style revealed little agreement as to a general construct of learning style, Keefe (1987) posited a generally accepted and useful framework and categorization of learning style which summarizes the various definitions: "learning styles are cognitive, affective, and physiological traits that serve as relatively stable indictors of how

learners perceive, interact with, and respond to the learning environment." Learning style in regard to measurement is focused on *how* we learn as compared to learning ability which is concerned with *what* we learn. Additionally, style is bipolar and on a continuum in contrast to ability which is unipolar and measured with a single score or percentile. Abilities assume a standard, while styles are non-judgmental and not right or wrong (Reiff, 1992).

Cognitive learning style. Cognitive learning style is associated with mental functioning with a cognitive psychology theoretical basis. Other learning style theories tend to be based on Jungian theory, learning processes, learning formats, brain localization, and the environment/physiological factors (Ashcraft, 1994; Bonham, 1987; Springer, 1987; Briggs, 1984; Keefe, 1987; Keirsey & Bates, 1978; and McCarthy, 1980).

Semantic Differential. "A multivariate differentiation of concept meanings in terms of a limited number of semantic scales of known factor compositions." (Snider & Osgood, 1972, p. 43)

Semantic proposition. It is the most basic unit of meaning (and identifiable component of conscious thought) is the simple relationship between two concepts which judgements can be made and includes patterns of weights and connections (Ashcraft, 1994, pp. 259, 291, 304, and 327).

Concept of schemata. Schemata are cognitive frameworks or structures used to characterize propositions based on and built on past

experiences (Reed, 1992; Rumelhart,1980; and Kintsch, 1974, p. 134). Schemata provide the framework for interpreting perceptional information and guide our expectations in making inferences (Ashcraft, 1994; Reed, 1992; and Wiswell, 1990).

Schema. Schema are micro structures which are comprised of propositions and organized by meaning within the knowledge structures or schemata (Reed, 1992 and Kintsch,1974, p. 119).

Multitrait-multimethod. This is a method to compare and validate constructs across traits and across instruments. Not only should a variable correlate highly with which it is theoretically connected, but it should also not correlate with variable with which it should differ. Constructs are expected to enter into relationships with other variables in predictable ways. Validity is inferred from a predicted network of relationships. This validates both the measure and the theory behind the measure. (Anastasi, 1988 and Kerlinger, 1986)

Factorability. It is a term to describe an initial check to see if a matrix (representing a data set) is factorable (or useful to perform a factor analysis). To be factorable, the matrix should produce several correlations of variables larger than .30. Sampling adequacy is also a measure of factorability of the correlation matrix (Kaiser's measure), and should be .60 or higher (Tabachnick & Fidell, 1989).

Factor loading. It is a term used to describe, as a result of a factor analysis, the relationship or correlations between variables and factors and to define and interpret factors as a unifying concept. A factor loading

of .30 higher on a factor is considered interpretable. Moreover, "the greater the loading the more the variable is a pure measure of the factor" (p.640) and can be useful as a marker variable in the analysis to help define the factor. As a general rule of thumb, a factor structure can be judged by criteria such as Comrey (1973) suggested: .70 excellent, .63 very good, 55 good, 45 fair, and .32 poor. (Kline, 1993 and Tabachnick & Fidell, 1989, p.639).

Simple structure. In factor analysis regardless of rotation or extraction method, a simple structure is sought. Thurstone (1947) defined it as a factor solution having as high of correlations as possible between variables loading on individual factors, while not loading on other factors, e. g. several variables correlate highly with one factor and one factor correlates highly with each variable.

Need For the Study

This research fulfilled the following significant needs by answering three research questions linking theory to practice:

1. Due to practical barriers to more routine usage, such as certification and material costs, classroom and curriculum time, and validity issues, the need for an efficient, practical, and current cognitive learning style instrument prompted the development of a innovative semantically derived and based instrument which grew with and became the focus of this study. This study tested, helped to develop, and provided

a semantic differential, cognitive-based, and information processing learning style instrument which is relatively easy to use, accessible, and generally useful to educators and trainers. The instrument should aid in the efficient identification and organization of individual and collective learning orientations and styles.

2. Two widely used learning style instruments which had not been factor analyzed for construct validity purposes were analyzed and their results published in this study for the use of educators and trainers. According to Kline (1993), factor analysis is the strongest evidence for instruments of construct validity (for without it, we do not know what is being measured).

3. Finally, the identification and evidences of shared common learning style cognitive constructs should significantly serve adult educators and trainers of adults to aid them in their understanding and selection of a learning style instrument to fulfill their diagnostic needs and to provide evidence of continued constructive validity of their selection. A review of the learning style literature confirmed Bonham's (1988 a) caution against the lack of validity and psychometric soundness of most existing learning style instruments. Additionally, recent advances have challenged earlier interpretations and have caused some instruments to be amend in regard to their theoretical derivations to be consistent with the synthetical insights emerging from many diverse fields (Bonham, 1987: Springer, 1987; and Ho, 1988).

Organization Of The Study

This chapter provided an outline of the need for an efficient and economical learning style instrument framed on a current, yet understandable model. Furthermore, this chapter has outlined the background which supports a need for a study to investigate the common cognitive constructs believed to be shared by widely used learning style instruments in order to better understand what is being measured and their relative value to adult educators.

Chapter Two contains, within the context of cognitive learning style and assessment instruments, a review of the related literature addressing: adult learning and diagnostics; the background on learning style, learning style instruments; semantic differential as a method of measurement; the rationale for another instrument; and the need for examining common cognitive constructs of learning style instruments.

Chapter Three describes the method for this study including: instruments used, samples of adults, data collection/analysis procedures, and the factor analyses conventions followed.

Chapter Four presents the results and data analyses.

Chapter Five concludes with discussion, conclusions, recommendations, and posits theoretical implications to the adult educational field.

CHAPTER II

Literature Review

In support of this study and within the context of cognitive learning style and assessment instruments, this chapter contains a review of the related literature specifically addressing: adult learning and diagnostics; learning style, instrument development, and psychometrics; the need for examining common cognitive constructs of learning style instruments and the rationale for another instrument; and semantic differential as a method of measurement and theoretical basis.

Before discussing learning style, learning style instruments, and semantic differential measurement, the uniqueness of adult learning and the need for diagnostics will be reviewed as a proper frame for this study.

The Uniqueness of Adult Learning, the Importance of Diagnostics, and the Advocacy of Learning Style in Adult Education.

Learning style and adult education are closely linked. What distinguishes adult from adolescent learning? A commonly accepted part of the adult learning model is the emphasis on the learner as the locus of the entire learning transaction. The term andragogy has been described as "the art and science of helping adults learn," as opposed to a teacher-centered approach and format (Knowles,1990, p. 55). Beder and Darkenwald (1982) observed that adults are treated differently than non-

adults in the classroom, a difference which is appropriate since the adults' prior learning is comprised of more, different kinds, and diversely organized experiences (Kidd, 1973).

Adults in their adult roles have to develop their own way of doing things and possess not only a wealth of past experiences but also their own unique way of learning. There is abundant evidence in the literature concerning the uniqueness of the adult learner, the different ways adults learn, and the value of learning style to adult learning. (Brookfield, 1986; Knowles, 1990; Knox, 1986; McCarthy, 1980; Merriam & Caffarella, 1991; Smith, 1990; and Zemke & Zemke, 1981).

The quantity (and quality) of life experience is in adult education literature one of the major differences between adult and adolescent learning. Life experiences also differentiate and uniquely shape each adult learner from one another. Moreover, according to Merriam (1991), life experience plays many important parts in adult learning:

1. Experience should be a learning resource,
2. It should be used as a motivation to participate in the learning,
3. It makes the learning process different from children in that the adults' world view and cognitive structure are modified, reshaped, and absorb the new information rather than being formed and accumulated,
4. And finally, experience can inhibit new ways of learning due to previously set ways and attitudes.

In this context and consistent with andragogic theories, the adult's learning style based on prior ways of learning, experiences, and

predispositions can be viewed as a strong ingredient to the learning process. Adult educators know that adults are relatively self-directed, resource and life experience laden, cognitively mature, and relevancy-seeking in learning activities. Not only do adults come to the classroom or training activity with content knowledge and experience to base the new learning upon, but they also come to the learning activity with their own agenda, motivations, life-based needs, and their unique individual differences built over a life time of learning (Knowles, 1990). Moreover, "adults define themselves largely by their experience, they have a deep investment in its value" (Knowles, 1980, p. 50). For the facilitator to be effective with adult learners, emphasis must be placed early in the learning activity on the diagnosis and engagement of the learner's past experiences, interests, and learning styles (Kidd, 1973).

Thus, the quantity and quality of prior knowledge, experiences, and maturity tend to distinguish adult learners from adolescents in regard to learning activities. By recognizing, measuring, and utilizing adult learners' unique differences and potentials (within the context of the lesson), the facilitator values the adult as a contributing, involved member of the learning team. In this regard, a learning style assessment can be very useful and desirable in achieving optimum learning especially during early diagnostics and orientation activities.

The notions of locus of control, collaboration, or self-directedness over the learning process seem to be other identifiable differences in a

comparison of adult versus adolescence learning (Knowles, 1990). With adults, it rests with the individual learner, and with adolescents the learning environment. We could then posit that adult learning is more individually initiated and cognitively weighed against prior learning and experiences. Meaning rests with the life experience laden adult learner; while adolescence learning is necessarily catalyzed from another, thus external and environmental, and meaning is framed and guided by the teacher (Merriam, & Caffarella, 1991 p. 129). In this context, locus of control and learner-centered learning processes take on two completely different orientations which effect practice. These differences between adults and adolescents in regard to learning could support understandings and explanations of the differences in learning style theories and the corresponding divergence and appropriateness of cognitive verses environmental approaches with adult learners.

With children and adults, through memory research and cognitive science and psychology, we now know that learning permanently changes the brain. In cognitive psychological terminology, these physical changes become unique cognitive structures or schemata. These structures are the bridges we use to acquire and make sense of information, recall prior knowledge, process and integrate new information and connect it to our existing memories and knowledge (Ashcraft, 1994; Klatzky,1984; and Kintsch, 1974). Thematic strategies for helping children learn are concerned with the building of these structures, while adult learning is more concerned with assimilating, accommodating, rejecting, integrating,

transforming, and utilizing information in relation to their prior learning and existing world view (Kovalik, 1993; Reed, 1992; and Arlin, 1984).

To optimize the adult learners' interests, experience, and capability to learn, educators and facilitators need to diagnosis these resources early in the learning activity in order to engage, involve and value the adult learner. One of the ways to include this important aspect of adult learning into the classroom is to use a diagnostic tool or a learning style assessment instrument (Knowles, 1990 and Price,1983).

In order for the learning to be relevant, how the adults learn is as important as what the adults learn. In regard to diagnostics, it becomes as important to consider not only what we know but how we know, and how we organize or structure information stored into memory which comprises our cognitive networks and their representation of knowledge (Ashcraft, 1994). As we learn new things, we must relate, connect, and thus make sense of the new information in relation to our cognitive schemata or world view and existing mental model. These mental processes manifest themselves into unique cognitive structures comprised and organized into personal mental models (Wiswell, 1990; Prawat, 1982: and Kintsch, 1974). Based on these cognitive structures and perspectives, the individual learner's unique style of learning should be considered in any learning transaction or activity (Knowles, 1990).

Educators and trainers while working with adults over the years have used many different instruments to gain an understanding of their students' learning styles with the intent of responding to their needs and

adapting the delivery of the subject matter to provide a more compatible format for learning.

For example, Knowles (1990) is an avid supporter of learning style and learning style instruments. He advocates in his writings the proper appreciation and use of learning style as a learning enabling tool. Since the brain is involved in all aspects of the learning process and each learner is now thought of as unique with unique learning styles, formats and designs must include the uniqueness of learning styles to ensure understanding and learning are optimized by all learners. He contends that each of us possesses our own unique learning style and that this style affects how we learn and what we learn. He further states that the use of learning style instruments is highly beneficial to the learner and to the entire learning group. Lesson delivery should respond to individual differences to accommodate each learner's uniqueness. Additionally, using learning style instruments can enhance small learning groups effectiveness.

Mezirow (1991) also recognized individual differences, cognitive processes, and learning styles as important in his discussion of transformative learning theory. He viewed perceiving, thinking, feeling and acting as cognitive activities which are habitually or thoughtfully engaged in and can be significantly influenced by distortions of our unique presuppositions which have resulted from prior learning. Our continued learning is dependent of our reflective perspective of what and

how we learn and if our basic assumptions are confirmed (or premise reflection).

In regard to learning theories, his contentions seem to be cognitively based and consistent. He acknowledged and elaborated on how meaning perspectives are transformed. Learning, he contended, is the changing of contexts rather than only the acquisition of data. We create our own world in that we look at our reality through our own presuppositions (cognitive schemata) and expectations which form the contexts within which we learn. We are open to some interpretations but block others out that make us uncomfortable. Since our senses can determine only differences (patterns, forms, and order), our own perceptions are partial, and we have biases and parochialisms manifested as styles which separate us from others and reality.

Brookfield (1986) viewed one of the major roles of the facilitator as being to help learners become aware of preferred learning styles and to develop meta learning skills of awareness and self-reflection. Every learning activity consists of personalities (facilitator and learners) which influence the direction and effectiveness of its success. Utilizing adult cognitive learning styles plays an important role in this process. It reassures paradigms of thinking, generates alternative ways of thinking, and lets us explore other ways of thinking. Consistent with the previous discussion in this study in regard to the notion of locus of control or passive and active learning, he contended that a didactic approach was inappropriate to allow for critical reflection, self-insight, and for

interpretation of meaning in regard to our previous learning and experiences.

Though they allow that in much of the literature, there are no common definitions to what a learning style is or is not, Merriam and Caffarella (1991) are also strong advocates of individual differences, diagnostics, and learning style and their relevance and utility in adult education. In their discussion of learning styles, they emphasized the need to understand differences in learning styles or how adults learn differently.

As evidenced in much of literature, many educators would agree that a learner centered process would include mechanisms for applying the individual's experiences, interests, and preferred learning styles to enhance the learning activity (Merriam & Caffarella, 1991). The work of Dunn and Dunn (1978), though working mainly with individual differences in adolescent populations, categorized learning styles into environmental areas and focused on external factors which could be manipulated to affect children's ability to learn (time of day, noise levels, activities, and learning formats. They, in their research, continually contended that regardless of which learning style attribute identified and allowed for, achievement scores increased--to include college students (Dunn, 1990).

Though many adult educators have philosophically supported the relevance and importance of learning styles in regard to facilitating adult learning activities (Merriam & Caffarella, 1991), the practical limitations

and constraints with regard administration, schedule, and costs limit a more widespread use and application. Additional issues confronting an adult educator and trainer, concerning test construction, validity, currency, and certification requirements, further inhibit the utilization of learning style instruments in many routine and practical educational/training settings and other learning opportunities (Bonham, 1988a). In spite of obstacles to a more widespread routine use, many adult educators continue to advocate and support learning style assessments with the adult learner.

Though there tends to be some agreement in the value of learning style, there are also disagreements as to what learning is, what learning styles are, and which theory is correct (Bonham, 1988a; Ferrell,1983; Reiff, 1992; and Reynolds,1988). Most accept Keefe's (1979) general categorizations of learning styles as being cognitive, affective, and physiological/physical. These have proved useful in studying learning style and learning style instruments (Ferrell, 1983, p. 33). What learning style is subscribed to depends upon what theoretical constructive model one accepts (and previous pedagogical experiences).

Cognitive Information Processing and Other Theories

The uniqueness of the adult learner and the different ways adults learn has a cognitive basis. In cognitive psychology, models of cognition, memory and learning have evolved into an information processing model.

This model, broadly defined, includes how humans encode and process information or how they acquire and integrate information (Ashcraft, 1994). Additionally, through memory research and cognitive science and psychology (Bigge & Shermis, 1992 and Ashcraft, 1994), many researchers contend that learning permanently changes the brain and creates unique cognitive structures or schemata. These structures are the bridges we use to acquire and make sense of information, recall prior knowledge, process and integrate new information and connect it to our existing memories and knowledge. This change in cognitive structure changes insight, since perception is based on prior learning (Bigge & Shermis, 1992). As adults, not only what we know but how we know is hard-wired into our cognitive networks.

Since learning can be defined as the acquiring and processing or integrating of information, learning style, from this perspective, is how people consistently prefer to acquire and integrate new information into their cognitive structure (McCarthy, 1980; and Smith, 1979). This conceptualization is not new; Jungian theory of psychological types defines and frames basic human differences in the way individuals prefer to use their perception (acquire information) and judgement (process or decide about information). Perception is all ways which a person becomes aware of people, things, events, ideas, and information. Judgement is ways of deciding or reaching conclusions about the information people perceive (Briggs, 1984; Bennet,1983; Keirsey and Bates,1978; and Jung, 1923).

These systematic cognitive differences affect everything a person does and are consistently manifested as patterns or styles of behaviors, motivations, interests, and skills (Myers & McCaulley, 1987 and Briggs, 1984). A modern information processing perspective of these constructs, representing perception and processing of information, can be overlaid upon Jungian typology (which provides an explanation regarding the individual stylistic differences within these broad categories). The information processing model represents a clear and understandable distillation of cognitive processes involved in learning styles. This representative of Jungian and information processing models is depicted in Figure 2. The information processing model explains what function is engaged and Jungian typology (as an illustration) tries to explain how we differently operationalize these cognitive processes (Reed, 1992; Myers & McCaulley, 1987; and Briggs, 1984). Cognitive style, using a Jungian perspective then, is how we prefer to make sense and interact with the world.

In summary of this section on adult learning and diagnostics, educators and facilitators need to diagnosis these attributes early in the learning activity in order to engage, involve, and from the individual learner's perspective, value the adult learner. In order for the learning to be meaningful, how the adults learn, or the adults' cognitive learning style, is as important as what adults learn. Prior knowledge, experiences, and maturity manifested in cognitive structure and styles tend to set adult learners a part from adolescents in regard to learning activities.

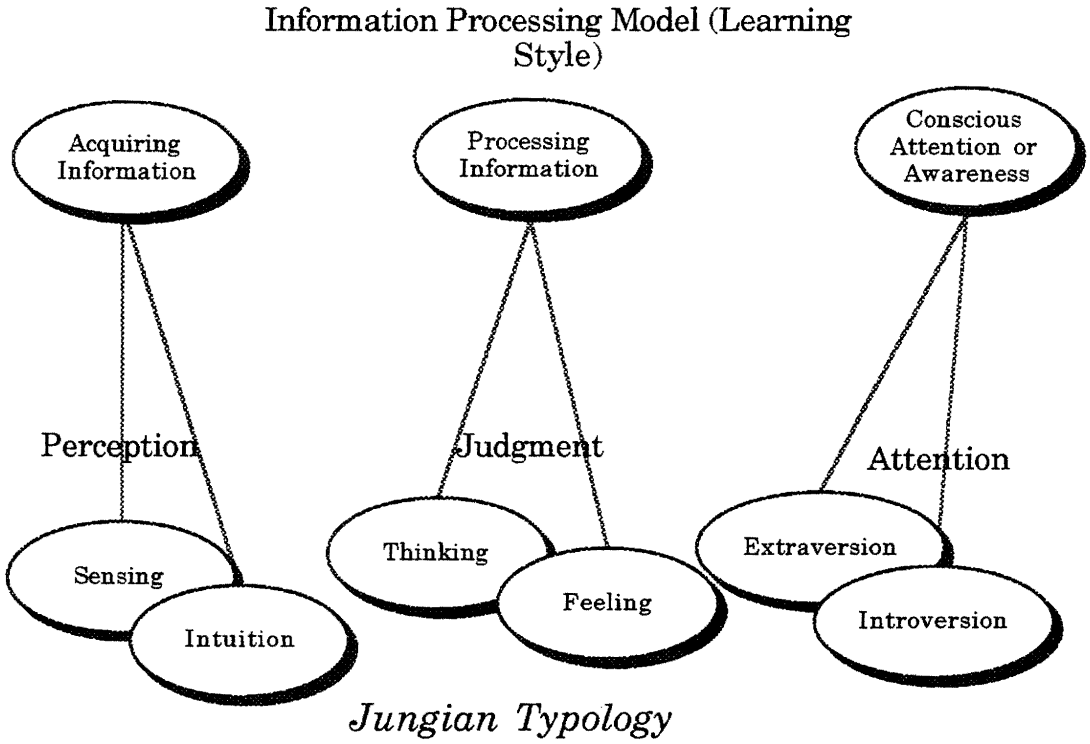

Figure 2. The Theoretical Relationship of Jungian Typology to the Information Processing Model

Especially with adults, their own unique style of learning should be considered in any learning transaction with a facilitator. One of the ways to include this important aspect of adult learning into the class room is to use a diagnostic tool or a learning style assessment instrument, linking theory to practice.

What is Learning Style?

Although Bigge and Shermis (1992) define learning style as the way we individually do these things, and in Keefe's view (1987), learning style offers the most useful answer to the question of individual differences and teaching strategies, there has not been a consensus or unifying concept produced by theorists and researchers to define learning style and which theories are relevant and valid (Curry, 1983). Moreover, the components of style, as advocated by different theorists who support only their own theories, seem unrelated (Bonham, 1988b).

What is learning? A behaviorist would define learning as an adaptive way of coping with change in our world, or the relationship between a person and the environment, or the change or potential for change in behavior due to experience (Chance, 1994). From a psychoanalytic view, learning is a change in thinking, feeling, and behaving, and psychotherapy is defined as methods of learning (Corsini and Wedding, 1989). Some say that learning is a change in one's cognitive belief structure--which I also found as a recurring notion in the adult education

literature (Mezirow, 1990; Wiswell, 1990; and Brookfield, 1986). For example:

"Learning new concepts of information requires us to accept that concept or information as being plausible. Plausibility is determined through our belief structure derived from acquired experiences. Therefore human learning is a personality construct." (Hashway & Duke, 1992. p. Preface) Also, learning has been defined as being comprised of both the process and the content as a duality, the how and the what as a unity (Ramsden, 1988). Finally and from all of these perspectives within a cognitive framework, learning can be construed as a discovery of meaning or the acquisition of new information and the transformation of knowledge (McCarthy, 1980).

Style is a different issue. Though some would simply say that style is manifested by consistent behavior, Gregorc (1982) views style from a cognitive and affective level:

"When viewed from a phenomenological perspective, stylistic characteristics reveal themselves to be surface indictors of two deep levels of the human mind: whole systems of thought, and peculiar qualities of the mind which an individual uses to establish links with reality. This perspective means that personal characteristics such as a concern for detail, the sincere valuing of grades, and the facile use of logic to determine truth are not merely happenstance... these characteristics are integrally tied to deep psychological constructs." (p. 51).

The way or how we tend to think, do, act, and behave is stylistic or our

style, and the way or how we tend, or prefer, to learn has been construed as what is accepted as learning style (Reiff ,1992; Rule & Grippin,1988; and Reynolds, 1988).

When attending to learning style, it should not be confused with ability. Learning style can be construed as more contextual both from the learner's prior experience, learning, and the learning activity itself; whereas ability is more concerned with the what or content. In regard to measurement and assessment, style is usually measured bipolar or on a continuum and ability uni-polar or as a percentage (Reiff, 1992, p. 8), and style relates to how we learn and ability relates to what we learn or "the difference between the way and the thing, the process and the product, between seeing and what is seen" (Smith, 1979, p 3).

Some writers have tried to identify every possible element of style which might effect the learning activity. Others have tried to categorize the elements into groups of three, four, and six (Reynolds, 1988). Keefe (1987) suggested some thirty-two elements and grouped them into three broad categories which were cognitive, affective, and physiological. Dunn and Dunn (1978) identified that learners were affected by their environment (sound, light, temperature, and design), emotions (motivation, persistence, responsibility, structure), social needs (peers, self, pair team, adult, mixed), and physical elements (perceptual, intake of food, time, and mobility). Reiff (1992) concluded that most researchers find it useful to accept Keefe's conception of the three learning style

categories: cognitive, affective, and physiological/physical.

From an individual learner's perspective, we could further reduce and group the three categories into two : external and internal prerogatives. Environmental factors that effect the individual learner as the quality of water to a fish are external prerogatives. Internal are the mental functions, attitudes, and dispositions. Both effect the learner's ability and propensity to learn, and both are evidenced in individual differences--the external in relation to and the internal in proaction to the learning situation.

The value of learning style to learning is prevalent in the literature and the majority of experimental research in regard to achievement and learning styles consistently has supported the advantage of learning and teaching style awareness and matching (Curry, 1983).

Cognitive learning style, in lieu of physical and environmental stylistic learning preferences (Dunn and Dunn, 1978), was the framework for examining four instruments in this study. Cognitive learning style is construed as the unique differences in the general way people tend to look at and think about things to make sense of and interact in their world (Smith, 1979). Measuring "cognitive" learning style can be very useful in adult education due to the adult learner's mature world view, experience base, and highly developed cognitive structure. Learning style applications can also be appropriate in adult learning formats, as previously discussed, as collaborative devices to help the facilitator respond to the felt needs of the learners and incorporate them into the

prescribed needs of the program. Learning style strategies can include alignment, awareness, learning team formation, and transformative frames of reference.

Even though many adult educators have advocated the value, use and diagnostics of learning style, Bonham (1988) has strongly cautioned that care must be exercised in regard to reliability and validity of many of the existing learning style instruments. Since this study was about the psychometric comparison of adult cognitive learning style instruments and the development of an instrument, a brief background concerning adult assessment, theory, and instrument construction principles was appropriate and relevant (these principles would also apply to other measurement instruments).

Instrument Development and Psychometrics

"If it exists, it can be measured." *Edward Thorndike*

The relationship and perspective between social need and measurement instrument is important to keep in mind when discussing or studying testing and assessment in general. From a developmental perspective, instruments are usually designed to meet a societal need, such as education, and should according to Bonham (1987) start with and be based upon theory. The theoretical bases and psychometric validation are the parts of the developmental process with which in the literature most the criticism and critique exists.

This instrument developmental process, Figure 3, can be described in

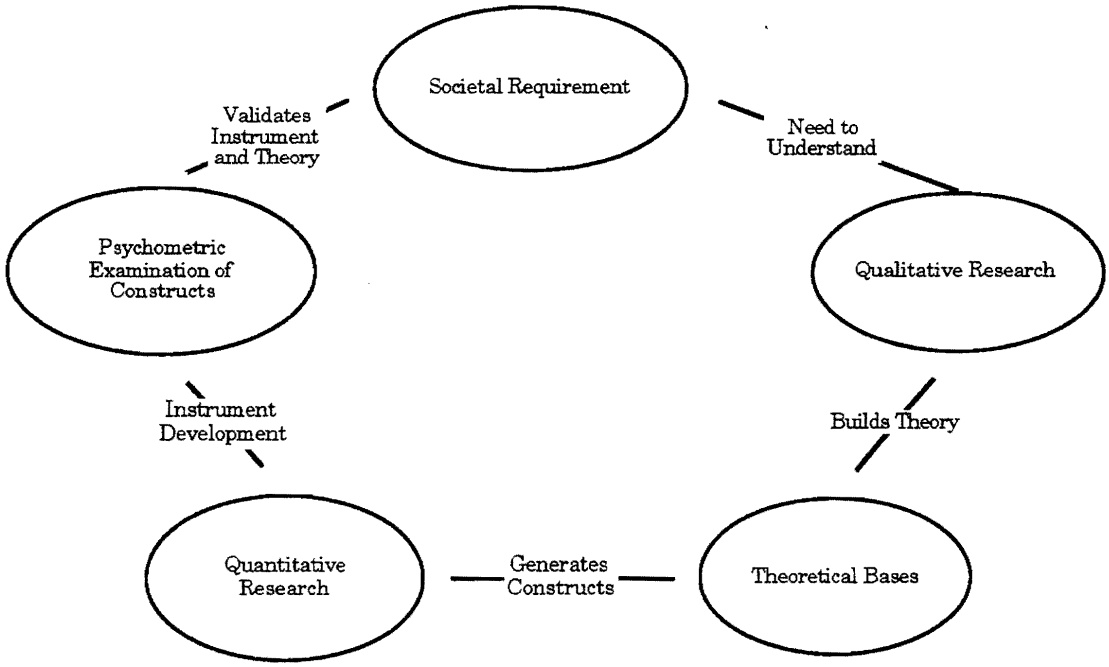

Figure 3. Instrument Developmental Process or Cycle

the context of a developmental research cycle:

1. A societal requirement drives a need to better understand some phenomenon.

2. This in turn leads to qualitative research which helps build theory.

3. A theoretical bases is then established which posited constructs which lead to quantitative research.

4. A method to measure the theoretical constructs is needed which catalyses instrument development efforts.

5. Psychometric examination of the constructs via the instrument validates both the instrument and the theoretical bases fulfilling the societal need.

6. This entire process can generate additional questions which could add to and begin a new developmental process (Anastasi, 1988; Kerlinger, 1986; Popham, 1981; and Oppenheim, 1966).

Today, capitalizing on individual differences in response to social need is increasingly important in an educational system striving for improvement and accountability. This has not always been the case. Though driven by social need, the first instrument developers (psychologists) were not concerned with individual differences but with normality or ways to test for similarities in a controlled experimental environment. In fact, if individual differences to tests were encountered, these were treated as mistakes and discarded from the experiment. This attitude was common to all who were trained and studied in the early

laboratories such as the ones founded by Wundt in 1879 (Lewis, 1983).

As psychological theory, thought, and practice developed as a science so did testing which became the primary means to describe and define the field (Cofer, 1975). In spite of controversy at its inception and continuing even now (but for different reasons), the field of psychology seems to have been in the forefront and has always influenced the testing or assessment movement.

Early prominent psychologists, such as Carl Jung and his colleagues, did not place much value in testing or in trying to define mental functioning or the 'psyche' since they contended that the mind mediates all experience and that there is not a perspective we can achieve which would be separate and objective from the mind in trying to define or measure it. Though Jung himself thought testing a childish parlour game, it is ironic that his theories of psychological type have become one of the most utilized in regard to normal populations of adults with educational applications. However, later Jung defended his own methods in describing the psyche as scientific, observable, and could be dealt with observation, classification, and predictions (Shelburne, 1988).

Since the turn of the century, testing has grown at a tremendous rate and applications have expanded into our work, play, and lives in general. Today, most people are familiar with assessment instruments. In school, in college, in the armed forces, at work, in industry, in a counseling center, or in a personnel office, most of us have taken some type of assessment test or instrument. With this growth has come

enlightenment, high expectations, technological advances, the sharing of information, and the convergence of disciplines. Additionally, ethical and social concerns such as, democratic infringements, exploitation of individual rights, breach of privacy, mental manipulation, and social selection issues balance the literature (Anastasi, 1988).

With the art of instrumentation came the science of psychometrics which is used as a standard of validity and reliability not only by the instrument developers but also by the subsequent scholars, academicians, and instrument reviewers. Psychometrics and technology truly gave us a view into the heretofore hidden human psyche. By making the individual's subjectivity knowable, calculable, and manipulable, we can now evaluate individuals by not only what they do but also by what and how they think (Rose, 1990).

Though in widespread use throughout our society and driven from the start by the needs of society (Anastasi, 1988), some contend that mental testing has been some danger to the individual free will and prerogative. Though testing is claimed to be the most important contribution of psychology to this century, mental testing can viewed as opening the door to the potential management and manipulation of the mind (Rose, 1990). This large social question is not the focus of this study, but issues of social selection and control are worth mentioning and are present in some of the literature on mental assessments.

All mental measurement instruments are comprised of some basic

assumptions (Eysenck & Eysenck, 1985). Learning style instruments (cognitive and affective) are no exception. The following are a good summary of these:

1. Human psychology is governed by a meta-theory of preference for pleasure and an avoidance of pain or their representations in our view of reality (Arlow, 1989).

2. Individuals are uniquely different and similar with regard to their personalities and dispositions.

3. A person is an integrated and organized whole (the entire individual is effected, is motivated, not just part of him.

4. Heredity plays an important determinant in personal traits.

5. These traits can be measured.

6. To the extent that they are incorporated into a theoretical framework, they can be useful in explaining individual differences and similarities (Eysenck & Eysenck, 1985).

Some commonality of measurement of the psychometric standards have evolved with the instruments, their use, and social science advances. There is still considerable controversy in this regard as well as how to best validate instruments. Modern technology and multivariate analysis has tremendously assisted in the measurement methodology and accessibility to researchers and scholars and other "authorities" for the purpose of designing, developing, conceptualizing, constructing, testing, measuring, and replicating, and critiquing mental measurement tests and other psycho-social construct based instruments (Kline, 1993).

The Need For the Comparison of Cognitive Learning Style Instruments and an Alternative Instrument

What was troubling in regard to psychometrics in regard to adult learning style instruments, consistent with Bonham's (1988) cautioning, is the surprising widespread lack of most published instruments in adherence to even basic technical construction procedures and their failure to address, account for, and even show some concern for the reliability and validity of the instrument and its theoretical basis and its relationship to reality. For example, Curry (1983) reported of the 21 instruments she investigated, only 10 met very minimal reliability measures (test-retest and internal reliability measures). Except for the MBTI, none were reported to have withstood factor analytic studies (Ferrell, 1983) and most have never been analyzed in this manner which Kline (1993) states is one of the more powerful evidences of construct validity. Bonham (1987) in her in depth dissertation review of learning style instruments strongly confirmed the general criticism of most of the instruments' psychometric weaknesses. This criticism coupled with the practical obstacles and constraints previously mentioned strongly support the need for more empirical research and the availability of an alternative instrument.

According to Bonham (1988) and Curry (1983), most of the existing learning style instruments do not stand up well to psychometric questions and standards. Their critiques support the need for a new

reliable and valid instrument and influenced the selection of representative instruments in this study to explore their relationships. The instruments selected either have not been adequately reviewed due to their recentness or, as with the MBTI, do possess some measure of factor stability. These instruments, the MBTI, the SSP, and the Gregorc Style Delineator, including the semantic differential instrument being tested in this study, the Cognitive Preference Pattern Indicator (CPPI), are reviewed in detail in Chapter Three with relevant descriptions and summaries of each instrument.

Finally, since this study included an investigation of a semantic differential approach to measuring cognitive learning style, the CPPI, some background on semantic differential and an argument for its appropriateness are included in this chapter.

Semantic Differential as a Method of Measurement of Cognitive Learning Style

As used with the CPPI, the development of a semantic differential instrument involves the use of factor analysis to determine the number and nature of factors entering into semantic description and judgment, and it helps determine the selection of a set of specific scales representing to a theoretical bases which can be operationalized as a measure of the meaning of the constructs.

Using the semantic differential, the meaning of a particular concept

to a particular individual can be specified quantitatively as a particular point in the multidimensional space defined by the instrument. By describing a preference for a stated trait/attribute, the respondent is asked to chose and value, thus describe what is meaningful. Originally, the technique was limited to connotative meaning because the early method and application of selection of the descriptive scales was in terms of usage and not in terms of a logical descriptive coverage (Osgood & Suci, 1972).

First devised by Charles Osgood in 1952, it became a sixteen year research effort to provide a method to measure meaning (Brown, 1972). Using factor analytic techniques, Osgood's purpose was to develop a "scaling instrument which gives representation to the major dimensions along which meaningful reactions or judgments vary" (Osgood & Suci, 1972). Over the years, semantic differential became a preferred measurement technique for attitudes and attitudinal change. The original research and method produced three general constructs in regard to the meaning of words: evaluative, potency, and activity with evaluative producing the most variance (Osgood, Suci, & Tannenbaum, 1972). Although Osgood envisioned the technique being used for other purposes to include personality assessments, it had not been envisioned as a cognitive assessment instrument.

Though semantic differential continues to be widely used to measure attitudes, perspectives, and affective feelings, it has not been used as a cognitive learning style instrument (Bonham, 1987). Within a cognitive

functioning or information processing frame work, the CPPI is the first attempt to utilize this relatively powerful method to indirectly measure learning style constructs. Using the semantic differential method, the CPPI is designed to reflect and measure the meaning perspectives in regard to descriptive choices along a continuum of psychological constructs of an information processing model (Reed, 1992 and McCarthy, 1980) and emulating the dialectic tension theorized by Carl Jung (1923).

Semantic differential can be construed as a measurement of the semantic meaning and value one places upon a word, situation, event, activity, or perception of reality (Osgood, Suci, & Tannenbaum, 1972). As such, it is one's representation of reality as distorted by existing and prior semantic structures also called schemata, prior experiences, memories, and prior learning (Ashcraft, 1994, p. 314). Each semantic memory, representing personal knowledge, is subjective and unique and is the representation of meaning in the mind (Osgood & Suci, 1972; Kintsch, 1974; and Prawat, 1982)). "Proposition-based theories are almost universally accepted within cognitive psychology as the best way of representing complex meanings" (Ashcraft, 1994, p. 335).

Semantic descriptions are defined in reference to other words and concepts or relationships, and an assumption for the semantic differential is that these word concepts can be defined by the sum of the relationships among these descriptors. In cognitive psychology, semantic distance (of which the semantic differential could be representative) is a descriptive concept (Osgood & Suci, 1972; Kintsch, 1974).

Additionally, semantic differential is the measurement of one's choice of bipolar adjective opposites and its value placed on a continuum (or scale) between the pair is an indicant or representation of the basic meaning propositions which comprise memory and learning (Osgood & Suci, 1972; Ashcraft, 1994, p. 327). Both the choice and the intensity or value selection are important. Adjective descriptors are best choices for the word pair elements in a semantic differential instrument which are inherently within themselves expressive of meaning. Making a value selection between them establishes one's own unique perspective and preference.

The appropriateness of using bipolar opposites to measure perception of information can be illustrated by the following cognitive explanation derived from cognitive, associative, and memory theory (Ashcraft, 1994). As the mind seeks patterns and attempts to construct familiar associations based on previous experience and learning (which are comprised of memories and inferences or representations stored in permanent memory) and in perceiving the initial pattern of an ambiguous object, one relates to familiar patterns in memory and infers or expects to identify a relative and coherent object which has meaning to the observer. As one connects to existing semantic structures and identifies an object from top down or global pattern clues, one can not construct the opposite perspective, bottom-up or detailed pattern clues, at the same time (Reed, 1992; Prawat, 1982). Disassociation of attention must take place and a

new orientation of perspective and pattern must be sought and then the opposite can be attended to and perceived (which is one explanation of illusions and their cause).

Although we could prefer to perceive things both ways, in a given situation choices must be made due to myopic attention effects of semantic pattern representation processes as illustrated above (Reed, 1992). This example of perceptional orientations and attention when seen in this light offers some argument for the notion of the bipolarity of a semantic measurement of one's representation and construction of reality, or how we tend to perceive things in our own unique ways.

Consistent with current thinking which espouses a more eclectic approach to psycho-educational theory in lieu of one of dominance (Corsini and Wedding,1989), the theoretical bases of the CPPI were derived from studying Ashcraft (1994), Reed (1992), Bruner, (1990), Cofer (1975), Kintsch (1974),Quillian (1967), and Osgood and Smith (1972), and Jung (1923). The cognitive stylistic constructs are overlayed upon a modern information processing model of learning style, which McCarthy (1980) summarized, people learn differently and in two important ways: how we perceive and how we process. The CPPI attempts to measure these ways or how we prefer to learn. In addition to the constructs of how information is acquired (concrete or abstract) and processed (objective or subjective), the CPPI also includes differences in attention or conscious attending (internal or external focus) in its stylistic distillation of a cognitive human information processing model. This model is designed to

represent mental constructs analogous to computer functioning for ease of understanding and use by the educator and which are less reliant upon complex abstractions, such as psychological type theory and interpretations, requiring indepth preparation by the facilitator and lengthy explanations during the learning activity.

Underlying and used to operationalize this model, making self-assessment or mental measurement possible, is *preference* meta-theory which is basic to the CPPI as well as other instruments. "A fundamental principle of psychoanalytic theory is that human psychology is governed by a tendency to seek pleasure and to avoid pain" (Arlow, 1989, p.19). Methods of mental assessment are possible due to this underlying meta-theory of preference. Learning style instrument developers tend to utilize this principle in constructing their instruments by relying on preference related designs asking for responses to questions, choices, and judgments (the CPPI is no exception). It goes without saying that pleasure (comfort, familiarity, reward, etc.) is preferred to pain or discomfort (and representations of or anticipations of either).

Since we tend to have preferences for where we process, how we process, and how we decide new information based on our existing mental structures (and are as a result of our past experiences in residence in our permanent memory), these preferences when measured by a semantic differential technique can describe and provide some measure of the dimensions of cognitive mental functioning. They become powerful yet discrete indicators of our own unique preferred style of thinking and

perception. These differences as measured become stylistic.

A person does not use the same information as another or in the same way. "different people see different worlds--the difference is as much a matter of how we see as what is seen" (Smith, 1979, p 3). Since we learn from acquiring and processing new information based on how we make sense of the world from our previous learning, our learning style is basically our choice or preference on how we prefer to organize, format, and integrate new information into our schemata (McCarthy, 1980). Our learning style manifests itself with our preference and our preference becomes our style.

From a cognitive view point, our style, in resident in our unconscious permanent memory, is transparent to ourselves and is difficult to become aware of without some mechanism or external frame of reference. This could be communicative feedback from others or a measurement instrument's results (if reliable and valid) which can be representative of consistent preferences for activities and their associated mental functions.

In transformative learning learning theory (Mezirow, 1991), we are asked to critically self-reflect in order become aware of our perceptional distortions of reality. From a cognitive perspective, this critical reflection of our basic presuppositions is only possible by some artifact which could be a method or device depicting alternative perspectives and perceptions of reality.

A cognitive learning style instrument (such as the CPPI) could be very useful in providing indicants of our consistent preferences for activities and their associated mental functions and clues of these alternative perspectives.

Chapter Summary

This chapter has reviewed the existing literature and has discussed learning and adult education, learning style, cognitive learning style instruments, and semantic differential.

The need for understanding what is being measured by cognitive learning style instruments and for an efficient and credible adult learning style instrument was supported in the literature as recently represented in Bonham's (1987) review and recommendations for further research. The purpose of this study was to respond to these needs and examine three commonly used adult cognitive learning style instruments, the Myers-Briggs Type Indicator, The Success Style Profile, and the Gregorc Style Delineator, with respect to factor structure and shared learning style constructs and to develop an alternative semantic differential method to measure a distilled information processing learning style model with adult populations.

In the next chapters, four cognitive learning style instruments were examined by factor analytical methods and compared. This included the Cognitive Preference Pattern Indicator's internal structure analyses and the comparison of it to the others in a test of construct validity. Chapter

Three included the method of the study. Chapter Four examined the results and analyses. Chapter Five concluded with discussion, recommendations, and implications to the field of adult education.

CHAPTER III

Method

This chapter contains information concerning the instruments used in the study, descriptions of the subjects or samples, and the procedures and conventions followed in the analyses addressing the research questions.

The purpose of this study was to provide evidences of reliability and construct validity for an alternative method using semantic differential, Cognitive Preference Pattern Indicator (CPPI), to measure cognitive learning styles with adult populations and at the same time to examine three instruments commonly used with adults for assessing cognitive learning style, the Success Style Profile (SSP), the Gregorc Style Delineator, and the Myers-Briggs Type Indicator (MBTI), with respect to factor structure and shared learning style constructs.

Using previous factor analytic research on the Myers-Briggs Type Indicator as a base line and performing initial factor analytic techniques on the remaining instruments, separate factor structures for each instrument were examined for evidence of construct validity. Then, the factor structure of the composite scores of the instruments were examined for the purpose of identifying shared common constructs.

Instruments

The Cognitive Preference Pattern Indicator (CPPI)

Theoretical bases. Within a cognitive functioning or information processing frame work, the CPPI is the first attempt to utilize a semantic differential, which is a relatively powerful method, to indirectly measure learning style constructs. Using the semantic differential method, the CPPI is designed to reflect and measure the meaning perspectives in regard to descriptive choices along a continuum of psychological constructs of an information processing model (Reed, 1992 and McCarthy, 1980) and emulating the dialectic tension theorized by Carl Jung (1923). The instrument, by method of semantic differential, measures and represents the following three cognitive constructs as a learning style distillation of the human information processing model (Ashcraft, 1994; Reed, 1992; and McCarthy, 1980):

1. Conscious awareness--on a continuum of inner and outer focus of attention,

2. Acquiring information--on a continuum of concrete and abstract perceptions, and

3. Processing and integrating of information into the existing cognitive schemata--on a continuum of objective and subjective processes.

Instrument description. The CPPI is an adult assessment instrument using a modified semantic differential approach to measuring one's preferences as they describe the cognitive information processing mental

functions mentioned above. The instrument is designed to be a paper/ pencil, self-administered and self-scoring cognitive learning style instrument designed especially for adult populations. The instrument is comprised of three separate scales which measure bipolar preferences and intensities on three cognitive information processing dimensions: Attention or conscious awareness (Inner or Outer), perceiving or acquiring information (Concrete or Abstract), and Deciding or processing information (Objective or Subjective) and which total 30 sets of descriptive word pair choices on a modified six point semantic differential design.

In measuring cognitive learning style, the mental functioning composites of Concrete-Objective, Concrete-Subjective, Abstract-Objective, and Abstract-Subjective are represented by the individual's aggregate scores on the instrument. These represent possible combinations portrayed by the instrument of individual preferences for acquiring information and processing information. These scores were used in comparison with the other three instruments learning style components in this study.

The CPPI was designed in a pamphlet format of four pages which is intended to be reproducible as a master copy by educators and trainers. The first page of the CPPI consists of instructions and demographic information. The second page is a work sheet displaying the 30 semantic word pairs arranged in context to the three cognitive dimensions above.

The third page is a self-scoring design which learners can use in a period of minutes to determine their learning style profile. The last page is a practical portrait of cognitive learning styles depicting one's preferences for attending, acquiring, and processing information as profiled on the scoring sheet.

Background and early development of the CPPI. Consistent with current thinking which espouses a more eclectic approach to psycho-educational theory in lieu of one of dominance (Corsini & Wedding,1989), the theoretical bases of the CPPI were derived from studying Ashcraft (1994), Cofer (1975), Kintsch (1974), Quillian (1967), Osgood & Smith (1972), and Jung (1923), and are derived from a modern information processing model of learning style summarized by Reed (1992) and McCarthy (1980)-- people learn differently and in two important ways: how we perceive and how we process. In addition to constructs of information acquisition and processing, the CPPI also includes an attending of information construct in its representation and distillation of a cognitive human information processing model.

The instrument, based on an information processing model, was initially developed in the spring of 1993 to meet the perceived need for a reliable, valid, practical, and current cognitive learning style instrument for the use of adult educators, adult learners, and trainers. Osgood's (1972) semantic differential techniques and the author's prior experience in co-authoring a previous attitudinal perception change instrument at the Armed Forces Staff College in 1988 provided the bases, knowledge,

insight, and technical skills required to help design and validate a semantic differential approach to learning style. To measure cognitive learning style, the idea to use a semantic differential design emerged during graduate classes on adult learning and cognition during discussions concerning learning, cognition, constructs,and measurement alternatives

Since a semantic differential instrument is comprised of word pair descriptors, cognitive learning style descriptors were initially obtained from the literature on cognitive psychology, memory, learning, psychological type, mental processes, and thesaurus sources.

Four previous versions of the instrument were tried and improved upon using contributions and feedback from graduate students, friends, and family. During this evolution, various scoring methods were refined and word pairs were derived, tested, and adopted through creative brain storming, analyzing descriptive comparative literature on several similar purpose instruments, and focus groups. Initial testing was with simple correlations with other instruments with very small groups of 30 or less.

Additionally, my 12 years of experience and practice in administering and interpreting cognitive learning style instruments to hundreds of adults, as the program director of executive development at the Armed Forces Staff College and as a management development facilitator and course director at the Defense Systems Management College, provided the practical insights necessary to link theory to application in developing a cognitive learning style instrument. I observed similarities in many of

the instruments I used, wondered how the instruments compared, and what they were really measuring. I also experienced problems in regard to certification, scoring costs, and curriculum time required to administer, interpret, and use the instruments in routine settings. All of which, I have tried to address in the CPPI's design and intended utility.

Reliability. Internal consistency reliability coefficients (Cronbach Alpha) produced with an initial sample of 141 adults were .77 (Outer/Inner scale), .88 (Concrete/ Abstract scale), and .82 (Objective/Subjective scale). Analyses with 731 adults produced similar coefficients of .79, .88. and .86 respectively. Reliability coefficients for female subjects (n=338) of .81, .88, and .84 and male subjects (n=394) of .79, .86, and .79 were also similar. The acquiring information dimension, represented by the Concrete and Abstract scale, was the most reliable.

Validity. One of the important purposes of this study was to provide evidence of construct validity by internal factor item analysis and comparative factor analysis with representative cognitive style instruments. Though with relatively small groups, during preliminary development, simple correlational analyses with other instruments were positive and encouraged further and more exacting testing which brought about one of the needs for this study. The final results of this study, displayed in Chapter IV and Chapter V, tend to support the CPPI's construct validity.

The primary purpose of the CPPI was to provide a valid and reliable

yet simple to administer instrument with convenient application templates which operationalize utilities such as learning styles and other complex activities. The CPPI was intended to improve on previous instrument methodologies and follow acceptable psychometric and design principles (Kline, 1993). With the use of corresponding portraits describing the learning style dimensions, the CPPI was intended to be available to educators and trainers for their routine use. Though its theoretical bases, cognitive information processing and semantic theory, differ somewhat in perspective and purpose with other instruments, its intent was to capture commonly shared constructs relevant to the cognitive learning styles of adults and to distill their results into an information processing model profile.

The Success Style Profile (SSP), the Gregorc Style Delineator, and the Myers-Briggs Type Indicator (MBTI

In order to be able to answer the research questions, a representative selection of different cognitive learning style instruments were selected in addition to the CPPI for inclusion in this study--the Success Style Profile (SSP), and the Gregorc Style Delineator (Gregorc), and the Myers-Briggs Type Indicator (MBTI). The first two instruments were selected based on their currency, their perceived reliability and validity. Due to their recency, they had not being included in the strong criticisms by Bonham (1987) and Curry (1983) in regard to reliability and validity issues which, except for the MBTI, had limited the choice of cognitive learning style

instruments to ones recently developed.

In regard to all other instruments I reviewed, I found (confirming Bonham and Curry's separate instrument reviews) that adequate factor analyses (for internal structure and construct validity purposes) had either not been conducted, or having been did not support the validity of the theories or the instruments examined (Ferrell, 1983). The Dunn LSI, Kolb LSI, and the Hermann Brain Dominance Instrument (HBDI) were some of my early candidates but were not selected for this study due to reported problematic reliabilities and/or construct validities (D'Amato, 1992: Gregg, 1989; and Ferrell, 1983). Additionally, in Curry's (1983) review, less than ten instruments met any minimal psychometric standards.

In personal communications on September 15, 1994 with the authors, D. Coates and A. Gregorc, of the Success Style Profile and the Gregorc Style Delineator, and a review of the existing learning style literature, it was determined that these two national and relatively new adult cognitive instruments have not been analyzed, studied, or examined with factor analytical methods. In order for adult educators and trainers to use these (or any other instruments) with some confidence of their construct validity (measuring what they are intended to measure), each instrument must show an internal factor structure which supports its theoretical basis.

This study analyzed the SSP, Gregorc, and CPPI in separate factor analyses prior to being able to conduct a comparison of all four (CPPI,

SSP, Gregorc, and MBTI). After each instrument's internal structure had proven salient, a separate comparative factor analysis was conducted to identify and explore the hypothesized shared common latent learning style constructs.

Though in an information processing context they are hermanuetically similar, the instruments greatly differ in measurement methods, theoretical bases, and interpretations. The SSP, Gregorc, and MBTI are described below:

Success Style Profile (SSP)

Instrument Design and Use. The Success Style Profile was developed by Coates (1991) to improve on the construction methods and theoretical currency of other cognitive instruments. It is a 96 question (paired), Likert scale, situational-based preference instrument. Its theoretical base is intended to be one of cognitive style combined with neuroscience. The SSP is designed for professional adults and other high motivational success-oriented populations. It could also have applications and be useful for students and other audiences. Six factors of cognition are measured: Perception and Conception input, Logic and Feel processing, and External and Internal attention. In measuring learning style, the factor scores for input and processing are combined as the components represented by the individual's scores on the instrument. To date, it is used on a national basis and rapidly gaining popularity by educators and

trainer of adults with tens of thousands of administrations.

Reliability and Validity. Split-half reliability correlations were reported above .84. Test-retest reliability samples have ranged from .64-.77 between the factors (Lindholm and Politano, 1989).

The Center for Creative Leadership (Dorn, Godwin, and Webb, 1989) conducted a comparison of similar constructs used by the SSP and the MBTI. Even though the basic terms and internal constructions of the instrument are different, forced-choice (MBTI) vs. narrative, preference, and intensity (SSP), correlations ranged from .45-.57 between the two instruments' scales. Other studies have been made comparing vocational expected representations and actual instrument results. These were reported to be consistent with expectations of preferred mental functions in comparison to vocational representations (Coates, 1991).

The SSP displays many inherent improvements offered by the instrument to cognitive instruments: Preference and intensity of preference, current mental functioning terminology, computer assisted administration and interpretation, feedback thoroughness, and a unique composite architecture of cognitive functioning.

In this present study, internal consistency reliability coefficients (Cronbach Alpha, n=589) ranged from .78 to .88 on all scales. An internal factor analysis was conducted with this innovative instrument along with a comparative analysis of its learning style constructs with the other three instruments to examine evidence of the SSP's construct validity, which is discussed in Chapter V.

The Gregorc Style Delineator

Instrument Design and Use. Using a phenomenological method to develop a self-analysis tool during his years as a director of a school laboratory, Gregorc (1982) created the Gregorc Style Delineator. This qualitatively designed and developed instrument was intended to "identify four basic channels which the mind receives and expresses information." (Gregorc, 1982. p 2.). Manifested as a cognitive style, these channels are labeled as: Concrete Sequential (CS), Abstract Sequential (AS), Abstract Random (AR), and Concrete Random (CR). In measuring learning style, these channels are the components represented by the individual's scores on the instrument. In an examination of the instrument, it was found that its design did not allow for empirically separating its composite construct channels into separate mental functions. Gregorc (personal communications, October 28, 1994) confirmed that the instrument's individual items were purposely designed only to measure and represent the composite channels and not the separate mental constructs. Including this instrument in this study was of keen interest, since it was reported to be purely qualitatively derived and has had little quantitative analyses Its composite channel scores were internally factor analyzed and used in comparison with the other three instruments in this study.

The instrument, simple to use, is comprised of 40 items which are ranked and scored within four separate scales, and is intended to measure

the four different cognitive learning style constructs cited above. The instrument, used nationally, is currently under review for inclusion in the pending Twelfth Version of the Buro's Mental Measurement Yearbook according to Dr. Trenton R. Ferro, Indiana University of Pennsylvania, the reviewer (personal communications, January 11, 1995).

Reliability and Validity. Reported analysis on this instrument include test-retest correlation coefficients of .85 to .88 on all scales. Standardized alpha coefficients were claimed to be from .89 to .92 on all scales. Validity studies have been limited to several correlational assessments made during interviews of several hundred subjects comparing Style Delineator scores and attribute scores, and responses to the self assessed accuracy of the results via ratings of the attributes. Correlations of the instruments and the rated attributes were between .55 and .76 (Gregorc, 1982).

According to Gregorc (1982), an additional comparative analysis of the instrument to rating accuracy of its description of self resulted in 29 % strongly agreeing, 57 % agreeing, 14 % unsure, and none disagreeing.

In this present study, however, internal reliability coefficients (Cronbach Alpha, n=467) ranged from .54 to .68. Kline (1993) recommends a minimum of above .70 as a standard for acceptable reliability.

Since factor analyses have not been accomplished to date and this instrument is being nationally used by adult educators and trainers, an

internal factor analysis was important to conduct along with a comparative factor analysis of its learning style constructs or 'channels' with the other instruments to examine construct validity of this different, yet innovative and qualitatively derived instrument .

The Myers-Briggs Type Indicator (MBTI)

Instrument Design and Use. "The MBTI is the most notable attempt to date to develop measures of Jung's psychological types" (Wiggins, 1989, p. 538). The Myers-Briggs Type Indicator is a forced-choice, self-report inventory that attempts to classify individuals according to Jungian theory of conscious psychological type. Over 40 theses and 260 dissertations have used the MBTI.

The MBTI classifies individuals along four bipolar dimensions: Extraversion/Introversion, Sensing (S)/ Intuition(N), Thinking(T)/ Feeling(F), and Judging/Perceiving. In measuring cognitive learning style, the factor scores representing the mental functioning preferences of NT, ST, SF, and NF are the learning style components represented by the individual's scores on the instrument (Lawrence, 1986 and Myers and McCaulley, 1987). These scores will be used in comparison with the other three instruments in this study.

Reliability and validity. From a total data set of 9,216 (Myers and McCaulley, 1987), the MBTI internal consistency reliability coefficients (Cronbach Alpha) produced estimates of .83 (E/I), .83 (S/N), .76 (T/F), .80 (J/P). The T-F scale demonstrated the least reliability and the S-N the

most. stability or test retest reliability of type category (in intervals of up to six years) has remained stable and is proportioned as follows: E/I 62-83%, S/N 57-89%, T/F 61-90%, and J/P 66-90%. (Wiggins, 1989 and Willis, 1985). Though several million administrations have been accomplished, no general adult sample distribution is available because most of the samples have been limited to career-oriented professionals, high school and college students, and other white collar samples (Macdaid, McCaulley, and Kainz, 1986). As populations increase in age and intelligence, there is evidence of increased reliabilities. Test-retest reliability seems to be related to the degree of strength on the initial preference score.

Much of the research has been focused on career-related topics such as job retention and turn-over. The MBTI has been shown to be moderately predictive of these criteria. Other evidence includes prediction of college student retention, learning, and tasks. This body of evidence is limited to the same sample populations noted above, but is impressive as regard to job turn-over with the many other variables influencing longevity (Willis, 1985).

The MBTI constructs were correlated and compared to the following instruments: Adjective Check List, California Psychological Inventory, Comrey Personality Scales, Edward Personality Preference Survey, Emotions Profile Index, Eysenck Personality Questionnaire, Maudsley Personality Inventory, FIRO-B, Jungian Type Survey, Minnesota Multiphasiac Personality Inventory, Omnibus Personality Inventory,

Personality Research Inventory, Stein Self-Description Questionnaire, Kuder Occupational Interest Survey, Strong-Campbell Interest Inventory, Kolb Learning Inventory, Internal External Locus of Control, and others. According to Myers and McCaulley (1987), the MBTI expected direction and correlation to similar constructs by individual construct and dimension were impressive. In any of the test reviews on the MBTI, inter-instrument factor analyses were not reported to have been conducted upon cognitive learning style deminsions.

The most impressive evidence of construct validity was reported by Thompson and Borrello (1986) in an item factor analytic study which included primary and secondary factor analyses. Factor analysis was applied to the 95 items of the instrument and the appropriateness of the item weights were examined, "the results strongly supported the instrument's construct validity." (p. 749) Factor loadings and description of the analysis will be included in this study along with the other three instruments factor results for comparison purposes.

MBTI questions are questions of preference for activities, comfort, and interests as they were believed to relate to mental functions, and these functions (in combination or singularly) are over-represented by "similar types" in specific vocations which preference theory would predict. The MBTI from this perspective has strong evidence of construct validity with the several million administrations and vocational/occupation analysis and prediction (Thompson and Burello,

1986; Devito, 1985; Keyser, 1983; and Coan, 1978).

Though requiring expensive certification, controlled access to scoring materials, and a relatively complex theoretical bases, the MBTI, due to its acceptable psychometric evidences and reviews (Thompson and Burello, 1986; Devito, 1985; Keyser, 1983; and Coan, 1978), was included in this study as a bench mark using and accepting its previous analyses. The other instruments, CPPI, SSP, and Gregorc, were individually factor analyzed to confirm their own internal measurement structures of constructs prior to their inclusion in the comparison of operationalized indicants of each instrument's interpretations of cognitive learning style.

Samples

General

Total samples. Over 1900 protocols from 1411 adults were used in the analyses for this study. Sample size requirements were driven by recommended factor analytic conventions in regard to subject to variable ratios and minimum size of samples (Kline, 1993). Though the earliest researchers in the 1950's recommended very conservative subject to variable ratios of as much as 10:1, Kline (1993) determined in his recent research on psychological testing that if a factor structure is robust, that subject to variable ratios can be as low as 2:1 and still produce consistent and stable results. However, it is generally recommended that an adequate or 'rule of thumb' ratio to be three to five cases per variable and a minimum sample size to be 100 (Tabachnick and Fidell, 1989).

Individual samples are described below.

Samples for separate instrument item analyses

Using previous factor analytic research on the Myers-Briggs Type Indicator as a base line and performing initial factor analytic techniques on the remaining instruments, separate factor structures for each instrument were produced and examined.

To support these item analyses, at least 400 adult samples per instrument were desired to conservatively exceed factor analytic conventions. All sample packets and instruments were coded for anonymity. Subjects could not be identified directly or indirectly with the provided information. Demographics as available were noted, though in the case of the SSP and Gregorc Style Delineator this study's interest were more in a confirmation of each instrument's internal structure for construct validity evidence and not in developmental context or adding to their generalizability to adult populations.

As an expediency, existing samples of adults were sought in the form of anonymous raw answer score sheets from the authors of the SSP and Gregorc Style Delineator. Dennis Coates, the author of the SSP, was interested in this research and provided from his archives a representative sample of some 400 score sheets. He also provided some demographics summary information as described below. Anthony Gregorc, the author of the Gregorc Style Delineator, was also interested in supporting this research but could not provide score sheets since his

instrument is self-scoring. However, through my faculty advisor, I contacted another doctoral candidate, Clayton Garrett, who agreed to share 280 Gregorc Style Delineator anonymous score sheets which he had obtained for comparative research from students and faculty from a small college in Northern Virginia. He also provided summary demographic information.

Since the separate examinations of the SSP and Gregorc Style Delineator were intended only for examining their respective dimensionsalities and internal structures and not a comparison of groups of subjects, existing raw data sufficed. However, taking advantage of the new data this study generated and in order to add variance to the respective total samples, I did combine their data with a data set of 201 collected which had been obtained for the comparative analyses of the four instruments in regard to latent common constructs (The procedures used to administer and collect the sample of 201 are described below).

In all cases, the demographics which were available are included. The CPPI and the comparative analysis of the four instruments, in direct support and administered or obtained of this study, were more purposely documented.

Actual Samples. The following actual samples per instrument were obtained.

CPPI--A sample of 731 adults (338 female, 394 male) was obtained. In the fall of 1994, the Adult Education Network was queried concerning

interests in participating in this study in regard to administering the CPPI. The Adult Education Network is administered by Nova South Eastern University. Forty teachers and professors of adult education across the country responded to the inquiry. It was agreed to send them reproducible masters of the CPPI if they would e-mail their mailing address and agree to administer and return the instruments by December 20, 1994. Over 400 anonymous adult samples were received from the participants from Nova South Eastern University, New Hampshire Technical College, Benet Academy, Rutgers, The University of North Carolina, Kwantlen College, Northern Virginia Graduate Center, Penn State University, and other small groups of adult educators throughout the United States. Additionally, the Defense Systems Management College also provided 131 samples. The additional 200 of the 731 were added from the data collected during the administrations of the four instruments. Pooling samples has been accepted to achieve wider variance and to obtain a larger sample populations in factor analysis studies (Kline, 1993; Tabachnick & Fidell, 1989). Some consideration must be given to very diverse groups within the aggregate in generalizing the factor structures (such as gender differences). The general demographics of the total largely represent managers, graduate students, government workers, executives, high school students, counsellors, nurses, professors, teachers, administrators, skilled laborers, and .other professionals. Tables Appendix B-1 and B-2 depict the ages, ethnic groups, education level, and vocations of the samples.

SSP--589 total samples were obtained to factor item analyze. The author, Dennis E.Coates, was queried for the purpose of obtaining what he believed a representative sample of adults. He provided protocols for 400 adult subjects, including 200 females and 200 males. Except for gender, ethnic group, age, and educational level specifics were not available. Approximately 51% were from identifiable professions: instructors, business managers, engineers, teachers, manufacturers, bank personnel, fund raisers, human resource consultants, sales and marketing professionals, government workers, homemakers, logistics managers, hospital workers, computer technicians, construction workers, and military personnel. An additional 49 % raw score sheets were randomly chosen from the author's archives without regard to profession or demographics. Further demographics were not available from the SSP scoring sheets provided, thus a combined table of demographics was not possible. An additional 189 adult subjects comprised of small groups from various organizations and institutions were obtained through voluntary participation in this study and demographics are the same as Appendix B Tables B-5 and B-6 with the exception of 12 graduate students (The SSP separate internal analyses were completed before all of the four instrument comparison samples, 201, were obtained).

Gregorc Style Delineator--467 total samples were obtained. In collaboration with Clayton Garrett, Northern Virginia Graduate Center., a sample of 280 anonymous questionnaires of college faculty and students attending a small Northern Virginia college were obtained. The majority

of the 280 were under 42 years old, female, African-American, and adult-roled working students. An additional 187 graduate level adults were obtained from: adult education and counseling education classes in Blacksburg, Roanoke, and Falls Church,Virginia campuses of Virginia Tech, the Defense Systems Management College, and several workshops for teachers and businesses in the Washington D. C. metropolitan area. The combined demographics of the total sample (467) are depicted in Appendix B, Table B-7.

MBTI --Internal factor item analytic results from previous studies (1986) performed by Thompson and Bordello (n=359) were used for this study to confirm construct validity of the MBTI and to insure the instrument's internal factor structure prior to comparison with other cognitive instruments.

For the comparative factor analysis of the four instruments, a separate sample of 201 adults were administered the MBTI, Form G, which was hand scored with the other instruments.

Comparative factor analyses of all four instruments

A total sample of 201 adults taking the same four instruments, CPPI, SSP, Gregorc, and MBTI, were obtained. The sample of adults included adult managers from the Defense Systems Management College, and several groups of graduate students, blue collar workers, teachers, and counsellors from the Northern Virginia Graduate Center, the

Washington D.C. metropolitan area, and the Virginia Tech College of Education in Blacksburg, Virginia. Demographics are depicted in Appendix B, Tables B-5 and B-6.

Though the recommended (Kline, 1993 and Tabachnick & Fidell, 1989) minimum variable to subject ratio and minimum number of subjects should be greater that 2:1 and use at least 100 subjects, the actual factor structures, which were examined for the purpose of identifying shared common constructs of the composite scores of the four instruments, was obtained with a more conservative subject to variable ratio of 10:1 (201 subjects to 19 variables). Supporting demographics by instrument and of the four instrument comparisons are depicted in Appendix B as referred to above. Instrument administration and collection considerations are described below.

Procedures

General

This study was a correlational research study with theory generating potential. Its purpose was to provide answers to the three research questions and to develop and test a semantic differential cognitive learning style instrument, the Cognitive Preference Pattern Indicator (CPPI).

The analyses had two broad functional parts, individual instrument and comparative analysis of the four instruments.

The first part was the separate examinations using principle

component/factor analyses (PCA/FA) of the SSP, Gregorc, and the CPPI, the semantic differential test instrument. In order to be able to meaningfully compare all of the instruments and their cognitive learning style constructs, individual instrument's factor item analyses were necessary or available (from previous research) to provide evidences of internal construct validity in order to insure each was measuring its intended theoretical framework (Kline, 1993). The MBTI had already undergone this type of in-depth analysis (Thomson and Borrello, 1986) and its salient results are displayed along with the other three which I examined.

The second part of the analyses was a factor analytic comparison of the four instruments which was to identify possible shared latent constructs, compare their individually defined learning style components, and provide construct validity for the CPPI.

Data Management and Analyses

All analyses were supported using EXCEL 4.0 (Microsoft) for data input and data management. Over 1900 protocols (each with between 30 to 96 entries) were coded and entered into data sets in spread sheet formats. Names and other identifications were not collected or recorded. Data sets were exported into StatView 4.1 (Abacus) for principle component and factor analyses on Macintosh SE/30 and 6600 Power Macintosh computers. StatView 4.1, standardized with SAS GLM, was selected for its factor analytic analyses capability in regard to accuracy,

flexibility, depth of analyses, diverse rotation and extraction choices, ease of use and customer support.

Instrument administration

In regard to the SSP and Gregorc, samples were primarily comprised of existing data. The CPPI sample of 530 (of the 731 total) was collected through some 40 different administrators and administrations. Since it was designed as self-scoring, this was not only possible but desired.

In the administrations and data collection of the four instruments, I conducted the majority of the administrations, but did use three other administrators to assist with small groups. The following procedures were briefed to the subjects and followed in all administrations.

The four instruments were numbered and placed in corresponding numbered envelopes. Demographics, without names or other identifications, were filled-out on only the CPPI cover sheet in each packet. The subjects were asked to write down or otherwise remember their packet number (for no other identification would be available for feedback purposes). This procedure proved to be practical and effective.

Since instrument fatigue and loss of thoughtful responses were of some concern if all four instruments were administered at one setting (with over 262 responses required of each adult), the instruments were filled-out in at least two sessions. This procedure was to avoid instrument fatigue and to enhance thoughtful responses. Random ordering of

instrument administrations to control for potential transfer effects and familiarity was not deemed an over-riding factor due to the separate response sessions and the major differences in instrument construction, measurement method, theoretical design, and interpretation. However, instructions were given for the respondents to fill-out one long and short instrument in each session, then the other long and short instruments in the remaining or second session. For example, the MBTI (long) and Gregorc (short), and the SSP (long) and CPPI (short) could be paired (or the MBTI and CPPI first, and then the SSP and Gregorc could be paired for the second administration). Time between sessions was between one to four weeks to preclude maturation problems and to accommodate for student and teacher schedules and other requirements. In all cases, all score sheets were returned for scoring and data entry. Feedback sessions, if desired, for the participants were scheduled and provided in accordance with their coded folder number.

Factor Analysis Procedures

Factor analysis in the context of developing and validating a learning style instrument has been widely used and accepted by instrument developers and psychometricians as a construct validity tool (Kline, 1993). Moreover, Kline (1993) is critical of instruments which have not been factor analyzed or do not exhibit factor structures when they have been studied in this manner. Construct validity of an instrument can be gained through the meaning of a construct in relation to other constructs.

If there are expected relationships which can be hypothesized among scales and factors, then factors which are confirmed by the analysis help validate the instrument and the theory (Kerlinger, 1986, p. 590).

The identified factors are said to be latent variables and since they are a best representation of a unique combination or group of variables. These underlying factors comprising a factor structure must be operationally defined by their relationships to be studied. The best underlying structure of the concepts can be obtained by more than one run or extraction method seeking a persistence of (or a stability of) a factor structure and a simple solution, which Thurstone (1947) defined as a factor solution having as high a correlation as possible between variables loading on individual factors, while not loading on other factors. (Kline, 1993; Tabachnick and Fidell, 1989; and Smith, 1979).

Prior to the actual analyses portion of this study, it was expected that when adults were administered the instrument(s), the descriptive scales of bipolar choices and values (or items and questions) would load on the appropriate factors and constructs hypothesized to be similar regardless of extraction method utilized. Similar and stable patterns of loadings of variables on factors would expected to be present on repeated analyses even when using different extraction methods if the instrument(s) tested possesses high internal validity to the theoretical constructs (Kerlinger, 1986; Tabachnick and Fidell, 1989; and Kline, 1993).

In regard to multimethod-multitrait analyses in the comparison of selected cognitive learning style instruments, correlations of similar

constructs would be expected to be high and designedly dissimilar constructs be relatively low or independent in comparing different instrument scales with each other (Kerlinger, 1986). Additionally, the comparative factor analyses on the learning style components of each instrument should yield expected high loadings on similar theoretical constructs and near zero loadings on unrelated constructs. Unexpected and additional factors in the comparisons should be analyzed and interpreted in regard to adult learning style implications and cognitive theory.

Conventions. In interpreting the results in Chapter IV, the conventions, depicted in Figure 4, and explanations below should be used. During all factor analyses in this study (individual instrument and comparative analyses), the following specific conventions were followed using Kline (1993) and Tabachnick and Fidell (1989) as primary sources.

1. Preliminary examinations.

    a. Descriptions of the sample data were examined.

    b. A correlation matrix was produced to indicate the sample's factorability--a matrix that was factorable (useful to perform a FA) was one which several correlations of variables exist larger than .30.

    c. Theoretical expectations for each instrument was explained prior to the initial extraction of factors (which questions or items should load together based on the theory the instrument was designed to measure). Like items or questions were coded in the data set prior to

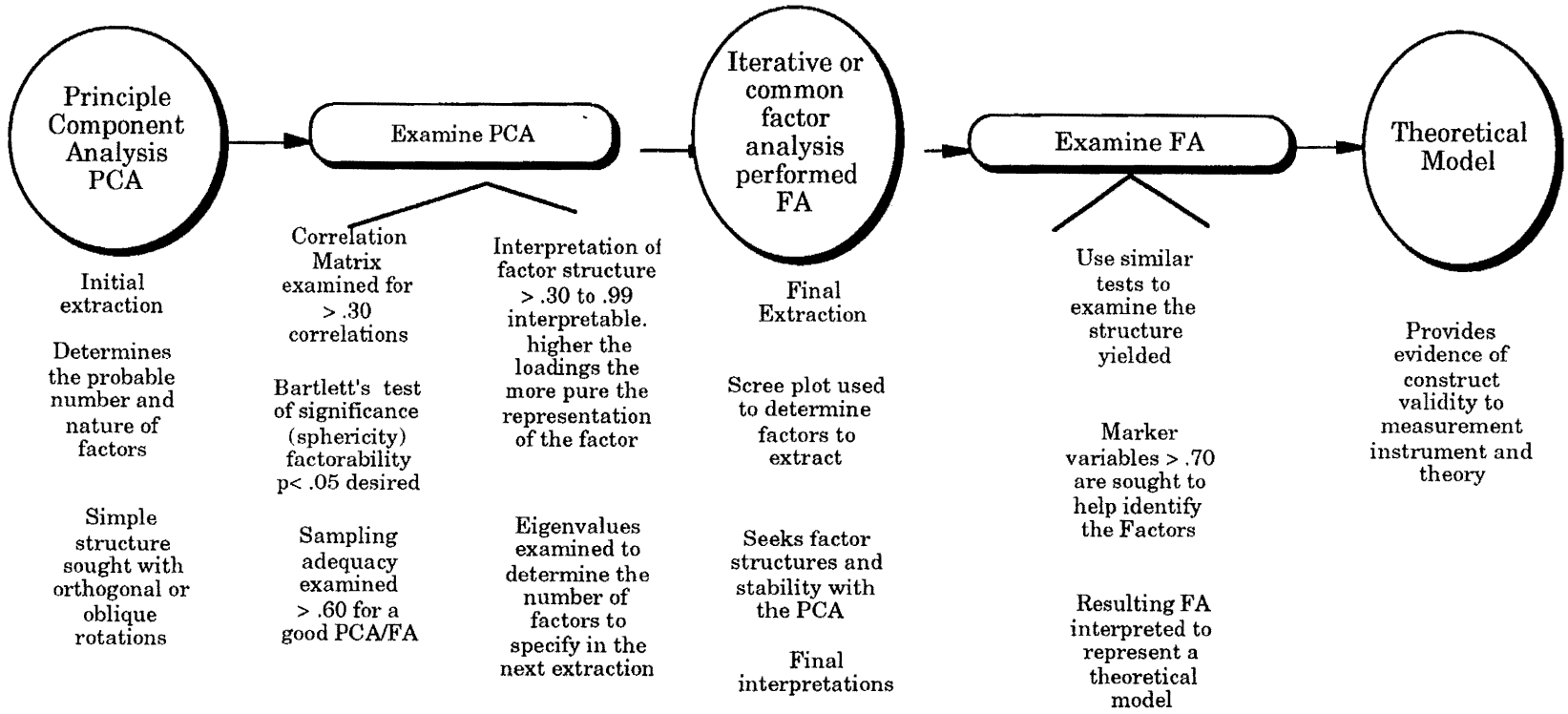

Figure 4. Factor Analysis conventions used in this study.

analyses to aid in recognition in the factor structures.

2. PCA, initial extraction. Since principle component analysis is the recommended first step of a factor analysis because it reveals the probable number and nature of factors present in the data, it was performed first to determine the number of factors to be finally extracted (a common factor analysis was performed specifying this number of factors after the PCA as delineated below in #3).

a. Rotation was performed after the extraction. Orthogonal and Oblique rotations were performed, retaining the best solution or simplest structure--the highest loadings on factors by variables with corresponding lowest loadings on other factors. The rotations used in this study maximize variance (varimax)--they maximize high correlations, minimize low ones, and make the factor matrix more interpretable, but do not change the basic relationships.

b. For all non-singular matrixes, a Barlett's significance test was performed with a $p < .05$ desired. This procedure tests the number of factors and evaluates all factors together and each factor separately against the null-hypothesis that there are no factors.

c. Kaiser's measure of sampling adequacy was performed with a values of .6 or above desired for a good FA.

d. Communality of factors to variables was examined to determine the amount of variance accounted for by the factors on the variables by squared multiple correlations (SMC) and final estimates.

e. An interpretation of factors extracted by the PCA was made using the following guidelines. Variables with .30 higher are interpreted. "the greater the loading the more the variable is a pure measure of the factor" Comrey's (1973) rule of thumb was utilized-in the analyses of factor loadings- .70 excellent, .63 very good, .55 good, .45 fair, and .32 poor (Tabachnick and Fidell, 1989, p. 640).

f. To support the next extraction and from the results of the PCA, the number of factors were reduced or user specified based on Root curve or Scree tests (Cattell. 1966), eigenvalues are plotted against factors in a descending order looking for is the point where a line drawn through the points noticeably changes direction-- the scree test is good when sample size is large, commonality values high, and each factor has several variables with high loadings.

3. Second extraction. An iterative or Common Factor Analysis (FA), which is widely used and understood and by which common variance is analyzed with unique and error variance removed, extraction was performed (the FA excludes all variance but shared variance estimated by commonalties and these values are substituted for the 1's in the positive diagonal representing the correlation between the variable and its estimated self or factor). As in the proceeding PCA's, rotations, commonality estimates, significance tests, factor interpretability, and variable loadings, and variable complexity--how many factors are shared by each variable, (Hofmann, 1978) were examined.

4. Factor stability. Factor structures were compared between the PCA and FA in each case. Comparisons were made between the pattern structure matrixes of the PCA and the FA (similar patterns--variables loadings on factors--should exist if the factor structure is stable).

5. Final results and interpretations were based on the FA or second extraction method (if both extractions produced consistent and stable structure). Marker variables or variables that load very high, above .70, on a factor help define, name, and interpret the factor (Kline, 1993). One the primary goals of PCA/FA is to find the minimum number of factors needed to reliably position variables (on coordinates) and "to discover the meaning of the factors that underlie responses to observed variables" (Tabachnick and Fidell, 1989, p.632).

Summary.

This chapter describes the instruments, the samples, and the procedures followed to support this study. In the next chapter, the data analyses and results are depicted with tables. Supplementary tables are provided in Appendices A and B.

CHAPTER IV

Results

This chapter examines the results of the data analyses. Internal factor analyses are presented in regard to the individual instruments and the comparative analysis of cognitive learning constructs.

The factor item analyses results include a summary of the analysis of the Myers-Briggs Type Indicator by Thompson and Borrello (1986) as a comparable basis and my own factor analyses of the Success Style Profile (SSP), the Gregorc Style Delineator, and finally the Cognitive Preference Pattern Indicator (CPPI).

As described in Chapter III and depicted in Figure 4, the analyses performed in this study followed the following conventions: an introduction; an examination of the correlation matrix for factorability; a principal component analysis (PCA) for initial factor extractions; and an iterative or common factor analysis for the final extraction and factor stability comparison. In all cases, simple solutions were sought seeking stable structures using either orthogonal or oblique rotations (Kline, 1993 and Tabachnick and Fidell, 1989).

During the comparative analysis of the cognitive learning style constructs of the four instruments, the same procedures were followed. The CPPI was also examined for reliability and construct validity in these processes as an important part of this study.

Individual Instrument Factor Analyses

Summary of the MBTI's Previous analysis

Thompson and Borrello (1986) examined the MBTI for construct validity purposes using factor analytic techniques. Their subjects were 359 college students enrolled in a common health course in a southern university (103 were ethnic minority students). Their initial extraction revealed 32 factors with eigenvalues greater than one. Eigenvalues for the first seven factors were 7.78, 5.06 4.37, 3.65 2.12, 2.08, and 1.98. Using the normal convention upon applying a scree test (determining where the eigenvalues tend to level-off in value--in this case after the '3.65'), four principal components were extracted and rotated to the varimax criteria.

Using a minimum criteria of .30 or above to determine saliency of item coefficients:

Twenty-two of twenty-four test items from the "JP" scale of the instrument loaded on the first factor (of which 14 were correlated with the factor .40-.67),

Twenty of twenty-two test items from the "EI" scale loaded on the second factor (of which 14 were correlated with the factor .40-.76),

Twenty-two of twenty-six test items from the "SN" scale loaded on the third factor (of which 13 were correlated with the factor .40-.56) , and

Sixteen of twenty-three test items from the "TF" scale loaded on the fourth factor (of which 9 were correlated with the factor .40-.66) .

Only factor four had other items loading with an absolute value of .3 or higher that were not theoretically expected to load--3 non "TF" items were associated with this generally "TF" factor. In Thompson and Burrello's rotated simple structure, their four factors represent relatively separate or orthogonal dimensions of items that theoretically and by test design should be related. Test items from separate scales tend to load on one factor and not on other factors.

The authors, Thompson and Borrello (1986), summarized their results to suggest that the MBTI test items are clearly related (correlated) to factors in the expected direction which provides evidence of construct validity. These clear relationships provided strong evidence that the MBTI's structure is both generalizable, accurate, and possesses some measure of construct validity.

In comparison to the analyses of the other three instruments, it is important to note the items of expected dimensions, their loadings, and their salient values above .30 of correlations of test items to factors.

Factor Item Analysis of the Success Style Profile

The SSP is a 96 question (paired), Likert scale, situational-based preference instrument. Its theoretical basis is intended to be one of cognitive style (mental functioning) in the context of brain localization theory (left, right, front, and rear). The SSP is designed for professional adults and other highly motivated, success-oriented populations. It could

also have applications for students and other audiences. Four mental functions representing cognition in alignment with their hypothesized brain locations were intended to be measured on separate scales representing: Perception, Conception, Logic, and Feel. Additionally, External and Internal attention factors were also measured on their separate scales. Together, these theoretical factors should reveal six expected scales. Theoretically, these six scales of the SSP were designed to represent bi-polar pairs (but not necessarily orthogonal) of three dimensions of mental functioning or cognition. Coates (1991) categorized these as dimensions of mental input, process, and attention. Somewhat balanced profiles resulting from an adult subject's responses to the instrument's design are not unusual (Coates, 1991).

From a psychometric perspective, my internal factor analysis of the SSP was expected to reveal Coates' theoretical structure of three to six factors/scales depending on the discrimination of the actual structure of the instrument.

Of a total sample of 589, 585 cases were analyzed with a subject to variable ratio of 6:1. Raw scores were used since Coates' furnished weighted scores in his current instrument yielded an unfactorable correlation matrix and on several preliminary PCA attempts did not yield a meaningful or stable factor structure. From telephone conversation with him on December 28, 1994, he agreed to my recommendation to use raw unweighted scores which tended to yield a relatively expected and

stable structure of the SSP. In order to be able to compare the SSP with the other instruments, I had to use the unweighted scores. Chapter V will discuss these preliminary findings with this instrument.

An examination of the correlation matrix to determine factorability was positive displaying many correlations among the variables above the .30 recommended to achieve a factor structure. Appendix A, Table A-1 depicts the correlation matrix. Bartlett's test of sphericity, which tests the hypothesis that the correlations in the matrix are zero (Tabachnick and Fidell, 1989), produced 25988.54 $p < .0000$.

SSP's Principal Component Analysis. An initial principal component analysis was conducted which extracted 21 factors with eigenvalues greater than one. Of these factors, the first eight(Tabachnick and Fidell, 1989) could be identified having the following eigenvalues: 13.7, 9.2, 5.2, 4.4, 2.8, 2.1, 1.9, and 1.8 accounting for .43 of the total variance. Though moderate, the structure was stable and consistent.

An oblique solution of the first eight factors of this PCA is depicted in Table 1. This table displays (using a minimum criteria of .30 or above to determine the saliency of item coefficients) the following structure:

Thirteen of the sixteen test items from the "Conception" scale of the instrument loaded on the third factor (of which 8 were correlated with the factor .43-.82).

Nine of the sixteen test items from the "Perception" scale loaded on the second factor (of which 7 were correlated with the factor .52-.85).

Table 1

Principal Component Analysis, SSP (8 0f 21 Factors)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
C-10	0.01	0.13	**0.30**	0.01	**-0.33**	-0.06	-0.13	0.01
C-15	0.00	**-0.39**	**0.40**	0.04	0.07	0.08	0.04	0.22
C-22	0.04	0.10	0.16	0.06	-0.14	0.09	0.01	-0.03
C-27	0.00	-0.09	**0.49**	-0.05	-0.19	0.09	0.00	0.05
C-3	-0.10	**-0.43**	**0.65**	0.08	-0.07	0.07	0.03	-0.03
C-34	-0.03	-0.29	**0.59**	-0.03	-0.03	0.05	0.14	0.14
C-39	0.12	-0.08	**0.73**	0.06	-0.10	0.06	0.06	-0.16
C-46	0.23	-0.29	**0.34**	-0.06	0.22	-0.04	0.06	-0.13
C-51	-0.05	0.03	0.26	0.02	0.06	0.19	0.02	-0.13
C-58	-0.01	-0.28	**0.54**	0.02	0.11	0.13	0.06	-0.02
C-63	0.11	-0.19	**0.47**	0.01	-0.04	0.03	-0.08	0.08
C-70	-0.02	-0.13	**0.43**	-0.01	**-0.35**	0.07	0.01	-0.09
C-75	0.08	0.10	**0.82**	0.00	0.04	-0.06	-0.04	-0.03
C-82	0.06	0.07	0.11	0.00	0.01	-0.02	0.01	0.03
C-87	-0.06	0.06	**0.34**	0.12	-0.12	0.18	-0.12	-0.04
C-94	0.06	-0.07	**0.37**	-0.05	0.02	-0.05	-0.07	0.01
E-14	0.12	0.12	-0.09	**-0.42**	0.11	0.03	0.09	-0.06
E-19	0.14	0.12	0.09	-0.05	-0.02	**0.60**	0.06	-0.02
E-2	0.13	-0.02	-0.01	**-0.44**	-0.09	**0.50**	0.03	-0.04
E-26	-0.01	0.00	-0.13	-0.05	0.00	-0.03	0.11	-0.02
E-31	0.26	0.00	0.03	**-0.47**	0.00	**0.32**	-0.01	0.14
E-38	-0.29	0.07	-0.08	-0.18	**0.46**	0.23	-0.06	-0.17
E-43	0.18	0.11	-0.04	-0.16	-0.05	0.20	-0.09	-0.05
E-50	-0.03	0.03	0.04	-0.04	-0.01	**0.72**	0.00	0.01
E-55	0.19	0.08	0.08	-0.11	0.12	0.01	0.00	-0.07
E-62	0.29	0.07	-0.03	**-0.55**	0.01	0.06	0.06	0.03
E-67	0.16	0.22	0.04	0.14	0.17	0.15	0.09	0.21
E-7	-0.19	0.13	0.03	-0.04	0.05	-0.02	-0.05	0.07
E-74	0.03	-0.10	-0.05	-0.06	**0.42**	0.17	0.17	-0.02
E-79	0.15	0.09	0.00	**-0.50**	0.15	-0.09	-0.06	0.05
E-86	-0.10	**0.31**	0.10	-0.12	-0.03	0.17	-0.15	-0.03
E-91	0.03	0.10	0.05	-0.01	0.04	**0.78**	0.07	0.00
F-12	**0.83**	-0.06	-0.13	0.03	0.03	-0.03	0.06	-0.09
F-17	0.13	-0.19	-0.04	0.15	0.20	0.11	**-0.35**	**0.32**
F-24	0.11	-0.20	0.06	-0.04	0.07	0.03	-0.06	-0.06
F-29	**0.78**	0.02	-0.11	-0.11	-0.01	0.06	-0.07	0.13
F-36	**0.56**	-0.13	-0.08	-0.03	0.08	-0.08	-0.02	0.13
F-41	0.05	0.04	0.01	0.05	0.16	-0.06	**-0.67**	-0.06
F-48	0.89	-0.09	-0.06	-0.03	0.02	0.00	0.02	-0.08
F-5	**0.73**	-0.04	-0.19	0.07	-0.04	0.16	0.01	0.10

Table 1 (Continued)

Principal Component Analysis, SSP (8 0f 21 Factors)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
F-53	**0.67**	0.04	0.15	0.00	-0.20	0.17	-0.04	-0.04
F-60	**0.68**	0.09	0.01	-0.16	-0.11	-0.13	0.01	-0.13
F-65	**0.66**	-0.01	0.21	0.05	-0.08	-0.11	0.08	0.04
F-72	0.04	-0.24	0.12	0.13	0.18	0.09	-0.14	0.10
F-77	0.28	-0.05	0.17	0.14	0.10	0.04	-0.15	0.15
F-84	**0.35**	-0.07	0.11	0.01	0.25	0.01	0.01	-0.28
F-89	0.04	-0.18	0.16	0.08	0.20	0.01	-0.12	-0.06
F-96	**0.30**	0.00	0.01	-0.09	0.16	0.05	0.07	-0.18
I-1	-0.07	0.09	0.11	**0.57**	0.01	-0.24	0.15	0.11
I-13	**0.34**	0.10	-0.07	0.20	-0.13	0.08	-0.09	0.02
I-20	-0.04	0.15	0.02	0.18	0.11	-0.20	0.09	-0.08
I-25	0.03	0.24	**0.48**	0.08	-0.01	0.17	-0.03	0.12
I-32	-0.03	0.07	-0.02	**0.52**	0.10	-0.22	0.13	0.09
I-37	0.20	0.10	0.20	0.08	-0.19	-0.06	0.01	**0.46**
I-44	0.10	0.06	0.14	-0.06	0.04	-0.12	-0.14	-0.06
I-49	-0.06	-0.01	0.10	-0.01	0.06	-0.10	-0.12	0.01
I-56	-0.02	0.19	0.05	0.04	-0.06	-0.01	-0.08	0.00
I-61	0.00	0.11	0.07	**0.69**	-0.03	0.09	-0.14	-0.08
I-68	0.05	0.00	0.00	0.01	0.03	-0.14	-0.06	0.04
I-73	-0.13	**0.34**	**0.77**	0.03	-0.09	-0.21	-0.13	0.06
I-8	0.20	0.12	0.07	0.11	0.00	0.09	0.09	-0.03
I-80	0.08	-0.03	-0.08	**0.43**	-0.09	0.03	0.10	0.04
I-85	0.22	-0.01	0.06	0.09	0.14	-0.10	0.13	-0.02
I-92	0.04	0.07	0.04	0.17	0.07	**-0.49**	0.03	0.14
L-11	**-0.50**	0.17	0.27	0.01	0.20	0.11	0.07	0.09
L-18	-0.05	**0.42**	-0.05	0.18	-0.05	0.00	**0.53**	-0.11
L-23	0.01	**0.58**	0.13	0.05	0.01	0.02	0.08	-0.12
L-30	-0.11	0.06	0.05	0.03	-0.12	0.10	0.01	0.09
L-35	**-0.31**	**0.47**	0.17	-0.06	-0.01	0.12	-0.02	**0.31**
L-42	0.00	**0.35**	-0.07	0.00	-0.08	0.16	**0.63**	0.08
L-47	**-0.46**	**0.31**	**0.47**	-0.08	0.05	-0.05	-0.01	0.07
L-54	-0.24	**0.42**	0.05	0.02	-0.01	0.12	0.24	0.03
L-59	**-0.48**	0.05	**0.36**	0.01	0.10	0.00	0.09	-0.08
L-6	-0.23	**0.41**	0.12	-0.01	0.02	-0.08	0.01	-0.14
L-66	**-0.34**	0.18	-0.20	0.07	-0.02	0.14	-0.07	-0.15
L-71	-0.04	0.71	0.07	-0.09	0.08	-0.08	0.05	-0.15
L-78	-0.14	**0.39**	0.13	-0.11	-0.03	-0.09	0.09	**0.38**
L-83	**-0.40**	**0.31**	0.23	-0.05	0.10	-0.07	0.13	**0.35**
L-90	-0.10	**0.56**	0.06	-0.10	0.05	0.06	0.27	0.03
L-95	-0.18	**0.34**	0.05	0.07	0.04	0.16	-0.10	0.09
P-16	0.08	**0.66**	-0.13	0.09	-0.05	-0.03	0.16	-0.19
P-21	-0.06	**0.40**	0.17	0.14	0.19	0.07	0.01	0.00

Table 1 (Continued)

Principal Component Analysis, SSP (8 0f 21 Factors)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
P-28	0.13	0.12	-0.10	0.13	-0.01	0.05	0.05	-0.03
P-33	0.12	**0.85**	-0.22	-0.01	0.01	0.05	-0.03	-0.10
P-40	0.07	**0.66**	**-0.42**	-0.03	-0.09	0.17	-0.06	-0.03
P-45	0.12	0.20	**-0.40**	-0.04	**0.38**	0.04	-0.01	0.12
P-52	0.16	**0.74**	-0.12	0.07	-0.11	-0.06	-0.15	0.02
P-57	**0.42**	0.06	0.09	0.01	0.11	0.00	0.01	0.01
P-64	0.04	**0.80**	-0.17	0.01	0.07	-0.03	-0.07	0.00
P-69	-0.09	**0.52**	-0.23	0.00	-0.06	-0.04	-0.20	0.12
P-76	0.07	0.15	-0.13	-0.01	**0.72**	-0.07	-0.13	0.03
P-81	0.00	**0.32**	**-0.33**	-0.01	0.25	0.02	0.06	0.21
P-88	0.23	0.06	-0.11	-0.03	**0.45**	-0.03	-0.12	0.17
P-9	0.08	**0.33**	-0.05	0.14	0.21	-0.02	0.04	0.04
P-93	0.01	-0.07	-0.04	0.01	**0.77**	-0.04	-0.06	-0.10
P-4	0.09	**0.59**	-0.01	0.10	-0.03	0.10	0.11	0.10

Note: Items are prefixed with the letter representing their construct.
"P" is perception, "C" is conception, "L" is logic, "F" is feel, "E" is external, and "I" is internal. **Bold values > .30.**

Nine of sixteen test items from the "Feel" scale loaded on the first factor (of which 8 were correlated with the factor .56-.83) ,

Twelve of sixteen test items from the "Logic" scale loaded on the second factor (of which 7 were correlated with the factor .41-.71) with the ten "Perception" items. This would suggest that the test questions measuring Logic and Perception are measures of their intended constructs but also that the constructs of Logic and Perception (as measured by the SSP) are related.

Four of sixteen test items from the "Internal" scale loaded on the fourth factor (.43-.69).

Five of sixteen test items from the "External" scale inversely loaded on the fourth factor (of which were correlated with the factor -.42 to -.55).

A sampling adequacy matrix is another measure of the factorability of the matrix with .60 or higher as an indicator of a good factor analysis (Tabachnick and Fidell, 1989). Table 2 depicts individual variable and a total matrix sampling adequacy for the SSP to be .883

Factor Analysis. To examine factor stability of the SSP, a second method of extraction or a common or iterative factor analysis was conducted and revealed a similar structure. Based on the results of the PCA above, Six factors were extracted using as iterative or common factor extraction. This extraction produced similar eigenvalues of 13.7, 9.2, 5.2, 4.4, 2.8 and 2.1. An oblique rotation was used to improve the solution.

Table 2

Sampling Adequacy, PCA, Success Style Profile, (21 Factors)

Items	SA ratio	Items	SA ratio
C-10	0.86	I-1	0.84
C-15	0.87	I-13	0.82
C-22	0.86	I-20	0.89
C-27	0.90	I-25	0.87
C-3	0.90	I-32	0.83
C-34	0.89	I-37	0.87
C-39	0.88	I-44	0.84
C-46	0.89	I-49	0.87
C-51	0.88	I-56	0.72
C-58	0.92	I-61	0.82
C-63	0.93	I-68	0.89
C-70	0.89	I-73	0.86
C-75	0.89	I-8	0.82
C-82	0.67	I-80	0.87
C-87	0.89	I-85	0.88
C-94	0.90	I-92	0.87
E-14	0.90	L-11	0.91
E-19	0.90	L-18	0.88
E-2	0.90	L-23	0.88
E-26	0.75	L-30	0.83
E-31	0.91	L-35	0.91
E-38	0.83	L-42	0.85
E-43	0.84	L-47	0.89
E-50	0.89	L-54	0.94
E-55	0.87	L-59	0.87
E-62	0.89	L-6	0.87
E-67	0.88	L-66	0.79
E-7	0.82	L-71	0.88
E-74	0.92	L-78	0.91
E-79	0.89	L-83	0.89
E-86	0.91	L-90	0.92
E-91	0.87	L-95	0.87
F-12	0.84	P-16	0.87
F-17	0.91	P-21	0.88
F-24	0.87	P-28	0.69
F-29	0.88	P-33	0.91
F-36	0.92	P-40	0.82
F-41	0.86	P-45	0.87
F-48	0.91	P-52	0.86
F-5	0.89	P-57	0.88
F-53	0.91	P-64	0.89
F-60	0.90	P-69	0.89
F-65	0.89	P-76	0.89

Table 2 (Continued)

Sampling Adequacy, PCA, Success Style Profile, (22 Factors)

Items	SA ratio	Items	SA ratio
F-72	0.92	P-81	0.92
F-77	0.92	P-88	0.86
F-84	0.92	P-9	0.87
F-89	0.93	P-93	0.87
F-96	0.90	P-4	0.86

Total matrix sampling adequacy: .883

Note: Sampling adequacy > .60 is an indicator of a good FA.
Items are prefixed with the letter representing their construct.
"P" is perception, "C" is conception, "L" is logic, "F" is feel, "E" is external, and "I" is internal.

Table 3 depicts the FA and its similar relationships and loading of variables to the factors. It yielded (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure: Fifteen of the sixteen test items from the "Conception" scale of the instrument loaded on the third factor (of which 14 were correlated with the factor .42-.72),

Nine of the sixteen test items from the "Perception" scale (again) loaded on the second factor (of which seven were correlated with the factor .43-.71),

Twelve of sixteen test items from the "Feel" scale loaded on the first factor (of which 8 were correlated with the factor .50-.79) ,

Fourteen of sixteen test items from the "Logic" scale loaded on the second factor (of which 12 were correlated with the factor .42-.68) with the nine "Perception" items. This again would suggest that the test questions measuring Logic and Perception are measures of their intended constructs but also that the constructs of Logic and Perception (as measured by the SSP) are related.

Seven "Internal" items loaded on the third factor (.31-.59) and another seven on the fourth factor (.33-.56) .

Seven of sixteen test items from the "External" scale inversely loaded on the fourth factor (of which five were correlated with the factor -.40 to-.57), and five items positively loaded on the fifth factor (.47-.63).

Table 3

Iterative or Common Factor Analysis, SSP (6 Factors)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
C-10	-0.02	0.16	**0.52**	0.19	-0.09	0.09
C-15	0.04	**-0.31**	**0.42**	0.18	0.22	0.25
C-22	0.06	0.09	**0.33**	0.05	0.03	0.08
C-27	-0.03	-0.08	**0.72**	-0.05	0.00	-0.16
C-3	-0.22	**-0.34**	**0.68**	0.07	0.23	0.09
C-34	-0.13	-0.27	**0.57**	-0.01	**0.31**	0.04
C-39	-0.01	-0.08	**0.62**	-0.08	0.08	0.00
C-46	0.25	-0.21	**0.45**	0.10	0.14	0.02
C-51	-0.03	0.06	**0.46**	-0.15	0.14	-0.26
C-58	-0.03	-0.20	**0.52**	0.04	**0.42**	0.08
C-63	0.20	-0.10	**0.59**	0.09	0.01	0.04
C-70	-0.06	-0.01	**0.59**	0.05	0.03	0.03
C-75	0.06	0.07	**0.56**	-0.10	-0.06	0.02
C-82	0.00	0.08	0.21	-0.06	-0.06	-0.08
C-87	0.06	0.04	**0.55**	0.08	0.01	-0.10
C-94	0.16	-0.06	**0.54**	0.11	0.10	-0.02
E-14	0.17	0.16	-0.06	**-0.53**	**0.34**	0.00
E-19	0.13	0.28	0.11	-0.12	0.23	**0.55**
E-2	0.20	0.09	0.00	**-0.49**	0.23	**0.33**
E-26	-0.05	0.00	0.03	-0.05	**0.48**	0.08
E-31	0.31	0.09	0.09	**-0.49**	0.19	0.14
E-38	-0.08	0.13	-0.07	-0.15	**0.63**	0.14
E-43	0.26	0.28	0.05	**-0.37**	-0.01	0.10
E-50	0.07	0.24	0.16	-0.14	0.26	**0.42**
E-55	0.22	0.14	0.10	**-0.40**	0.28	-0.13
E-62	**0.37**	0.13	0.03	**-0.51**	0.11	-0.01
E-67	0.09	**0.45**	0.07	0.00	0.20	0.23
E-7	-0.13	0.05	0.12	-0.12	**0.47**	-0.12
E-74	0.10	0.06	0.07	-0.17	**0.58**	0.04
E-79	**0.31**	0.15	0.06	**-0.57**	0.14	-0.21
E-86	0.00	**0.36**	0.17	-0.24	0.24	-0.06
E-91	0.10	0.27	0.06	-0.26	0.29	**0.49**
F-12	**0.72**	-0.09	-0.10	-0.05	0.06	0.01
F-17	0.29	-0.10	0.27	0.14	0.21	-0.10
F-24	0.22	**-0.31**	0.10	0.16	**0.50**	0.22
F-29	**0.73**	0.06	-0.02	-0.15	-0.06	0.00
F-36	**0.58**	-0.12	0.06	0.07	0.23	-0.01
F-41	**0.32**	-0.16	0.15	0.08	0.18	-0.24
F-48	**0.79**	-0.11	-0.04	-0.09	0.01	0.03
F-5	**0.63**	0.00	-0.10	-0.09	0.04	0.09
F-53	**0.60**	-0.03	0.10	-0.06	0.00	0.16

Table 3 (Continued)

Iterative or Common Factor Analysis, SSP (6 Factors)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
F-60	**0.66**	0.03	-0.03	-0.11	-0.07	-0.05
F-65	**0.50**	-0.06	0.11	-0.07	-0.07	0.07
F-72	0.17	-0.28	0.21	0.17	**0.52**	0.11
F-77	**0.35**	-0.09	**0.31**	-0.02	0.17	-0.17
F-84	**0.37**	-0.08	0.10	-0.18	**0.36**	-0.11
F-89	0.21	-0.24	0.20	0.13	**0.53**	0.05
F-96	**0.32**	-0.03	0.00	-0.25	**0.39**	-0.07
I-1	-0.12	0.16	0.23	**0.53**	0.03	-0.11
I-13	**0.37**	0.19	0.13	**0.33**	-0.17	0.10
I-20	-0.02	0.22	0.29	0.11	0.10	**-0.38**
I-25	0.05	**0.32**	**0.46**	0.08	-0.15	0.09
I-32	0.02	0.17	0.11	**0.56**	0.15	-0.14
I-37	0.19	0.12	**0.39**	0.17	-0.08	-0.09
I-44	0.21	-0.07	**0.34**	0.22	0.09	-0.24
I-49	0.02	0.08	**0.31**	-0.03	0.16	**-0.39**
I-56	0.08	0.18	0.10	**0.36**	-0.20	0.10
I-61	0.02	0.16	0.15	**0.56**	0.00	0.06
I-68	0.27	-0.01	**0.35**	0.22	0.03	-0.26
I-73	-0.10	0.21	**0.59**	0.02	-0.23	-0.20
I-8	0.24	0.26	0.09	0.20	-0.16	0.25
I-80	0.20	0.14	0.22	**0.49**	0.00	-0.07
I-85	**0.37**	0.03	**0.31**	0.15	-0.02	-0.22
I-92	0.12	0.07	0.19	**0.33**	0.14	**-0.45**
L-11	**-0.43**	**0.34**	0.28	0.07	0.22	0.18
L-18	-0.15	**0.56**	-0.09	0.08	0.06	0.16
L-23	-0.06	**0.65**	0.13	-0.17	-0.21	-0.10
L-30	-0.12	0.24	**0.31**	-0.06	0.18	-0.04
L-35	-0.24	**0.54**	0.23	-0.03	0.01	0.03
L-42	-0.10	**0.57**	-0.04	0.03	0.09	0.18
L-47	**-0.37**	**0.42**	**0.52**	0.00	-0.08	-0.09
L-54	-0.23	**0.57**	0.14	-0.10	0.05	-0.04
L-59	**-0.41**	0.19	**0.45**	0.03	0.25	0.06
L-6	-0.25	**0.45**	0.17	0.05	0.08	0.06
L-66	-0.15	**0.31**	-0.03	0.10	0.12	0.09
L-71	0.01	**0.68**	-0.02	-0.16	-0.15	-0.20
L-78	-0.03	**0.54**	0.19	0.09	-0.06	0.02
L-83	-0.23	**0.49**	**0.33**	0.08	-0.08	-0.04
L-90	-0.08	**0.67**	0.04	-0.16	-0.17	-0.10
L-95	0.01	**0.48**	0.20	0.14	-0.13	0.10
P-16	0.01	**0.63**	-0.15	0.02	-0.02	-0.02
P-21	0.05	**0.36**	0.00	0.16	0.29	0.14

Table 3 (Continued)

Iterative or Common Factor Analysis, SSP (6 Factors)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
P-28	0.12	0.27	-0.26	0.22	0.15	0.26
P-33	0.22	**0.73**	-0.28	0.00	-0.04	0.04
P-40	**0.30**	**0.32**	-0.14	0.14	0.25	0.03
P-45	0.21	**0.61**	-0.15	0.00	-0.06	-0.09
P-52	**0.47**	0.07	-0.07	0.13	0.23	0.19
P-57	0.21	**0.73**	-0.17	0.01	-0.09	-0.06
P-64	0.10	**0.49**	-0.02	0.08	0.12	-0.19
P-69	**0.36**	0.20	-0.09	-0.09	0.28	-0.23
P-76	0.25	**0.43**	-0.09	0.11	**0.33**	-0.06
P-81	**0.51**	0.14	-0.08	0.01	0.21	-0.13
P-88	0.14	**0.37**	-0.11	0.12	**0.39**	0.05
P-9	0.20	0.01	-0.05	0.00	**0.52**	0.00
P-93	0.10	**0.60**	-0.08	0.01	0.12	0.00
P-4	0.27	**0.62**	**-0.35**	-0.03	-0.06	0.09

Note: Items are prefixed with the letter representing their construct.
"P" is perception, "C" is conception, "L" is logic, "F" is feel, "E" is external, and "I" is internal. **Bold values > .30.**

A communality summary, which depicts how much variance in each variable is accounted for by all of the factors extracted (in this case six), is depicted in Table 4. During the first extraction, with many factors, this summary should be reasonably high or close to "1". During the second extraction, the communality summary is more revealing and relevant to the final factors of interest; the variance accounted for in each variable by the final selected factors is representative of the instrument's measurement robustness.

Table 5 on variable complexity shows each variable's representation of factors. Tabachnick and Fidell (1989) suggest that a variable should be as close to "1" as possible to be a good measure of one factor, and complexity of 2 or more suggests that the variable is actually measuring more than one factor. This is a useful test for test developers in examining their individual test items (Hofmann, 1978). The SSP's average was 2.19. This suggests that the instrument's variables can represent two factors or dimensions and that many are related.

Factor Item Analysis of the Gregorc Style Delineator

This qualitatively designed and developed instrument was intended to "identify four basic channels which the mind receives and expresses information." (Gregorc, 1982). Manifested as a cognitive style, these channels are labeled as: Concrete Sequential (CS), Abstract Sequential

Table 4

Communality Summary, FA, Success Style Profile

Items	SMC	Final Estimate	Items	SMC	Final Estimate
C-10	0.54	0.35	I-01	0.50	0.39
C-15	0.42	0.36	I-13	0.45	0.34
C-22	0.33	0.16	I-20	0.42	0.34
C-27	0.56	0.50	I-25	0.54	0.40
C-03	0.60	0.53	I-32	0.51	0.44
C-34	0.56	0.46	I-37	0.40	0.27
C-39	0.55	0.42	I-44	0.46	0.32
C-46	0.53	0.39	I-49	0.42	0.32
C-51	0.46	0.35	I-56	0.49	0.23
C-58	0.58	0.51	I-61	0.43	0.37
C-63	0.53	0.45	I-68	0.49	0.36
C-70	0.47	0.34	I-73	0.51	0.40
C-75	0.53	0.37	I-08	0.41	0.27
C-82	0.18	0.06	I-80	0.45	0.38
C-87	0.47	0.34	I-85	0.52	0.36
C-94	0.53	0.40	I-92	0.49	0.47
E-14	0.55	0.49	L-11	0.48	0.40
E-19	0.52	0.53	L-18	0.52	0.35
E-02	0.57	0.53	L-23	0.58	0.49
E-26	0.43	0.23	L-30	0.43	0.24
E-31	0.61	0.52	L-35	0.51	0.42
E-38	0.47	0.42	L-42	0.59	0.36
E-43	0.44	0.32	L-47	0.59	0.54
E-50	0.46	0.41	L-54	0.48	0.41
E-55	0.59	0.42	L-59	0.48	0.40
E-62	0.58	0.47	L-06	0.44	0.31
E-67	0.49	0.34	L-66	0.25	0.14
E-07	0.43	0.30	L-71	0.56	0.49
E-74	0.51	0.46	L-78	0.50	0.37
E-79	0.61	0.53	L-83	0.56	0.42
E-86	0.44	0.33	L-90	0.58	0.49
E-91	0.59	0.53	L-95	0.53	0.35
F-12	0.58	0.51	P-16	0.49	0.38
F-17	0.48	0.32	P-21	0.38	0.27
F-24	0.54	0.45	P-28	0.35	0.21
F-29	0.63	0.54	P-33	0.59	0.53
F-36	0.57	0.48	P-40	0.41	0.28
F-41	0.50	0.30	P-45	0.51	0.39
F-48	0.68	0.64	P-52	0.44	0.32
F-05	0.53	0.40	P-57	0.62	0.53
F-53	0.51	0.45	P-64	0.45	0.34
F-60	0.46	0.41	P-69	0.48	0.36

Table 4 (Continued)

Communality Summary, FA, Success Style Profile

Items	SMC	Final Estimate	Items	SMC	Final Estimate
F-65	0.39	0.30	P-76	0.52	0.40
F-72	0.54	0.47	P-81	0.48	0.37
F-77	0.52	0.39	P-88	0.44	0.33
F-84	0.56	0.45	P-09	0.47	0.34
F-89	0.58	0.50	P-93	0.54	0.38
F-96	0.51	0.40	P-04	0.53	0.43

Note: Items are prefixed with the letter representing their construct.
"P" is perception, "C" is conception, "L" is logic, "F" is feel, "E" is external, and "I" is internal.

Table 5

Variable Complexity (VC), FA, Success Style Profile

Items	VC ratio	Items	VC ratio
C-10	1.63	I-01	1.79
C-15	3.67	I-13	3.38
C-22	1.40	I-20	2.95
C-27	1.13	I-25	2.24
C-03	2.08	I-32	1.59
C-34	2.16	I-37	2.34
C-39	1.10	I-44	3.72
C-46	2.41	I-49	2.39
C-51	2.10	I-56	2.64
C-58	2.32	I-61	1.33
C-63	1.35	I-68	3.60
C-70	1.05	I-73	1.94
C-75	1.14	I-08	4.87
C-82	1.95	I-80	2.02
C-87	1.15	I-85	3.00
C-94	1.37	I-92	2.72
E-14	2.18	L-11	3.77
E-19	2.25	L-18	1.44
E-02	2.71	L-23	1.53
E-26	1.11	L-30	3.01
E-31	2.41	L-35	1.78
E-38	1.38	L-42	1.34
E-43	2.91	L-47	2.90
E-50	3.12	L-54	1.57
E-55	3.21	L-59	3.01
E-62	2.10	L-06	2.02
E-67	2.07	L-66	2.33
E-07	1.64	L-71	1.40
E-74	1.31	L-78	1.36
E-79	2.23	L-83	2.40
E-86	3.14	L-90	1.34
E-91	3.00	L-95	1.82
F-12	1.09	P-16	1.12
F-17	3.91	P-21	2.74
F-24	2.99	P-28	4.89
F-29	1.12	P-33	1.51
F-36	1.48	P-40	3.69
F-41	3.86	P-45	1.43
F-48	1.07	P-52	2.13
F-05	1.14	P-57	1.34
F-53	1.23	P-64	1.59

Table 5 (Continued)

Variable Complexity, FA, Success Style Profile

Items	VC ratio	Items	VC ratio
F-60	1.10	P-69	3.69
F-65	1.26	P-76	2.84
F-72	2.59	P-81	1.71
F-77	3.12	P-88	2.67
F-84	2.93	P-09	1.32
F-89	2.26	P-93	1.17
F-96	2.80	P-04	2.09
		Average	2.19

Note: Items are prefixed with the letter representing their construct. "P" is perception, "C" is conception, "L" is logic, "F" is feel, "E" is external, and "I" is internal.

VC should be close to "1" to represent only one variable.

(AS), Abstract Random (AR), and Concrete Random (CR). The instrument was constructed using psychological laden and derived words or phrases which each represent one of these composite channels (contextually, a pair of mental functions, e.g. CS, AS, AR, or CR). The instrument is comprised of 40 items which are ranked and scored within four separate scales. I expected the factor analysis to reveal four factors which would support the instrument's four scales or channels.

With a sample size of 467, the subject to variable ratio was over 10:1. An examination of the correlation matrix to determine factorability was positive displaying many correlations among the variables above the .30 recommended to achieve a factor structure and a Bartlett's test of sphericity produced 20053.2 $p < .0001$. The total matrix sampling adequacy was .251. Appendix A, Table A-2 depicts the correlation matrix.

Gregorc PCA. An initial principal component analysis was conducted which extracted 16 factors with eigenvalues greater than one. Of these factors, the first six could be identified having the following eigenvalues: 5.7, 3.0, 2.5, 2.2, 1.8, and 1.6 accounting for over .41 of the total variance. A communality summary, which depicts how much variance in each variable is accounted for by all of the factors extracted (in this case 16), is depicted in Table 6.

An orthogonal solution (since an oblique rotation did not improve the structure in regard to achieving the most simplicity) of this PCA is

Table 6

Communality Summary, PCA, Gregorc Style Delineator (16 Factors)

Items	SMC	Final Estimate
AR-Aesthetic	0.97	0.61
AR-Attuned	0.97	0.78
AR-Aware	0.98	0.79
AR-Colorful	0.98	0.77
AR-Empathy	0.97	0.79
AR-Lively	0.97	0.69
AR-Nonjudgmental	0.96	0.75
AR-Person-oriented	0.97	0.65
AR-Sensitive	0.98	0.77
AR-Spontaneous	0.96	0.78
AS-Analytical	0.97	0.67
AS-Evaluative	0.96	0.84
AS-Ideas	0.98	0.85
AS-Judge	0.98	0.66
AS-Logical	0.97	0.77
AS-Proof	0.97	0.63
AS-Quality	0.96	0.76
AS-Rational	0.98	0.72
AS-Referential	0.98	0.74
AS-Research	0.97	0.70
CR-Creative	0.95	0.71
CR-Experimenting	0.95	0.70
CR-Innovative	0.97	0.75
CR-Insightful	0.94	0.72
CR-Intuitive	0.97	0.87
CR-Multisolutions	0.95	0.70
CR-Perceptive	0.94	0.59
CR-Practical dreamer	0.97	0.66
CR-Risk-taker	0.93	0.69
CR-Troubleshooter	0.97	0.89
CS-Careful detail	0.95	0.67
CS-Objective	0.96	0.68
CS-Ordered	0.97	0.73
CS-Perfectionist	0.93	0.68
CS-Persistent	0.97	0.83
CS-Practical	0.95	0.82
CS-Product oriented	0.96	0.64
CS-Realistic	0.97	0.70
CS-Solid	0.92	0.61
CS-Thorough	0.97	0.87

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.

depicted in Table 7. This table displays (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure in regard to the four scales of the instrument (AR, AS, CR, and CS):

Two of the ten items from the "AR" scale of the instrument loaded inversely on the third factor,

Three of the ten items from the "AS" scale of the instrument loaded positively on the the first factor (and two each on the third and fourth).

Four of ten from the "CR" scale of the instrument loaded inversely on the sixth factor, and two loaded on the second.

Three of ten from the "CS" scale of the instrument loaded inversely on the second factor.

In order to determine if the Gregorc had a more interpretable structure, I followed convention and ran another PCA using a root curve or scree plot technique to reduce the relevant extracted factors. This second PCA revealed the following oblique solution in Table 8. Three factors were extracted having the following eigenvalues: 5.6, 3.0, 2.5 accounting for over .28 of the total variance. A communality summary is depicted in Table 9.

This three factor extraction seemed to clarify the instrument's potential internal structure:

Nine of the ten items from the "AR" scale of the instrument clearly loaded inversely on the first factor (-.33 to -.69).

Table 7

Principal Component Analysis, Orthogonal solution, Gregorc Style Delineator (6 of 16 Factors)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
AR-Aesthetic	-0.02	-0.01	-0.06	-0.25	0.20	0.13
AR-Attuned	-0.04	0.03	-0.20	-0.09	-0.08	-0.15
AR-Aware	-0.08	0.13	-0.07	-0.14	-0.13	-0.11
AR-Colorful	-0.09	**0.30**	-0.01	-0.10	-0.15	-0.01
AR-Empathy	-0.19	-0.02	-0.10	-0.12	-0.01	-0.05
AR-Lively	-0.27	0.16	**0.38**	0.15	-0.06	-0.04
AR-Nonjudgmental	0.04	0.09	**0.41**	**-0.38**	-0.13	0.01
AR-Person-oriented	-0.05	-0.02	0.04	0.02	**-0.87**	-0.01
AR-Sensitive	**-0.49**	-0.02	0.20	-0.20	-0.09	-0.07
AR-Spontaneous	-0.26	**0.40**	0.17	0.08	0.04	-0.17
AS-Analytical	**0.48**	-0.01	-0.02	0.27	-0.24	-0.05
AS-Evaluative	0.18	0.02	0.03	**0.72**	0.13	0.06
AS-Ideas	0.00	-0.05	0.09	0.14	0.14	0.07
AS-Judge	0.09	-0.06	0.05	0.05	0.23	0.05
AS-Logical	**0.33**	0.03	0.02	-0.04	0.06	0.06
AS-Proof	-0.01	0.08	**0.63**	0.12	0.19	-0.11
AS-Quality	-0.12	-0.10	0.10	**0.70**	-0.14	0.04
AS-Rational	**0.83**	-0.01	0.01	-0.04	0.10	0.09
AS-Referential	0.17	0.06	**0.31**	0.22	**0.35**	0.21
AS-Research	0.05	0.09	0.12	0.11	0.01	0.00
CR-Creative	-0.12	0.28	-0.19	-0.15	-0.13	-0.10
CR-Experimenting	**-0.37**	**0.37**	-0.09	0.04	0.24	0.04
CR-Innovative	-0.06	0.06	-0.10	-0.15	-0.04	**-0.34**
CR-Insightful	0.02	0.08	**-0.72**	-0.04	0.18	**-0.32**
CR-Intuitive	0.08	0.08	**-0.32**	**-0.38**	0.00	**-0.50**
CR-Multisolutions	-0.06	0.06	-0.24	-0.07	-0.05	0.02
CR-Perceptive	-0.25	-0.08	-0.21	-0.10	-0.04	**-0.70**
CR-Practical dreamer	0.01	0.16	-0.13	-0.10	**0.32**	-0.10
CR-Risk-taker	-0.02	**0.48**	-0.11	-0.13	0.05	0.09
CR-Troubleshooter	0.09	0.20	-0.11	-0.01	0.05	-0.05
CS-Careful detail	0.20	**-0.35**	0.17	0.16	0.15	0.13
CS-Objective	0.28	-0.06	0.07	-0.08	-0.02	**0.51**
CS-Ordered	0.11	-0.17	-0.13	0.04	-0.04	0.22
CS-Perfectionist	0.06	**-0.80**	0.00	0.10	0.09	-0.07
CS-Persistent	-0.08	**-0.33**	0.16	-0.06	-0.16	-0.11
CS-Practical	-0.24	-0.07	-0.18	-0.02	0.02	**0.65**
CS-Product oriented	-0.05	-0.09	0.07	0.03	**0.33**	0.07
CS-Realistic	0.11	-0.10	-0.07	0.09	-0.27	0.23
CS-Solid	0.05	-0.08	0.21	-0.17	0.07	0.27
CS-Thorough	-0.14	**-0.67**	-0.09	-0.04	-0.16	0.17

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.
Bold values > .30.

Table 8

Principal Component Analysis, Scree 3 Factors, Gregorc Style Delineator

Items	Factor 1	Factor 2	Factor 3
AR-Aesthetic	**-0.44**	0.03	0.05
AR-Attunned	**-0.36**	-0.13	-0.25
AR-Aware	-0.25	**-0.41**	0.03
AR-Colorful	**-0.56**	-0.02	0.04
AR-Empathy	**-0.62**	-0.21	-0.09
AR-Linely	**-0.61**	0.08	**0.35**
AR-Nonjudgmental	**-0.37**	-0.01	0.08
AR-Personoriented	**-0.33**	**-0.36**	-0.14
AR-Sensitive	**-0.69**	-0.29	0.06
AR-Spontaneous	**-0.59**	0.26	0.16
AS-Analytical	**0.54**	0.02	0.02
AS-Evaluative	0.27	0.13	**0.34**
AS-Ideas	0.08	**0.47**	0.18
AS-Judge	0.14	0.05	**0.36**
AS-Logical	**0.40**	-0.06	0.16
AS-Proof	-0.14	0.00	**0.60**
AS-Quality	0.05	-0.04	**0.36**
AS-Rational	**0.35**	-0.04	0.06
AS-Referential	0.08	0.06	**0.58**
AS-Research	**0.32**	0.08	0.12
CR-Creative	0.00	**0.44**	**-0.32**
CR-Experimenting	-0.15	**0.51**	-0.01
CR-Innovative	0.20	**0.42**	**-0.48**
CR-Insightful	0.00	0.18	**-0.59**
CR-Intuitive	0.01	0.07	**-0.58**
CR-Multisolutions	0.17	**0.49**	-0.29
CR-Perceptive	-0.09	0.06	**-0.56**
CR-Practical dreamer	-0.25	0.28	-0.26
CR-Risk-taker	0.11	**0.48**	-0.15
CR-Troubleshooter	0.15	**0.36**	-0.20
CS-Careful detail	0.17	**-0.44**	0.14
CS-Objective	**0.49**	0.14	0.19
CS-Ordered	0.29	**-0.38**	0.02
CS-Perfectionist	0.13	**-0.50**	-0.01
CS-Persistent	0.02	**-0.52**	-0.06
CS-Practical	**0.38**	-0.09	0.15
CS-Product oriented	**0.47**	0.02	0.09
CS-Realistic	**0.42**	-0.28	0.08
CS-Solid	**0.32**	-0.14	0.21
CS-Thorough	0.08	**-0.61**	-0.11

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.
Bold values > .30.

Table 9

Communality Summary ,PCA, 3 Factors, Gregorc Style Delineator

Items	SMC	Final Estimate
AR-Aesthetic	0.93	0.19
AR-Attuned	0.97	0.22
AR-Aware	0.97	0.18
AR-Colorful	0.96	0.30
AR-Empathy	0.96	0.39
AR-Lively	0.98	0.45
AR-Nonjudgmental	0.98	0.13
AR-Person-oriented	0.97	0.21
AR-Sensitive	0.97	0.44
AR-Spontaneous	0.95	0.48
AS-Analytical	0.93	0.29
AS-Evaluative	0.97	0.21
AS-Ideas	0.96	0.24
AS-Judge	0.97	0.16
AS-Logical	0.95	0.23
AS-Proof	0.97	0.34
AS-Quality	0.97	0.14
AS-Rational	0.98	0.14
AS-Referential	0.94	0.35
AS-Research	0.96	0.13
CR-Creative	0.97	0.31
CR-Experimenting	0.92	0.32
CR-Innovative	0.96	0.39
CR-Insightful	0.98	0.39
CR-Intuitive	0.97	0.34
CR-Multisolutions	0.97	0.31
CR-Perceptive	0.98	0.35
CR-Practical dreamer	0.97	0.28
CR-Risk-taker	0.96	0.24
CR-Troubleshooter	0.95	0.16
CS-Careful detail	0.97	0.29
CS-Objective	0.97	0.29
CS-Ordered	0.97	0.29
CS-Perfectionist	0.97	0.30
CS-Persistent	0.94	0.27
CS-Practical	0.98	0.22
CS-Product oriented	0.97	0.24
CS-Realistic	0.95	0.33
CS-Solid	0.98	0.22
CS-Thorough	0.95	0.41

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.

Four of the ten items from the "AS" scale of the instrument loaded positively on the the first factor (.32-.54) and five loaded on the third factor (.34-.60).

Six of ten from the "CR" scale of the instrument loaded on the second factor(.36-.51) and four inversely loaded on the third factor (-.32 to-.59).

Five of ten from the "CS" scale of the instrument loaded on the fist factor (.32-.49) and five inversely on the second (-.38 to-.61) factor.

Factor Analysis. In a check of factor stability, an iterated common factor extraction was performed, specifying four factors using an orthogonal rotation. Its results are depicted in Table 10. Four factors were extracted having the similar eigenvalues: 5.7, 3.0, 2.5, and 2.7 accounting for over .34 of the total variance. A communality summary is depicted in Table 11. A similar structure to the PCA emerged.

Five of the ten items from the "AR" scale of the instrument clearly loaded inversely on the first factor (-.43 to -.61) and the fourth factor (-.35 to -.64),

Seven of the ten items from the "AS" scale of the instrument loaded positively on the the first factor (.30-.53) and five loaded on the third factor (.33-.58).

Seven of ten from the "CR" scale of the instrument loaded on the second factor(.30-.56) and six inversely loaded on the third factor (-.31 to-.57).

Table 10

Iterative or Common Factor Analysis, 4 Factors, Gregorc Style Delineator

Items	Factor 1	Factor 2	Factor 3	Factor 4
AR-Aesthetic	0.02	0.05	0.08	**-0.64**
AR-Attuned	-0.13	-0.08	-0.23	**-0.44**
AR-Aware	0.05	**-0.40**	0.06	**-0.35**
AR-Colorful	**-0.47**	0.09	0.03	-0.29
AR-Empathy	-0.25	-0.13	-0.06	**-0.63**
AR-Lively	**-0.61**	0.22	**0.33**	-0.14
AR-Nonjudgmental	-0.08	0.03	0.09	**-0.42**
AR-Person-oriented	**-0.43**	-0.27	-0.15	-0.02
AR-Sensitive	**-0.61**	-0.15	0.06	-0.29
AR-Spontaneous	**-0.56**	**0.38**	0.14	-0.25
AS-Analytical	**0.47**	-0.10	0.02	0.28
AS-Evaluative	**0.35**	0.05	**0.34**	0.09
AS-Ideas	-0.03	**0.47**	0.16	0.13
AS-Judge	**0.31**	-0.01	**0.36**	-0.05
AS-Logical	**0.38**	-0.14	0.16	0.22
AS-Proof	-0.01	0.01	**0.59**	-0.03
AS-Quality	-0.19	-0.01	**0.33**	**0.38**
AS-Rational	**0.53**	-0.15	0.08	-0.04
AS-Referential	**0.30**	0.01	**0.58**	-0.06
AS-Research	**0.46**	-0.02	0.13	-0.01
CR-Creative	-0.21	**0.47**	**-0.34**	0.09
CR-Experimenting	-0.26	**0.56**	-0.03	0.00
CR-Innovative	-0.06	**0.41**	**-0.50**	0.18
CR-Insightful	0.12	0.16	**-0.57**	**-0.30**
CR-Intuitive	0.01	0.07	**-0.57**	-0.17
CR-Multisolutions	-0.02	**0.47**	**-0.31**	0.13
CR-Perceptive	-0.07	0.07	**-0.55**	-0.21
CR-Practical dreamer	-0.15	**0.31**	-0.26	**-0.31**
CR-Risk-taker	0.06	**0.46**	-0.16	0.00
CR-Troubleshooter	0.26	**0.30**	-0.19	-0.16
CS-Careful detail	0.20	**-0.48**	0.15	0.12
CS-Objective	**0.32**	0.06	0.18	**0.40**
CS-Ordered	0.15	**-0.42**	0.02	**0.31**
CS-Perfectionist	-0.02	**-0.50**	-0.01	0.26
CS-Persistent	-0.23	**-0.48**	-0.07	**0.32**
CS-Practical	0.19	-0.15	0.14	**0.40**
CS-Product oriented	**0.30**	-0.06	0.08	**0.37**
CS-Realistic	0.07	**-0.31**	0.06	**0.58**
CS-Solid	0.12	-0.18	0.20	**0.41**
CS-Thorough	-0.05	**-0.60**	-0.10	0.21

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.

Bold values >.30.

Table 11

Communality Summary, FA, Gregorc Style Delineator (4 Factors)

Items	SMC	Final Estimate
AR-Aesthetic	0.93	0.42
AR-Attuned	0.97	0.27
AR-Aware	0.97	0.29
AR-Colorful	0.96	0.32
AR-Empathy	0.96	0.48
AR-Lively	0.98	0.54
AR-Nonjudgmental	0.98	0.19
AR-Person-oriented	0.97	0.28
AR-Sensitive	0.97	0.48
AR-Spontaneous	0.95	0.54
AS-Analytical	0.93	0.31
AS-Evaluative	0.97	0.25
AS-Ideas	0.96	0.26
AS-Judge	0.97	0.23
AS-Logical	0.95	0.24
AS-Proof	0.97	0.35
AS-Quality	0.97	0.29
AS-Rational	0.98	0.31
AS-Referential	0.94	0.43
AS-Research	0.96	0.23
CR-Creative	0.97	0.38
CR-Experimenting	0.92	0.38
CR-Innovative	0.96	0.45
CR-Insightful	0.98	0.46
CR-Intuitive	0.97	0.35
CR-Multisolutions	0.97	0.34
CR-Perceptive	0.98	0.36
CR-Practical dreamer	0.97	0.28
CR-Risk-taker	0.96	0.24
CR-Troubleshooter	0.95	0.23
CS-Careful detail	0.97	0.30
CS-Objective	0.97	0.30
CS-Ordered	0.97	0.30
CS-Perfectionist	0.97	0.33
CS-Persistent	0.94	0.38
CS-Practical	0.98	0.23
CS-Product oriented	0.97	0.24
CS-Realistic	0.95	0.44
CS-Solid	0.98	0.25
CS-Thorough	0.95	0.42

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential.

Seven of ten from the "CS" scale of the instrument loaded on the fourth factor (.31-.58) and six inversely on the second (-.31 to-.60) factor.

Sampling adequacy remained the same at .251. Variable complexity in Table 12, averaged 1.84 per test item.

Though the Gregorc Style Delineator revealed an interpretable structure, it did not clearly display the structure expected by Gregorc's theoretical interpretation of four learning style channels.

Factor Analysis of the CPPI

Introduction, expectations, and summary. The instrument is comprised of three separate scales which measure bipolar preferences and intensities on three cognitive information processing dimensions: Conscious Attention (Inner or Outer), Acquiring Information (Concrete or Abstract), and Processing Information (Objective or Subjective) and which total 30 sets of descriptive word pair choices on a modified six point semantic differential design.

I expected the CPPI to show evidence of construct validity if three factors emerged which would represent the information processing model above and if the word pair comprising each of the three scales tended to correlate or load together on their representative factor and not on the other factors. Using a sample of 731 adults, the CPPI's correlation matrix was examined for factorability. Its results were very positive with many correlations above the necessary .30. A Bartlett's test of sphericity also

Table 12

Variable Complexity, Factor Analysis, 4 Factors, Gregorc Style Delineator

Items	Orthogonal
AR-Aesthetic	1.05
AR-Attuned	1.83
AR-Aware	2.05
AR-Colorful	1.76
AR-Empathy	1.42
AR-Lively	1.97
AR-Nonjudgmental	1.19
AR-Person-oriented	1.96
AR-Sensitive	1.59
AR-Spontaneous	2.37
AS-Analytical	1.75
AS-Evaluative	2.17
AS-Ideas	1.43
AS-Judge	2.00
AS-Logical	2.37
AS-Proof	1.01
AS-Quality	2.45
AS-Rational	1.22
AS-Referential	1.52
AS-Research	1.17
CR-Creative	2.35
CR-Experimenting	1.41
CR-Innovative	2.24
CR-Insightful	1.80
CR-Intuitive	1.21
CR-Multisolutions	1.90
CR-Perceptive	1.37
CR-Practical dreamer	3.39
CR-Risk-taker	1.27
CR-Troubleshooter	3.28
CS-Careful detail	1.72
CS-Objective	2.36
CS-Ordered	2.14
CS-Perfectionist	1.52
CS-Persistent	2.28
CS-Practical	2.03
CS-Product oriented	2.09
CS-Realistic	1.61
CS-Solid	2.08
CS-Thorough	1.31
Average	1.84

Note: Prefixes represent Gregorc constructs or channels: AR is Abstract/Random, AS is Abstract/Sequential, CR is Concrete/Random, and CS is Concrete/Sequential. VC should be close to "1" to represent only one variable.

indicated a factorable matrix with 8068.7 < .0001. Total matrix sampling adequacy was .90 (.60 or above for a good FA). Appendix A, Table A-3 depicts the correlation matrix.

PCA. I performed an initial PCA using a root curve method of determining the number of factors to extract based on eigenvalues. Using this method, five factors were extracted with eigenvalues of 6.2, 3.8, 3.6, 1.2, and 1.1 accounting for a total variance of .53. Table 13 displays the communality summary.

An oblique solution of this PCA is depicted in Table 14. This table displays (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure in regard to the three scales of the instrument (representing: Attention, Acquiring Information, and Processing Information):

Ten of the ten items from the "Attention" scale of the instrument loaded on the third factor (with eight loading .52-.76) and four loaded on a fifth factor (which will be discussed in Chapter V),

Ten of ten items from the "Perceiving (acquiring information)" scale of the instrument loaded on the first factor (.54-.81),

Ten of ten items from the "Deciding (processing information)" scale of the instrument loaded on the second factor (with eight loading .59-.75).

FA. To examine factor stability of the CPPI, a second method of extraction or a common or iterative factor analysis was conducted and

Table 13

Communality Summary, PCA, CPPI, 5 Factors

Scale-Items	SMC	Final Estimate
ATT-action/reflection	0.44	0.59
ATT-outgoing/reserved	0.50	0.61
ATT-calm/active	0.24	0.39
ATT-hasty/hesitant	0.26	0.35
ATT-alone/crowd	0.25	0.30
ATT-verbal/nonverbal	0.34	0.49
ATT-doing/rehearsal	0.30	0.52
ATT-listening/talking	0.37	0.64
ATT-outside/inside	0.15	0.42
ATT-acting/watching	0.36	0.52
PR-facts/theories	0.53	0.59
PR-horizon/nearby	0.34	0.52
PR-real/imagination	0.51	0.58
PR-detail/global	0.49	0.57
PR-conceptual/factual	0.57	0.64
PR-literal/figurative	0.47	0.54
PR-specifics/possibilities	0.58	0.65
PR-estimate/precise	0.38	0.50
PR-present/future	0.32	0.46
PR-abstract/concrete	0.56	0.62
DC-logic/values	0.40	0.45
DC-rational/compassion	0.65	0.72
DC-sentiment/pragmatic	0.42	0.53
DC-analytic/considerate	0.48	0.61
DC-person/impersonal	0.33	0.45
DC-thoughtful/practical	0.45	0.62
DC-helpful/sensible	0.38	0.56
DC-impartial/partial	0.15	0.32
DC-reasons/feelings	0.58	0.65
DC-subjective/objective	0.23	0.40

Note: Prefixes represent scales:
ATT is attention (focus of attention or conscious awareness),
PR is perceiving (acquiring information), and
DC is deciding (processing or integrating information).

Table 14

Principal Component Analysis, CPPI, Oblique Solution, 5 Factors

Scale-Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
ATT-action/reflection	0.25	0.06	**0.62**	0.29	**0.44**
ATT-outgoing/reserved	0.09	-0.20	**0.76**	0.03	0.23
ATT-calm/active	-0.05	0.06	**0.61**	-0.03	0.00
ATT-hasty/hesitant	-0.01	0.01	**0.57**	-0.02	0.25
ATT-alone/crowd	0.03	-0.15	**0.52**	-0.09	0.09
ATT-verbal/nonverbal	0.00	-0.06	**0.69**	0.00	-0.03
ATT-doing/rehearsal	0.05	-0.02	**0.48**	**0.34**	**0.52**
ATT-listening/talking	-0.12	0.12	**0.72**	-0.12	-0.17
ATT-outside/inside	-0.03	0.04	**0.30**	-0.02	**0.62**
ATT-acting/watching	0.01	0.07	**0.61**	**0.37**	**0.32**
PR-facts/theories	**0.76**	0.00	0.05	-0.01	0.15
PR-horizon/nearby	**0.57**	-0.08	0.02	**-0.47**	-0.07
PR-real/imagination	**0.74**	0.06	0.05	0.04	0.13
PR-detail/global	**0.74**	-0.07	-0.08	-0.02	-0.14
PR-conceptual/factual	**0.81**	-0.05	0.02	-0.04	0.04
PR-literal/figurative	**0.71**	0.09	-0.01	0.09	-0.04
PR-specifics/possibilities	**0.79**	0.05	0.04	-0.02	-0.13
PR-estimate/precise	**0.60**	0.10	0.01	0.19	-0.26
PR-present/future	**0.54**	-0.01	-0.04	**-0.38**	0.17
PR-abstract/concrete	**0.78**	0.05	0.00	0.04	0.05
DC-logic/values	0.20	**0.59**	0.04	0.13	-0.08
DC-rational/compassion	0.11	**0.80**	0.04	0.21	-0.06
DC-sentiment/pragmatic	-0.06	**0.73**	-0.02	0.02	0.08
DC-analytic/considerate	-0.06	**0.71**	0.06	**0.31**	-0.17
DC-person/impersonal	-0.12	**0.67**	-0.10	-0.01	0.00
DC-thoughtful/practical	0.13	**0.70**	-0.01	-0.23	0.16
DC-helpful/sensible	-0.04	**0.69**	-0.10	-0.19	0.18
DC-impartial/partial	-0.06	**0.33**	-0.15	**0.38**	0.23
DC-reasons/feelings	0.08	**0.75**	-0.03	0.27	-0.01
DC-subjective/objective	0.16	**0.40**	-0.03	**0.44**	-0.06

Note: Prefixes represent scales:
ATT is attention (focus of attention or conscious awareness),
PR is perceiving (acquiring information), and
DC is deciding (processing or integrating information).
Bold Items > .30.

revealed a similar structure. Based on observed loadings in the PCA above, four factors were specified using an iterative or common factor extraction. This extraction produced the same eigenvalues of 6.2, 3.8, 3.6, 1.2, and 1.062. An oblique rotation was used which slightly improved the solution.

Table 15 depicts the FA and its similar structure to the PCA. The FA produced (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure:

Again, ten of the ten items from the "Attention" scale of the instrument loaded on the third factor (with nine loading .51-.76) and four also loaded on a fifth factor (the possible implications will be discussed in Chapter V).

Ten of ten items from the "Perceiving (acquiring information)" scale of the instrument loaded on the first factor (.55-.81).

Nine of ten items from the "Deciding (processing information)" scale of the instrument loaded on the second factor (with eight loading .60-.80).

Sampling adequacy (total matrix of .90) and variable complexity (average of 1.3) are depicted in Table 16 and Table 17.

The CPPI analysis' results suggest that its test items are clearly related (correlated) to factors in the expected direction. This provided clear evidence of construct validity. These very clear relationships provided strong evidence that the instrument's structure and

Table 15

Iterative or Common Factor Analysis, CPPI, Oblique Solution, 4 Factors

Scale-Items	Factor 1	Factor 2	Factor 3	Factor 4
ATT-action/reflection	0.26	0.03	**0.67**	**0.32**
ATT-outgoing/reserved	0.10	-0.20	**0.76**	-0.01
ATT-calm/active	-0.05	0.07	**0.58**	-0.14
ATT-hasty/hesitant	0.00	0.00	**0.59**	-0.03
ATT-alone/crowd	0.03	-0.14	**0.51**	-0.13
ATT-verbal/nonverbal	0.00	-0.04	**0.65**	-0.13
ATT-doing/rehearsal	0.06	-0.06	**0.55**	**0.42**
ATT-listening/talking	-0.11	0.15	**0.65**	**-0.31**
ATT-outside/inside	-0.01	0.00	**0.39**	0.15
ATT-acting/watching	0.02	0.04	**0.64**	**0.34**
PR-facts/theories	**0.76**	-0.01	0.08	0.06
PR-horizon/nearby	**0.57**	-0.05	0.01	**-0.44**
PR-real/imagination	**0.74**	0.06	0.07	0.09
PR-detail/global	**0.73**	-0.06	-0.09	-0.03
PR-conceptual/factual	**0.81**	-0.04	0.03	0.00
PR-literal/figurative	**0.71**	0.09	0.00	0.08
PR-specifics/possibilities	**0.79**	0.06	0.03	-0.05
PR-estimate/precise	**0.59**	0.11	-0.03	0.09
PR-present/future	**0.55**	0.00	-0.01	-0.26
PR-abstract/concrete	**0.78**	0.04	0.02	0.08
DC-logic/values	0.20	**0.60**	0.02	0.05
DC-rational/compassion	0.12	**0.80**	0.03	0.11
DC-sentiment/pragmatic	-0.05	**0.73**	0.00	0.00
DC-analytic/considerate	-0.06	**0.71**	0.03	0.16
DC-person/impersonal	-0.12	**0.67**	-0.09	-0.04
DC-thoughtful/practical	0.14	**0.70**	0.02	-0.19
DC-helpful/sensible	-0.02	**0.69**	-0.07	-0.14
DC-impartial/partial	-0.06	0.29	-0.11	**0.44**
DC-reasons/feelings	0.09	**0.73**	-0.02	0.20
DC-subjective/objective	0.16	**0.38**	-0.03	**0.37**

Note: Prefixes represent scales:
ATT is attention (focus of attention or conscious awareness),
PR is perceiving (acquiring information), and
DC is deciding (processing or integrating information).
Bold Values > .30.

Table 16

Sampling Adequacy, Common Factor Analysis, CPPI, 4 Factors

Scale-Items	
ATT-action/reflection	0.84
ATT-outgoing/reserved	0.85
ATT-calm/active	0.88
ATT-hasty/hesitant	0.87
ATT-alone/crowd	0.84
ATT-verbal/nonverbal	0.85
ATT-doing/rehearsal	0.84
ATT-listening/talking	0.83
ATT-outside/inside	0.82
ATT-acting/watching	0.87
PR-facts/theories	0.92
PR-horizon/nearby	0.88
PR-real/imagination	0.94
PR-detail/global	0.93
PR-conceptual/factual	0.93
PR-literal/figurative	0.94
PR-specifics/possibilities	0.92
PR-estimate/precise	0.92
PR-present/future	0.87
PR-abstract/concrete	0.92
DC-logic/values	0.92
DC-rational/compassion	0.89
DC-sentiment/pragmatic	0.92
DC-analytic/considerate	0.90
DC-person/impersonal	0.92
DC-thoughtful/practical	0.90
DC-helpful/sensible	0.89
DC-impartial/partial	0.89
DC-reasons/feelings	0.90
DC-subjective/objective	0.94
Total matrix sampling adequacy: .90	

Note: Prefixes represent scales:
ATT is attention (focus of attention or conscious awareness),
PR is perceiving (acquiring information), and
DC is deciding (processing or integrating information).
SA ratio >.60 for a good FA.

Table 17

Variable Complexity, Common Factor Analysis, CPPI, 5 Factors

Items	Orthogonal	Oblique
ATT-action/reflection	1.74	1.79
ATT-outgoing/reserved	1.15	1.18
ATT-calm/active	1.17	1.16
ATT-hasty/hesitant	1.02	1.00
ATT-alone/crowd	1.33	1.30
ATT-verbal/nonverbal	1.11	1.09
ATT-doing/rehearsal	1.90	1.94
ATT-listening/talking	1.61	1.63
ATT-outside/inside	1.31	1.29
ATT-acting/watching	1.56	1.54
PR-facts/theories	1.03	1.04
PR-horizon/nearby	1.90	1.89
PR-real/imagination	1.09	1.06
PR-detail/global	1.07	1.05
PR-conceptual/factual	1.00	1.01
PR-literal/figurative	1.13	1.06
PR-specifics/possibilities	1.06	1.02
PR-estimate/precise	1.23	1.12
PR-present/future	1.43	1.42
PR-abstract/concrete	1.07	1.03
DC-logic/values	1.34	1.24
DC-rational/compassion	1.17	1.09
DC-sentiment/pragmatic	1.00	1.01
DC-analytic/considerate	1.15	1.12
DC-person/impersonal	1.05	1.11
DC-thoughtful/practical	1.26	1.23
DC-helpful/sensible	1.08	1.10
DC-impartial/partial	1.91	1.92
DC-reasons/feelings	1.29	1.18
DC-subjective/objective	2.45	2.36
Average	1.32	1.30

Note: Prefixes represent scales:
ATT is attention (focus of attention or conscious awareness),
PR is perceiving (acquiring information), and
DC is deciding (processing or integrating information).
VC should be close to "1" to represent only one variable.

dimensionality are both generalizable, accurate, and possess some measure of construct validity.

Comparison of Four Instruments

Expectations and Choices

The second part of the analyses was a factor analytic comparison of the four instruments which was to identify possible shared latent constructs, compare their individually defined learning style components, and provide construct validity for the CPPI. I choose not to use the "J/P" or non-mental functioning dimension of the MBTI in the comparison since the "J/P" construct was initially developed as a device to help identify which function between the Judging (thinking/feeling) or the Perceiving (sensing/intuitive) functions was dominant in a person's psychological type (Myers and McCaulley,1987).

Also, I found it necessary and clearer in each comparative analysis to use only one side of the CPPI's three scales since its aggregate scoring design can be adequately represented by one side of the bipolar constructs of Inner or Outer, Abstract or Concrete, and Objective or Subjective in its comparison with other instruments. Using one side also avoids creating a singular correlation matrix and potential artificial structures. Testing one side of the CPPI's three bipolar dimensions then the other confirmed

this method. Using multitrait and multimethod rationale, the CPPI's constructs loaded with the expected constructs of the other instruments and inversely with the opposite constructs of the the other instruments.

During preliminary analyses, the CPPI's bipolar opposites and the instrument's relationships to the other instruments were explored (though separately). Due to the scoring design of the CPPI's bipolar scales which is purposely and theoretically ipsative in nature as they are total scored, two different PCA/FA runs were examined first using one side of the scale for comparisons, then the other. Both runs revealed the same relationships and results though inversely to each other. Using both sides of the scales at the same time of composite variables (in the analysis) would have artificially created a singular matrix and could have suggested a latent structure when there might not be one (Kline, 1993 and Tabachnick and Fidell, 1989).

Out of curiosity, however, I did experiment with inputting all the CPPI's variables into one FA with the other instruments. The FA produced the same general structure and relationships to the other instruments but also produced the singular matrix which did not allow for some interpretations and might impose questions of an artificial structure in the comparative analyses.

When comparing the nineteen separate mental functioning variables and attention constructs (excluding the non-mental function or "J/P" scale of the MBTI), my expectations due the instruments' cognitive

similarities (if viewed in a context of the information processing model) conformed to categories of acquiring information and processing information and an attention dimension.

Though not all of the internal factor item analyses structures were robust, there still was enough structure in each instrument to analyze and examine further in a comparative series of factor analyses to try to better understand underlying latent processes or structures which these instruments share. With a sample of 201 adult subjects, all four instruments' constructs (subscale scores) were compared and examined using similar PCA/FA conventions followed with the separate instrument item analyses. Except for the Gregorc's channels, the instruments' constructs (subscales) were prefixed ("ATT" for attention, "PR" for perceiving or acquiring information, and "DC" for deciding or processing information) in the data sets to ease in their comparative interpretations (in line with my initial expectations).

Principal Component Analysis of the Four Instruments.

Using a sample of 201 adults, the correlation matrix, Appendix A, Table A-6, was examined for factorability. Its results produced many correlations above the necessary .30. A Bartlett's test of sphericity also indicated a factorable matrix with 3809.3 < .0001. Total matrix sampling adequacy was .66 (.60 or above for a good FA).

I performed an initial PCA using a root curve method of

determining the number of factors to extract based on eigenvalues. Using this method, six factors were extracted with eigenvalues of 5.9, 3.2, 2.8, 2.1,.9, and .6, accounting for a total variance of .82. Table 18 displays the communality summary.

An orthogonal solution (since an oblique rotation did not improve the structure in regard to achieving the most simplicity) of this PCA is depicted in Table 19. This table displays (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure:

The following variables loaded on the first factor: Gregorc's Abstract/Sequential, Abstract/Random, and Concrete/Sequential (.50, -.82, and .37). All five of the "processing information variables of the other instruments , prefixed "DC", loaded (-.93 to .85).

Additionally, the the MBTI and CPPI 'Attention" variables loaded on the second factor in a bi-polar manner (-.93 to .92). Theoretically opposite dimensions loaded as expected in an inverse manner to its opposite construct on the same instrument and in relation to theoretically opposite variables of the other instruments.

The following variables loaded on the third factor: All five of the acquiring information variables, prefixed "PR" of the CPPI, SSP, and MBTI (-.56 to .91). Gregorc's Concrete/Random and Concrete/Sequential loaded (-.59 and .57). Theoretical inverse relationships again emerged.
The fourth factor was totally defined by the SSP six constructs with positive loadings (.36-.84).

Table 18

Communality Summary, Principal Component Analysis, Four Instruments

Composite Scale (Channel)-Instrument	SMC	Final Estimate
Abstract/Random-Gregorc	0.97	0.80
Abstract/Sequential-Gregorc	0.96	0.92
Concrete/Random-Gregorc	0.97	0.90
Concrete/Sequential-Gregorc	0.98	0.86
Scale-Instrument-Construct	**SMC**	**Final Estimate**
AT-CPPI-Outer*	0.51	0.71
AT-MBTI-Extraversion	0.96	0.56
AT-MBTI-Introversion	0.93	0.91
AT-SSP-External	0.60	0.75
AT-SSP-Internal	0.65	0.78
PR-CPPI-Concrete*	0.61	0.72
PR-MBTI-Intuitive	0.85	0.85
PR-MBTI-Sensing	0.86	0.86
PR-SSP-Perception	0.70	0.79
PR-SSP-Conception	0.73	0.82
DC-CPPI-Objective*	0.69	0.77
DC-MBTI-Feeling	0.85	0.88
DC-MBTI-Thinking	0.83	0.85
DC-SSP-Logic	0.59	0.75
DC-SSP-Feel	0.73	0.77

Note: Prefixes--"AT" indicate attention variable, "PR" perceiving or acquiring information, "DC" deciding or processing information. Gregorc constructs are composites.
*CPPI bi-polar constructs omitted in comparisons to avoid singular matrix structure.

Table 19

Principal Component Analysis, Orthogonal Solution, Four Instruments

Composite Scale-Instrument (Channel)	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Abstract/Random-Gregorc	**-0.82**	0.14	-0.04	0.02	-0.20	-0.27
Abstract/Sequential-Gregorc	**0.50**	-0.10	0.07	0.06	**0.81**	-0.04
Concrete/Random-Gregorc	0.00	0.06	**-0.59**	0.03	**-0.68**	**-0.30**
Concrete/Sequential-Gregorc	**0.37**	-0.12	**0.57**	-0.08	0.24	**0.57**

Scale-Instrument-Construct	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
AT-CPPI-Outer*	0.25	**0.78**	-0.04	-0.03	-0.08	-0.17
AT-MBTI-Extraversion	-0.19	**0.92**	-0.10	0.00	-0.03	0.07
AT-MBTI-Introversion	0.14	**-0.93**	0.12	0.01	0.04	-0.07
AT-SSP-External	0.03	**0.62**	0.06	**0.60**	0.01	-0.06
AT-SSP-Internal	0.00	-0.24	-0.02	**0.84**	0.04	0.04
PR-CPPI-Concrete*	0.13	-0.09	**0.82**	0.14	0.03	0.08
PR-MBTI-Intuitive	-0.20	0.01	**-0.90**	-0.04	-0.02	-0.07
PR-MBTI-Sensing	0.10	-0.07	**0.91**	0.06	0.12	0.03
PR-SSP-Conception	0.17	0.21	**-0.56**	**0.55**	-0.16	**0.34**
PR-SSP-Perception	-0.10	0.11	**0.33**	**0.81**	0.06	0.02
DC-CPPI-Objective*	**0.85**	-0.10	0.08	-0.12	0.09	0.04
DC-MBTI-Feeling	**-0.93**	-0.06	-0.13	-0.02	-0.05	0.00
DC-MBTI-Thinking	**0.90**	0.11	0.16	0.02	0.03	0.04
DC-SSP-Feel	**-0.50**	**0.31**	**-0.31**	**0.52**	-0.24	0.00
DC-SSP-Logic	**0.50**	0.00	0.25	**0.36**	0.06	**0.55**

Note: Prefixes--"AT" indicate attention variable, "PR" perceiving or acquiring information, "DC" deciding or processing information. Gregorc constructs are composites.

*CPPI bi-polar constructs omitted in comparisons to avoid singular matrix structure. **Bold values > .30**

The fifth factor was determined by the Gregorc "AS" and "CR" constructs in a bipolar relationship (.81 to -.68).

The sixth factor was defined by the SSP Conception and Logic constructs.

Iterative or Common Factor Analysis

A second extraction was performed using an iterative common factor extraction to confirm structure stability. Although a root curve or scree plot indicated the first three factors, four factors were purposely extracted to investigate and display the unique loadings of the fourth factor in the previous PCA. Eigenvalues were produced (5.9, 3.2, 2.8, and 2.1 which accounted for .74 of the variance. Communality Summary is depicted in Table 20. Sampling adequacy was .63. Variable complexity averaged 1.4. The FA produced a similar structure, even though an additional variable was extracted and an oblique rotation was used. The additional factor tended to be defined by the SSP's variables.

The FA is depicted in Table 21. This table displays (using a minimum criteria of .30 or above to determine saliency of item coefficients) the following structure:

The following variables loaded on the first factor: Gregorc's Abstract/Sequential, Abstract/Random, and Concrete/Sequential (-.60, .89, and -.39). Again, as in the PCA, all five of the "processing information

Table 20

Communality Summary, Common Factor Analysis, 4 Instruments, 4 Factors

Composite Scale (Channel)-Instrument	SMC	Final Estimate
Abstract/Random-Gregorc	0.97	0.79
Abstract/Sequential-Gregorc	0.96	0.46
Concrete/Random-Gregorc	0.97	0.63
Concrete/Sequential-Gregorc	0.98	0.69
Scale-Instrument-Construct	**SMC**	**Final Estimate**
AT-CPPI-Inner*	0.52	0.68
AT-MBTI-Extraversion	0.93	0.87
AT-MBTI-Introversion	0.94	0.88
AT-SSP-External	0.60	0.72
AT-SSP-Internal	0.66	0.76
PR-CPPI-Abstract*	0.61	0.67
PR-MBTI-Intuitive	0.85	0.79
PR-MBTI-Sensing	0.86	0.83
PR-SSP-Conception	0.73	0.75
PR-SSP-Perception	0.70	0.76
DC-CPPI-Subjective*	0.69	0.76
DC-MBTI-Feeling	0.85	0.83
DC-MBTI-Thinking	0.83	0.81
DC-SSP-Feel	0.73	0.77
DC-SSP-Logic	0.59	0.63

Note: Prefixes--"AT" indicate attention variable, "PR" perceiving or acquiring information, "DC" deciding or processing information. Gregorc constructs are composites.
*CPPI bi-polar constructs omitted in comparisons to avoid singular matrix structure.

Table 21

Iterative or Common Factor Analysis, 4 Instruments, 4 Factors

	(Processing) DC	**(Attention)** ATT	**(Acquiring)** PR	
Composite Scale-Instrument	Factor 1	Factor 2	Factor 3	Factor 4
Abstract/Random-Gregorc	**0.89**	0.08	-0.06	-0.05
Abstract/Sequential-Gregorc	**-0.60**	-0.09	-0.14	0.04
Concrete/Random-Gregorc	0.03	0.04	**0.77**	0.01
Concrete/Sequential-Gregorc	**-0.39**	-0.05	**-0.61**	0.01
Scale-Instrument-Construct	Factor 1	Factor 2	Factor 3	Factor 4
AT-CPPI-Inner*	0.27	**-0.82**	-0.06	0.07
AT-MBTI-Extraversion	0.11	**0.91**	-0.01	0.00
AT-MBTI-Introversion	-0.05	**-0.92**	-0.02	0.01
AT-SSP-External	-0.07	**0.62**	-0.08	**0.56**
AT-SSP-Internal	-0.03	-0.27	0.06	**0.84**
PR-CPPI-Abstract*	0.00	0.01	**0.81**	-0.10
PR-MBTI-Intuitive	0.06	-0.08	**0.88**	0.00
PR-MBTI-Sensing	0.05	0.02	**-0.93**	0.01
PR-SSP-Conception	**-0.34**	0.18	**0.60**	**0.64**
PR-SSP-Perception	0.12	0.11	**-0.35**	**0.77**
DC-CPPI-Subjective*	**0.87**	0.02	-0.06	0.10
DC-MBTI-Feeling	**0.94**	-0.16	-0.03	-0.02
DC-MBTI-Thinking	**-0.91**	0.21	-0.01	0.03
DC-SSP-Feel	**0.45**	0.24	0.26	**0.52**
DC-SSP-Logic	**-0.58**	0.05	-0.21	**0.46**

Note: Prefixes--"AT" indicate attention variable, "PR" perceiving or acquiring information, "DC" deciding or processing information. Gregorc constructs are composites.
*CPPI bi-polar constructs omitted in comparisons to avoid singular matrix structure. **Bold values > .30.**

variables of the other instruments , prefixed "DC", loaded (-.91 to .94). Theoretical inverse relationships again emerged as expected.

The second factor displayed four of the five "Attention" variables of the CPPI, SSP, and MBTI (-.92 to .91). The MBTI and CPPI's variables inversely loaded as expected (theoretically).

The following variables loaded on the third factor: All five of the acquiring information variables, prefixed "PR" of the CPPI, SSP, and MBTI (-.35 to .88). Gregorc's Concrete/Random and Concrete/Sequential loaded positively (.77 and -.61). Again, the theoretically opposite dimensions loaded as expected in an inverse manner to its opposite construct on the same instrument and in relation to theoretically opposite variables of the other instruments.

The fourth factor of this extraction was again defined by the six SSP variables (.52-.84).

During the separate PCA and FA, the CPPI's bipolar opposites and the instrument's relationships to the other instruments were explored (though separately). I did experiment with inputting all the CPPI's variables in one FA with the other instruments. The FA produced the same general structure and relationships to the other instruments but also produced a singular matrix which does not allow for some FA interpretations and might impose an artificial structure.

Chapter Summary

This chapter examined the results of the individual instrument factor analyses and the comparative analyses. With the MBTI's previous analysis as a baseline, factor item analysis was conducted on the SSP, Gregorc Style Delineator, and the CPPI. The SSP yielded a consistent structure, though unweighted raw scores had to be used in the analysis. The SSP tended to support its theoretical constructs but displayed overlapping factors among several of its dimensions. The Gregorc's structure did not support all of its four theoretical constructs. The CPPI demonstrated the strongest internal factor structure of the four instruments, including the MBTI.

Factor analyses which compared the four instruments displayed a clear structure in three expected dimensions.

In the next chapter, the three research questions of this study will be answered within the limitations of this research. Each instrument's results will be analyzed and the comparative analysis will be discussed. Tentative conclusions and recommendations will be made.

CHAPTER V

Discussion, Conclusions, and Recommendations

A person does not use the same information as another or in the same way..."different people see different worlds--the difference is as much a matter of how we see as what is seen" (Smith, 1979, p 3).

Since we learn from acquiring and processing new information based on how we make sense of the world from our previous learning, our learning style is basically our choice or preference on how we prefer to organize, format, and integrate new information into our schemata (McCarthy, 1980). Our learning style manifests itself with our preference and our preference becomes our style. Measuring our learning style, however, has been problematic.

Most of the existing learning style instruments, according to Bonham (1987), Curry (1983), and recent reviews by D'Amato (1992) and Gregg (1989), are at best marginally reliable and possess little psychometric rigor and soundness. Consistent with these strong affidavits for caution in their use and the resulting recommendations from Bonham (1987 and 1988) for additional learning style research, it was important from both a theoretical and practical basis to develop a useful and sound alternative instrument, the Cognitive Preference Pattern Indicator (CPPI).

Simultaneous to examining its construct validation, it also proved

useful to empirically examine several other current and widely used cognitive learning style instruments, the Myers Briggs Type Indicator--MBTI, the Success Style Profile--SSP, and the Gregorc Style Delineator. Except for the MBTI, they had not been factor analyzed and as such their separate construct validities were unknown.

The three research questions in this study, listed below, dealt with the instrumentation, measurement, and theoretical issues of dimensionality in regard to cognitive learning style instruments.

1. In comparison to other cognitive learning style instruments, to what extent would a modified semantic differential technique be adequate in regard to reliability and validity in measuring learning style constructs of the information processing model?

2. Are the internal factor structures in the CPPI, SSP, and Gregorc Style Delineator consistent with their intended theoretical dimensions and constructs? The MBTI factor structure has been previously demonstrated (Thompson & Borrello, 1986).

3. What are the shared common cognitive constructs among the adult learning style instruments in this study?

The conclusions and recommendations for each of these questions will now be discussed.

Research Question One-the Reliability and Validity of the CPPI

In regard to the first research question concerning the

psychometric properties displayed by the Cognitive Preference Pattern Indicator (CPPI), the instrument using a modified semantic technique exhibited a surprising robustness in comparison with the other instruments of this study.

Conclusions of the CPPI

The CPPI's reliability, internal factor structure, and common construct comparisons (multitrait multimethod) all provided strong positive evidences for the new instrument's dimensionality, consistency, stability, and robustness.

Reliability of the CPPI. All tests to be determined reliable should produce reliability coefficients above .70 (Kline, 1993). The CPPI scales' reliability coefficients (Cronbach alpha--the most accepted and conservative of the reliability tests) exceeded standards for acceptable reliability.

Internal consistency reliability coefficients produced with an initial sample of 141 adults were .77 (Outer/Inner scale), .88 (Concrete/ Abstract scale), and .82 (Objective/Subjective scale). Analyses during this study, using a total of 731 adults, produced similar coefficients of .79, .88. and .86 respectively. Reliability coefficients for female and male subjects were also similar, .81, .88, and .84 and .79, .86, and .79 respectively. The acquiring information dimension, represented by the Concrete and Abstract scale, was the most reliable.

The CPPI's scales, as they are, even without tailoring a few of its lower loading items due to the factor item analyses, produced favorable reliability estimates in comparison to the reliability coefficients of the SSP's scales-- .64 to .77 (Lindholm and Politano, 1989), the Gregorc Style Delineator's scales-- .89 to .92 (Gregorc, 1982), and the MBTI's scales-- .76 to .83 (Myers and McCaulley, 1987).

Internal Structure of the CPPI. In comparison to Thompson and Burrello's (1986) analysis of the MBTI which produced twenty of twenty-two test items from the "EI" scale, twenty-two of twenty-six test items from the "SN" scale, and sixteen of twenty-three test items from the "TF" scale, the similar constructs and scales of the CPPI displayed a strong and stable factor structure. Its final internal factor analysis, Table 15 (page 114), produced ten of the ten items from the "Attention" scale loading together (with nine loading .51-.76), ten of ten items from the "Perceiving (acquiring information)" scale loading together (.55-.79), and nine of ten items from the "Deciding (processing information)" scale loading together (with eight loading .60-.80).

Marker variables are a few items in each scale which due to their relatively high loadings are deemed to be pure representations of the factor for interpreting or identifying the factor (Kerlinger, 1986; Tabachnick & Fidell, 1989; and Kline, 1993). The marker variables of the CPPI in each scale, the highest loadings of each factor, were:

The acquiring information scale (Factor 1) was identified by the

marker variables or preference choices for PR-facts/theories, real/imagination, detail/global, conceptual/factual, literal/figurative, specifics/possibilities, and abstract/concrete (all loaded above .70).

The deciding or processing information scale (Factor 2) was identified by DC-rational/compassion, sentiment/pragmatic, analytic/considerate, and reasons/feelings (all loaded above .70).

The attention scale (Factor 3) was identified by ATT-outgoing/reserved (loaded .76).

In addition to the clear structure of three factors of perceiving or acquiring information (factor 1), deciding or processing information (factor 2), and attention or conscious awareness (factor 3), a fourth factor emerged comprised of word pairs: ATT-doing/rehearsing, acting/watching, listening talking (inverse), PR-nearby/horizon (inverse), DC-impartial/partial, and DC-subjective/objective moderately emerged without a strong loading or marker variable.

In the PCA, Table 14 (page 112), a fifth factor emerged also somewhat representative of the attention scale comprised of five variables: action/reflection, outgoing/reserved, hasty/hesitant, doing/rehearsal, and acting/watching. The identifying marker variables were action/reflection and doing/rehearsal.

Construct Validity of the CPPI. As depicted above in reference to the CPPI's internal structure, the instrument produced clear and stable internal factor structures consistent with its theoretical model, the

information processing model (Conscious attention, Acquiring information, and Processing information). In Appendix B, Tables B-3 and B-4, I ran supplementary internal factor analyses by gender to determine if there tended to be a definite gender difference in the structure of the instrument. Both factor analyses yielded similar structures. Appendix A, Tables A-4 and A-5 depict the correlation matrices.

In the comparative factor analyses of the four instruments, the CPPI's constructs loaded on theoretically expected dimensions and in the expected directions (multitrait multimethod) with the other instruments' constructs (Kerlinger, 1986). For example, the factor analysis in Table 21 displayed:

All five of the processing information variables of the CPPI, SSP, and MBTI, prefixed "DC", loaded on the first factor (-.91 to .94). Theoretical inverse relationships again emerged as expected.

The second factor displayed four of the five "Attention" variables of the CPPI, SSP, and MBTI (-.92 to .91). The MBTI and CPPI's variables inversely loaded as expected (CPPI's "I" inversely with the MBTI's "E").

All five of the acquiring information variables (prefixed "PR") of the CPPI, SSP, and MBTI loading together (-.35 to .93) on the third factor.

On of the above factors, the theoretically opposite dimensions loaded as expected in an inverse manner to their opposite construct on the same instrument and in relation to theoretically opposite variables of the other instruments, which provided some additional evidence of construct

validity for the constructs of the CPPI and the other instruments involved (Kline, 1993 and Anastasi,1988).

Of the CPPI's 30 variables, its average variable complexity measured 1.3. This figure suggests the instrument's relative orthogonality of its theoretical constructs represented by the factors in its relatively simple, robust structure. Tabachnick and Fidell (1989) suggest that a variable should be as close to "1" as possible to be a good measure of one factor, and complexity of 2 or more suggests that the variable is actually measuring more than one factor. This is a useful test for test developers in examining their individual test items.

In this study, the CPPI produced evidences toward its reliability and validity with adult populations. Based on the information processing model of conscious attention, acquiring information, and processing information, the CPPI's reliability coefficients, internal factor structure, and its comparative analysis with the other instruments suggest, within the limitations of this study, that it might be both generalizable and accurate in its measurement of cognitive learning style.

Recommendations for the CPPI

To improve and refine the CPPI, based on this analysis, I could, in accordance with Kline's (1993) recommendations for test construction using factor analysis:

1. Retain the scales clearly represented by the first three factors.

2. Reduce or appropriately weight the items in each scale which load less than .40.

3. Replace the few low loading items with alternative test items and re-analyze the CPPI for improvement of internal reliability and factor structure.

4. Examine possible subscales to the Attention scale which though loaded together on one factor, also defined two subsequent factors in regard to possible activity and disposition components of conscious attending or focus of attention.

. 5. Recommend that improvements to the CPPI incorporate a combination of the above (to include a possible accommodation for weighting the scoring of minor gender differences).

6. Perform or encourage additional psychometric research with broader and more diverse sample populations for this relatively promising instrument

Research Question Two-the Factor Structures of the Instruments

The second research question concerns the factor structure of the CPPI, SSP, and Gregorc Style Delineator. My original intention in examining the factor structures of the SSP and Gregorc Style Delineator was not one of instrument design or development, but one of confirmation of structure. In order to insure that prior to comparing these instruments' representations of cognitive learning style, they had to display reasonable internal structures and seem to measure what their author's intended.

Since neither instrument had withstood a factor analytical scrutiny and were not developed using factor analysis techniques, their construct validities were in question (Kline, 1993). Therefore, my analysis of them was more of a check of internal structure in relation to their respective theoretical constructs and not developmental in nature as the CPPI's factor analyses as addressed above.

Conclusions of the Internal Analyses of the SSP and Gregorc Instruments

The Factor Structure of the Success Style Profile. Table 3 (page 91) depicts the SSP and its similar relationships and loadings of variables to the factors. The structure was relatively consistent with the instrument's theoretical bases representing the cognitive categories of Coates' dimensions of cognition. The instrument was designed based on theoretical separate scales representing the cognitive functions of Perception, Conception, Logic, and Feel and the attention scales depicting External and Internal orientations. For the instrument to support its theoretical constructs, six groups of sixteen questions meant to measure these constructs should have loaded together on six dimensions or factors. The analysis in this study yielded the following structure which provided some evidence of the SSP's construct validity (that it measures what it was intended to represent).

Fifteen of the sixteen test items from the "Conception" scale, nine of

the sixteen test items from the "Perception" scale, twelve of sixteen test items from the "Feel" scale, and fourteen of sixteen test items from the "Logic" scale loaded on factors as theoretically expected.

However, the fourteen items from the "Logic" scale loaded on the same factor with the nine "Perception" items. This could suggest that the SSP's questions intended to measure different constructs of Logic and Perception are measures of their intended constructs but also that the theoretical constructs of Logic and Perception as measured by the SSP are related (The other instruments' internal structures and in the comparative analyses of the four instruments do not support this theoretical relationship).

The weakest scales of the SSP in this analysis were its measurement of the Internal and External constructs.

Six of sixteen test items from the "Internal" scale loaded on the third factor (.33-.56) with items from the "Conception" scale which suggests a possible relationship of the two constructs as measured by the instruments. Various other "Internal" items loaded on other factors.

Seven of sixteen test items from the "External" scale inversely loaded on the fourth factor with its theoretical Internal opposite, and five "External" items positively loaded on the fifth factor.

Table 5 on variable complexity shows the SSP's variables representation of factors. Tabachnick and Fidell (1989) suggest that a variable should be as close to "1" as possible to be a good measure of one

factor, and complexity of 2 or more suggests that the variable is actually measuring more than one factor. The SSP's average was 2.19. This suggests that the instrument's variables may represent two factors or dimensions and that many are related. The SSP's internal factor structure (summarized above) tends to confirm this.

Marker variables representing questions of the SSP tended to support the labeling of the SSP's scales. The marker questions or phrases, as well as all the questions of the instrument, are situational and psychological choices between paired theoretical opposite phrases designed to represent their constructs. The marker variables on the SSP seem to be helpful in confirming the factor it represents label or name.

The Conception scale's marker variable questions were identified as Conception questions by the author and loaded highly on the conception factor: C-27 "Using your mind, knowledge, and concepts" and C-3 "Envisioning a new way of doing something."

The Perception scale's marker variable questions were: P-33 "Following a well tested procedure," P-57 "Relying on a proven, successful method," L-71 "Having clear directions, controlling a situation."

One logic question, L-90, qualified as a marker "Following a plan, leaving nothing to chance." However, this marker (along with the other logic questions) loaded on the same factor as the perception questions, which suggests that the SSP's perception and logic questions as currently constructed tend to measure the same thing.

Marker variables for the Feel scale included F-48 "A kind warm spirit," F-12 "Producing something that touches people's hearts," and F-29 "The affection of friends."

The External and Internal scales did not have high enough loadings to highlight marker variables which also could suggest that these scales are also the SSP's weakest.

The above SSP factor structure can be defined by the following: The first factor is defined by the "Feel" scale, the second by the "Logic" and "Perception" scales, the third by the "Conception" and "Internal"scales, the fourth by the "Internal" and "External" scales, and the fifth by the "External" scale.

Though not as clearly defined as the MBTI and CPPI, the factor structures could be interpreted as generally supporting its theoretical constructs as evidenced in its internal analyses and in the comparative analyses with the other three instruments discussed below in response to research question three. The SSP's common constructs were shared (except for the SSP's Internal scale) in the expected dimensions and direction with the other instruments.

The Gregorc Style Delineator. The Gregorc Style Delineator in these analyses was the most challenging in regard to obtaining an internal factor structure. The instrument was constructed using psychological laden and derived words or phrases which each represent one of these composite channels (contextually, a pair of mental functions,

e.g. CS, AS, AR, or CR). If the Gregorc Style Delineator measures its theoretical composite constructs, its four basic channels, with which according to Gregorc (1982) the mind receives and expresses information, Concrete Sequential (CS), Abstract Sequential (AS), Abstract Random (AR), and Concrete Random (CR), its internal factor structure would tend to display these four factors as separate dimensions.

My initial principal component analysis, Table 7 (page 102), produced a disappointing result. Only two of the ten items from the "AR" scale of the instrument loaded together (inversely) on the third factor and three of the ten items from the "AS" scale of the instrument loaded positively on the the first factor. Four of ten from the "CR" scale of the instrument loaded inversely on the sixth factor, and three of ten from the "CS" scale of the instrument loaded inversely on the second factor.

Seeking a more interpretable structure, I ran another PCA and a follow-on iterative factor analysis, FA, using a root curve or scree plot technique to reduce the relevant extracted factors. The PCA, Table 8, and the FA, Table 10, (pages 103 and 106) revealed the following similar structure and seemed to better represent the instrument's potential internal structure:

Nine of the ten items from the "AR" scale of the instrument clearly loaded inversely on the first factor. The "AS" scale loaded on two different factors, four items loaded positively on the first factor and four loaded on the third factor.

Six of ten from the "CR" scale loaded on the second factor and four inversely loaded on the third factor.

Six of ten from the "CS" scale of the instrument loaded on the first factor and four inversely on the second factor.

The Gregorc Style Delineator's factor structure in this study can be summarized by the following:

First Factor defined by "-AR", "AS", and "CS".

Second Factor defined by "CR" and "-CS".

Third Factor defined by "AS" and "-CR".

The above structure did not clearly support four separate factors or constructs (or channels). However, it did provide some evidence due to the inverse loading of possible bipolar relationships in the theoretically expected directions between "AS" and "CR"; "AR" and "CS"; as well as "CR" and CS" (presumably the "R and S"). One could argue that the items and expressions which comprise these channels represent different dimensions of cognitive style. In examining the factor analyses of this study as evidence of the construct validity of Gregorc's four separate channels, a simpler orthogonal structure would have provided stronger support. Finally in its internal analyses, none of the scales had high enough loadings to qualify variables as marker variables (since none of the Gregorc variables were found to be near pure representations of the factors). These modest relationships displayed by the factor structures also tended to be consistent with the lack of a clear definition between the

composite constructs or channels with each other.

Its most definable characteristic was the bipolar and inverse relationships which were theoretically consistent. This was present in both its internal and comparative analyses as discussed above.

Recommendations for the CPPI, SSP, and Gregorc

Cognitive Preference Pattern Indicator. This instrument promises to provide the adult education community with a current and practical alternative to other learning style instruments. It is recommended that improvements be considered in strengthening its attention and deciding or processing scales by deleting, weighting, or replacing the outside/inside item and the impartial/partial and subjective/objective items respectively. These moderate loading variables could be replaced and tested without jeopardizing the general robustness of the CPPI in future research.

The CPPI's relative generalizablity is currently limited. Due to the general homogeneity of the graduate level, professional, 40 year old, caucasian majority of the 731 sample used in this study, some caution is recommended in the use of the instrument with different populations of adults and adolescents.

The Success Style Profile. From the results of this study, several of the scales seem to have multicollinearity problems (load on more than one factor) as indicated in its internal factor structures, Table 3 (page 91), variable complexity ratios, and its singular definition of the fourth factor

brought about by the six SSP variables in the comparative factor analyses, Table 21 (page 125).

The current scoring of the SSP does not reflect these composite relationships. For example, items representing more than one scale in the factor structure are not credited in the SSP's scoring as composites. Currently, the SSP's variables are treated as independent in regard to values selected on each item and values tabulated in the scoring procedures. In addition, the existing weighting of items, as furnished by Coates for this study, did not produce a useful factor structure in the preliminary principal component analyses, and unweighted scoring had to be used.

Based on this study's results, the current instrument scoring procedure needs modification and review. Therefore, it is recommended that the SSP items be appropriately weighted to yield a more robust structure.

Gregorc Style Delineator. The Gregorc Style Delineator's factor structure was not clearly defined in accordance with its theoretical constructs or channels, and the instrument's internal reliability coefficients were below the recommended .70 minimum on all scales.

However, an interesting structure is interpretable in regard to the constructs of the information processing model. As can be seen on Table 21 (page 125), the Concrete Random (CR) and Concrete Sequential (CS) loaded on opposite poles on the acquiring information dimension in a

consistent direction (sign) with the CPPI-Abstract (Gregorc's CR), CPPI-Concrete (Gregorc's CS) and the SSP-Conception and Perception, and MBTI-Intuitive and Sensing constructs, respectively. The Abstract Random (AR) and Abstract Sequential (AS) loaded on opposite poles on the processing of information dimension also consistent in direction with the other instruments' processing loading constructs.

From these empirical relationships, one could posit that the Gregorc channels and theoretical bases should be amended to represent the information processing model with the acquiring information dimension being represented by the CR as an "idea-seeking"or abstract perceiving construct with its opposite being the CS representation of a "fact-seeking" or concrete perceiving construct. The second dimension could represent the process side of the model with AR being an " intuitive-decision making" or subjective pole and AS an analytical or objective opposite. If this construct and theoretical suggestion was accepted, then Gregorc should consider the re-naming of his channels to a more accurate representation of what is actually being measured.

Though in the comparison with the other instruments, the Gregorc Style Delineator could be construed, if one accepts the above conceptualizations, as contributing in the comparative factor analyses to the dimensional structure and in the expected directions consistent with the other instruments, it is recommended that some caution be exercised in interpreting one's results under Gregorc's current theoretical

explanations (as a cognitive learning style instrument) which this analysis did not clearly support.

The Myers-Briggs Type Indicator. The MBTI was used a baseline and a comparative model for the internal factor analyses of the other instruments. In the comparative analyses, the MBTI loaded in relation to itself and the other instruments in the expected dimensions and in the expected directions as could be theoretically anticipated. Additionally, its robustness served as marker variables in defining the emergent information processing model overlaying the three factor solution of the four instrument analyses.

Research Question Three-Shared Common Constructs

The third research question asked what were the shared common cognitive constructs among the adult learning style instruments in this study? To answer this question, comparative factor analyses were performed using the four instruments and nineteen of their theoretically similar variables of cognitive style or mental functions.

Conclusions of the Comparative Analysis

Shared structure of the four instruments. In the iterative or common factor analysis, four factors were extracted, Table 21 (page 125).

The following variables loaded on the first factor: Gregorc's Abstract/Sequential, Abstract/Random, and Concrete/Sequential (-.60, .89, and -.39). As in the PCA, Table 19 (page 122), all five of the "processing

information variables of the other instruments , prefixed "DC", loaded (-.91 to .94). Theoretical inverse relationships again emerged as expected.

Another factor, in this case the second, displayed four of the five "Attention" variables of the CPPI, SSP, and MBTI (-.92 to .91). The MBTI and CPPI's variables inversely loaded as expected (theoretically).

The following variables loaded on the third factor: All five of the acquiring information variables, prefixed "PR" of the CPPI, SSP, and MBTI (-.35 to .88). Gregorc's Concrete/Random and Concrete/Sequential loaded (.77 and -.61). The theoretically opposite dimensions loaded as expected in an inverse manner to its opposite construct on the same instrument and in relation to theoretically opposite variables of the other instruments.

The fourth factor of this extraction was defined by the six positive loading SSP variables.

To identify the factors, the following marker variables were sought:

Factor 1 could be identified as a deciding or processing information construct and can be presented by DC-CPPI-Subjective, DC-MBTI-Feeling, Gregorc's Abstract/Random, and DC-MBTI-Thinking (inversely).

Factor 2 was clearly an attention factor and was identified by AT-CPPI-Inner, AT-MBTI-Extraversion, and AT-MBTI-Introversion.

Factor 3 could identified as a acquiring information construct represented by marker variables of PR-CPPI-Abstract, PR-MBTI-Intuitive, and PR-SSP-Conception, PR-MBTI-Sensing (inversely), and Gregorc's Concrete/Random scale.

Factor 4 was clearly an SSP unique factor and could be identified by the SSP's AT-SSP- Internal, and AT-SSP-Perception marker variables

Note: Similar structures were duplicated using the CPPI's bipolar opposite constructs of AT-CPPI-Outer, PR-CPPI-Concrete, and DC-CPPI-Objective but with inverse signs to the CPPI constructs used above. Table 19 and 21 (pages 122 and 125) depict the opposite designed constructs of the CPPI due to the constructed ipsative total scoring design of the instrument.

The Information Processing Model Fit. This latent structure tended to support my expectations that the instruments of this study, though constructed and interpreted differently, share some relationships and a pronounced model of mental constructs which is clear for the CPPI, SSP, and MBTI and can be reasoned as well for the Gregorc Style Delineator. The information processing model referred to earlier in this study nicely overlays the empirical relationships of the shared common constructs which clearly defined three factors. Additionally, the CPPI, which is based upon an information processing conceptualization, is supported by these strong empirical relationships which comprise the structure of Table 21 and are depicted as three factors in Figure 5.

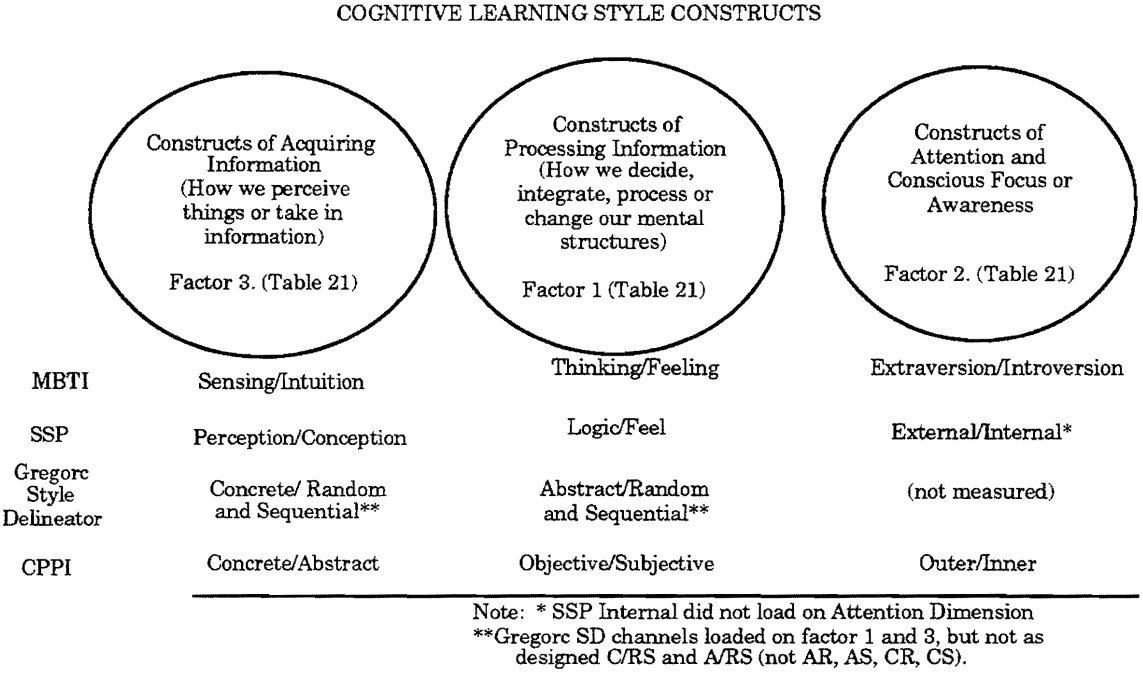

Figure 5. The Defined Relationships of the Common Constructs of this Study

Recommendations from the Analyses

1. Since the relationships revealed in this study strongly suggest a common cognitive model of learning style, it is recommended that other learning style instruments, not included in this study, be compared for common constructs consistent with this study's information processing model.

2. It is recommended that other multivariate analyses methods be examined such as LISREL analysis in order to confirm the latent structures and their interrelationships of this study's learning style constructs.

3. Consistent with Bonham (1988) and Curry (1983), it is recommended that continued caution be exercised in regard to the use and administration of most learning style instruments.

Summary

This research has helped to provide to the adult education community a promising alternative learning style instrument, the CPPI. The examination of the CPPI produced clearly acceptable internal reliability coefficients on all scales and relatively strong evidence of construct validity in the internal and comparative factor analyses. This instrument could fill the need of educators and trainers for a more efficient, economical, cost-effective, and more useful means to diagnose adults learning styles without the necessity for extensive curriculum

time, complex interpretations, and expensive certification courses.

Additionally, this research provided a factor analytical comparison and construct validating examination of two relatively untested instruments, the SSP and Gregorc Style Delineator. It compared all four instruments, including the Jungian based MBTI, to the constructs of a modern information processing model. Through factor analyses, it explored common constructs of these instruments and offered strong empirical evidence to better understand what is represented by the instruments and what is actually being measured. The shared common constructs of this study defined a robust three factor solution clearly representing the constructs of attending, acquiring, and processing of information. These practical representations and explanations of cognitive learning styles help reconcile the different theoretical and conceptual frameworks of the instruments in this study.

A combined factor analysis of the four instruments yielded a robust three factor solution which was consistent with an information processing model framework for clearly describing individual differences in regard to cognitive learning styles. The clear relationships of this model revealed strong empirical support to the theoretical bases of the CPPI.

Educators and trainers of adults should be able to quickly and easily use this information processing framework in responding to the adult learner's diagnostic learning needs.

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APPENDIX A

CORRELATION MATRICES

Table A-1

SSP, Correlation Matrix

	C-10	C-15	C-22	C-27	C-3	C-34	C-39	C-46	C-51	C-58	C-63	C-70
C-10	**1.00**	0.19	0.20	0.34	0.23	0.13	0.23	0.23	0.18	0.18	0.35	0.34
C-15	0.19	**1.00**	0.21	0.22	0.32	0.38	0.28	0.28	0.17	0.31	0.38	0.21
C-22	0.20	0.21	**1.00**	0.24	0.14	0.16	0.28	0.17	0.19	0.16	0.23	0.21
C-27	0.34	0.22	0.24	**1.00**	0.38	0.41	0.40	0.40	0.35	0.36	0.37	0.37
C-3	0.23	0.32	0.14	0.38	**1.00**	0.45	0.44	0.29	0.28	0.50	0.30	0.37
C-34	0.13	0.38	0.16	0.41	0.45	**1.00**	0.37	0.32	0.27	0.53	0.35	0.27
C-39	0.23	0.28	0.28	0.40	0.44	0.37	**1.00**	0.27	0.38	0.40	0.35	0.33
C-46	0.23	0.28	0.17	0.40	0.29	0.32	0.27	**1.00**	0.22	0.38	0.37	0.27
C-51	0.18	0.17	0.19	0.35	0.28	0.27	0.38	0.22	**1.00**	0.35	0.23	0.23
C-58	0.18	0.31	0.16	0.36	0.50	0.53	0.40	0.38	0.35	**1.00**	0.33	0.32
C-63	0.35	0.38	0.23	0.37	0.30	0.35	0.35	0.37	0.23	0.33	**1.00**	0.33
C-70	0.34	0.21	0.21	0.37	0.37	0.27	0.33	0.27	0.23	0.32	0.33	**1.00**
C-75	0.15	0.22	0.21	0.28	0.32	0.29	0.43	0.25	0.19	0.31	0.37	0.26
C-82	0.06	0.04	0.09	0.10	0.12	0.10	0.07	0.07	0.13	0.05	0.06	0.11
C-87	0.31	0.18	0.19	0.46	0.27	0.21	0.27	0.29	0.29	0.29	0.39	0.29
C-94	0.34	0.35	0.29	0.37	0.30	0.31	0.29	0.39	0.30	0.36	0.45	0.32
E-14	0.05	0.09	0.16	0.11	0.07	0.15	0.18	0.08	0.16	0.21	0.07	0.07
E-19	0.22	0.16	0.20	0.18	0.16	0.14	0.22	0.13	0.13	0.18	0.21	0.15
E-2	0.02	0.11	0.08	0.16	0.14	0.17	0.20	0.10	0.11	0.19	0.12	0.10
E-26	0.07	0.09	0.13	0.17	0.16	0.24	0.15	0.15	0.12	0.18	0.08	0.08
E-31	0.05	0.15	0.10	0.20	0.17	0.27	0.22	0.13	0.21	0.26	0.18	0.12
E-38	0.01	0.12	0.12	0.09	0.14	0.14	0.17	0.10	0.17	0.26	0.07	0.10
E-43	0.12	0.01	0.10	0.09	0.03	0.02	0.12	0.13	0.12	0.06	0.17	0.12
E-50	0.15	0.13	0.12	0.19	0.14	0.14	0.20	0.20	0.24	0.25	0.21	0.24
E-55	0.15	0.06	0.06	0.22	0.15	0.15	0.28	0.15	0.23	0.27	0.23	0.17
E-62	0.00	0.11	0.09	0.12	0.07	0.17	0.17	0.18	0.17	0.18	0.19	0.13
E-67	0.20	0.02	0.16	0.08	0.06	0.05	0.16	0.12	0.11	0.14	0.17	0.17
E-7	0.12	0.10	0.06	0.17	0.18	0.26	0.15	0.09	0.23	0.23	0.14	0.18
E-74	0.01	0.11	0.11	0.19	0.24	0.28	0.21	0.25	0.27	0.35	0.21	0.19
E-79	-0.03	0.07	0.10	0.15	0.10	0.17	0.18	0.16	0.20	0.19	0.18	0.11
E-86	0.14	0.04	0.20	0.18	0.09	0.16	0.23	0.14	0.23	0.17	0.16	0.24
E-91	0.04	0.12	0.16	0.14	0.11	0.19	0.18	0.14	0.19	0.23	0.15	0.11
F-12	0.08	0.14	0.08	0.11	0.06	0.13	0.10	0.25	0.12	0.17	0.20	0.08
F-17	0.19	0.26	0.12	0.28	0.20	0.19	0.18	0.28	0.24	0.24	0.30	0.14
F-24	0.06	0.32	0.14	0.19	0.25	0.29	0.15	0.26	0.09	0.30	0.27	0.10
F-29	0.08	0.09	0.10	0.20	0.01	0.08	0.12	0.26	0.09	0.15	0.23	0.10
F-36	0.13	0.23	0.09	0.19	0.14	0.23	0.20	0.39	0.13	0.28	0.28	0.14
F-41	0.10	0.14	0.06	0.17	0.12	0.15	0.16	0.23	0.17	0.22	0.26	0.08
F-48	0.09	0.15	0.10	0.16	0.05	0.08	0.18	0.35	0.14	0.21	0.23	0.12
F-5	0.06	0.15	0.12	0.08	0.07	0.07	0.15	0.12	0.14	0.15	0.14	0.04
F-53	0.08	0.18	0.14	0.20	0.14	0.16	0.21	0.27	0.13	0.24	0.22	0.13
F-60	0.09	0.06	0.08	0.07	0.00	0.06	0.16	0.21	0.09	0.13	0.23	0.06
F-65	0.06	0.15	0.08	0.13	0.10	0.11	0.18	0.23	0.11	0.16	0.24	0.11
F-72	0.08	0.25	0.11	0.22	0.30	0.31	0.24	0.31	0.17	0.39	0.23	0.16
F-77	0.13	0.20	0.13	0.30	0.23	0.31	0.24	0.28	0.24	0.34	0.42	0.15
F-84	0.03	0.20	0.15	0.23	0.22	0.27	0.26	0.31	0.25	0.32	0.24	0.21
F-89	0.05	0.29	0.15	0.22	0.34	0.36	0.24	0.34	0.17	0.39	0.25	0.15
F-96	-0.01	0.14	0.09	0.19	0.10	0.21	0.23	0.23	0.20	0.26	0.24	0.14
I-1	0.20	0.04	0.09	0.10	0.17	0.06	0.10	0.00	0.08	0.04	0.02	0.12
I-13	0.19	0.05	0.06	0.08	0.03	-0.05	0.10	0.14	0.08	-0.01	0.20	0.13
I-20	0.22	0.02	0.19	0.28	0.15	0.13	0.21	0.12	0.34	0.16	0.14	0.18
I-25	0.32	0.10	0.13	0.31	0.21	0.16	0.28	0.16	0.20	0.21	0.26	0.21
I-32	0.11	0.09	0.08	0.10	0.01	0.10	0.07	0.06	0.03	0.09	0.13	0.11
I-37	0.24	0.18	0.12	0.30	0.16	0.22	0.20	0.20	0.11	0.17	0.26	0.20
I-44	0.20	0.11	0.11	0.31	0.18	0.22	0.22	0.30	0.24	0.25	0.27	0.17

Table A-1 (Continued)

SSP, Correlation Matrix

C-75	C-82	C-87	C-94	E-14	E-19	E-2	E-26	E-31	E-38	E-43	E-50	E-55
0.15	0.06	0.31	0.34	0.05	0.22	0.02	0.07	0.05	0.01	0.12	0.15	0.15
0.22	0.04	0.18	0.35	0.09	0.16	0.11	0.09	0.15	0.12	0.01	0.13	0.06
0.21	0.09	0.19	0.29	0.16	0.20	0.08	0.13	0.10	0.12	0.10	0.12	0.06
0.28	0.10	0.46	0.37	0.11	0.18	0.16	0.17	0.20	0.09	0.09	0.19	0.22
0.32	0.12	0.27	0.30	0.07	0.16	0.14	0.16	0.17	0.14	0.03	0.14	0.15
0.29	0.10	0.21	0.31	0.15	0.14	0.17	0.24	0.27	0.14	0.02	0.14	0.15
0.43	0.07	0.27	0.29	0.18	0.22	0.20	0.15	0.22	0.17	0.12	0.20	0.28
0.25	0.07	0.29	0.39	0.08	0.13	0.10	0.15	0.13	0.10	0.13	0.20	0.15
0.19	0.13	0.29	0.30	0.16	0.13	0.11	0.12	0.21	0.17	0.12	0.24	0.23
0.31	0.05	0.29	0.36	0.21	0.18	0.19	0.18	0.26	0.26	0.06	0.25	0.27
0.37	0.06	0.39	0.45	0.07	0.21	0.12	0.08	0.18	0.07	0.17	0.21	0.23
0.26	0.11	0.29	0.32	0.07	0.15	0.10	0.08	0.12	0.10	0.12	0.24	0.17
1.00	0.12	0.30	0.30	0.10	0.18	0.17	0.05	0.18	0.11	0.21	0.19	0.21
0.12	**1.00**	0.09	0.14	0.06	0.08	0.03	0.04	0.02	0.06	0.06	0.05	0.09
0.30	0.09	**1.00**	0.36	0.04	0.19	0.06	0.05	0.10	0.04	0.08	0.18	0.16
0.30	0.14	0.36	**1.00**	0.11	0.15	0.09	0.16	0.19	0.13	0.11	0.17	0.16
0.10	0.06	0.04	0.11	**1.00**	0.26	0.43	0.22	0.43	0.31	0.31	0.23	0.48
0.18	0.08	0.19	0.15	0.26	**1.00**	0.36	0.15	0.34	0.22	0.23	0.47	0.21
0.17	0.03	0.06	0.09	0.43	0.36	**1.00**	0.18	0.47	0.23	0.35	0.36	0.33
0.05	0.04	0.05	0.16	0.22	0.15	0.18	**1.00**	0.19	0.21	0.12	0.13	0.17
0.18	0.02	0.10	0.19	0.43	0.34	0.47	0.19	**1.00**	0.26	0.30	0.32	0.34
0.11	0.06	0.04	0.13	0.31	0.22	0.23	0.21	0.26	**1.00**	0.14	0.25	0.24
0.21	0.06	0.08	0.11	0.31	0.23	0.35	0.12	0.30	0.14	**1.00**	0.25	0.27
0.19	0.05	0.18	0.17	0.23	0.47	0.36	0.13	0.32	0.25	0.25	**1.00**	0.23
0.21	0.09	0.16	0.16	0.48	0.21	0.33	0.17	0.34	0.24	0.27	0.23	**1.00**
0.19	0.04	0.08	0.15	0.44	0.28	0.45	0.17	0.47	0.22	0.30	0.24	0.29
0.25	0.05	0.09	0.16	0.13	0.33	0.13	0.11	0.15	0.21	0.23	0.29	0.14
0.06	0.06	0.10	0.15	0.23	0.08	0.15	0.19	0.17	0.25	0.08	0.14	0.24
0.18	0.07	0.17	0.25	0.34	0.24	0.28	0.29	0.33	0.36	0.17	0.24	0.36
0.25	0.12	0.09	0.16	0.49	0.16	0.37	0.15	0.50	0.22	0.38	0.18	0.42
0.25	0.15	0.21	0.24	0.24	0.18	0.21	0.15	0.21	0.24	0.27	0.30	0.26
0.21	0.10	0.17	0.16	0.27	0.51	0.48	0.13	0.34	0.29	0.30	0.50	0.28
0.09	0.04	0.10	0.19	0.23	0.16	0.17	0.08	0.23	0.07	0.14	0.08	0.23
0.17	0.04	0.28	0.25	0.09	0.13	0.10	0.09	0.22	0.14	0.04	0.11	0.21
0.12	0.01	0.14	0.26	0.21	0.13	0.23	0.31	0.22	0.24	0.04	0.11	0.13
0.13	0.06	0.10	0.19	0.21	0.19	0.21	0.08	0.42	0.03	0.25	0.19	0.28
0.12	0.05	0.17	0.31	0.20	0.14	0.16	0.17	0.25	0.12	0.13	0.13	0.21
0.11	0.02	0.19	0.22	0.08	-0.01	0.06	0.10	0.12	0.13	0.14	0.04	0.15
0.13	0.03	0.15	0.24	0.23	0.16	0.20	0.08	0.33	0.05	0.20	0.12	0.26
0.08	0.06	0.05	0.15	0.24	0.19	0.23	0.12	0.32	0.03	0.19	0.15	0.28
0.23	0.08	0.16	0.25	0.17	0.23	0.25	0.06	0.31	0.08	0.20	0.20	0.27
0.15	0.00	0.11	0.21	0.20	0.17	0.20	0.09	0.26	0.02	0.19	0.06	0.22
0.21	0.04	0.14	0.18	0.12	0.14	0.18	0.07	0.17	-0.03	0.21	0.05	0.19
0.18	0.05	0.18	0.25	0.18	0.12	0.17	0.23	0.19	0.29	0.09	0.14	0.24
0.30	0.08	0.29	0.31	0.20	0.09	0.11	0.15	0.23	0.10	0.15	0.18	0.28
0.25	0.07	0.21	0.25	0.27	0.14	0.27	0.18	0.31	0.25	0.18	0.20	0.39
0.25	0.00	0.25	0.27	0.21	0.14	0.17	0.27	0.26	0.24	0.07	0.15	0.29
0.15	0.00	0.19	0.22	0.33	0.21	0.27	0.19	0.34	0.22	0.14	0.18	0.39
0.08	0.09	0.11	0.09	-0.17	-0.03	-0.36	-0.01	-0.27	-0.09	-0.11	-0.06	-0.05
0.08	0.02	0.10	0.13	-0.14	0.12	0.00	-0.02	0.07	-0.08	0.07	0.10	-0.01
0.07	0.08	0.19	0.16	0.09	-0.01	-0.07	0.11	0.00	0.08	0.03	0.07	0.15
0.29	0.10	0.26	0.20	0.04	0.25	0.09	-0.19	0.16	0.02	0.16	0.22	0.16
0.05	0.03	0.14	0.09	-0.13	-0.07	-0.24	0.05	-0.27	0.00	-0.07	-0.04	-0.05
0.21	0.15	0.23	0.28	0.00	0.12	0.05	0.10	0.10	-0.14	0.05	0.12	0.06
0.15	0.09	0.24	0.27	0.01	0.03	-0.01	0.06	0.10	0.09	-0.15	0.08	0.07

Table A-1 (Continued)

SSP, Correlation Matrix

E-62	E-67	E-7	E-74	E-79	E-86	E-91	F-12	F-17	F-24	F-29	F-36	F-41
0.00	0.20	0.12	0.01	-0.03	0.14	0.04	0.08	0.19	0.06	0.08	0.13	0.10
0.11	0.02	0.10	0.11	0.07	0.04	0.12	0.14	0.26	0.32	0.09	0.23	0.14
0.09	0.16	0.06	0.11	0.10	0.20	0.16	0.08	0.12	0.14	0.10	0.09	0.06
0.12	0.08	0.17	0.19	0.15	0.18	0.14	0.11	0.28	0.19	0.20	0.19	0.17
0.07	0.06	0.18	0.24	0.10	0.09	0.11	0.06	0.20	0.25	0.01	0.14	0.12
0.17	0.05	0.26	0.28	0.17	0.16	0.19	0.13	0.19	0.29	0.08	0.23	0.15
0.17	0.16	0.15	0.21	0.18	0.23	0.18	0.10	0.18	0.15	0.12	0.20	0.16
0.18	0.12	0.09	0.25	0.16	0.14	0.14	0.25	0.28	0.26	0.26	0.39	0.23
0.17	0.11	0.23	0.27	0.20	0.23	0.19	0.12	0.24	0.09	0.09	0.13	0.17
0.18	0.14	0.23	0.35	0.19	0.17	0.23	0.17	0.24	0.30	0.15	0.28	0.22
0.19	0.17	0.14	0.21	0.18	0.16	0.15	0.20	0.30	0.27	0.23	0.28	0.26
0.13	0.17	0.18	0.19	0.11	0.24	0.11	0.08	0.14	0.10	0.10	0.14	0.08
0.19	0.25	0.06	0.18	0.25	0.25	0.21	0.09	0.17	0.12	0.13	0.12	0.11
0.04	0.05	0.06	0.07	0.12	0.15	0.10	0.04	0.04	0.01	0.06	0.05	0.02
0.08	0.09	0.10	0.17	0.09	0.21	0.17	0.10	0.28	0.14	0.10	0.17	0.19
0.15	0.16	0.15	0.25	0.16	0.24	0.16	0.19	0.25	0.26	0.19	0.31	0.22
0.44	0.13	0.23	0.34	0.49	0.24	0.27	0.23	0.09	0.21	0.21	0.20	0.08
0.28	0.33	0.08	0.24	0.16	0.18	0.51	0.16	0.13	0.13	0.19	0.14	-0.01
0.45	0.13	0.15	0.28	0.37	0.21	0.48	0.17	0.10	0.23	0.21	0.16	0.06
0.17	0.11	0.19	0.29	0.15	0.15	0.13	0.08	0.09	0.31	0.08	0.17	0.10
0.47	0.15	0.17	0.33	0.50	0.21	0.34	0.23	0.22	0.22	0.42	0.25	0.12
0.22	0.21	0.25	0.36	0.22	0.24	0.29	0.07	0.14	0.24	0.03	0.12	0.13
0.30	0.23	0.08	0.17	0.38	0.27	0.30	0.14	0.04	0.04	0.25	0.13	0.14
0.24	0.29	0.14	0.24	0.18	0.30	0.50	0.08	0.11	0.11	0.19	0.13	0.04
0.29	0.14	0.24	0.36	0.42	0.26	0.28	0.23	0.21	0.13	0.28	0.21	0.15
1.00	0.18	0.16	0.29	0.58	0.22	0.29	0.30	0.16	0.20	0.38	0.26	0.15
0.18	**1.00**	0.12	0.21	0.17	0.26	0.31	0.07	0.22	-0.02	0.17	0.13	0.00
0.16	0.12	**1.00**	0.27	0.17	0.19	0.10	0.06	0.18	0.21	0.05	0.16	0.12
0.29	0.21	0.27	**1.00**	0.30	0.25	0.30	0.21	0.22	0.27	0.22	0.26	0.13
0.58	0.17	0.17	0.30	**1.00**	0.28	0.24	0.21	0.15	0.16	0.32	0.26	0.19
0.22	0.26	0.19	0.25	0.28	**1.00**	0.27	0.04	0.12	0.04	0.11	0.09	0.11
0.29	0.31	0.10	0.30	0.24	0.27	**1.00**	0.13	0.08	0.12	0.17	0.12	0.03
0.30	0.07	0.06	0.21	0.21	0.04	0.13	**1.00**	0.28	0.27	0.48	0.48	0.20
0.16	0.22	0.18	0.22	0.15	0.12	0.08	0.28	**1.00**	0.21	0.32	0.31	0.37
0.20	-0.02	0.21	0.27	0.16	0.04	0.12	0.27	0.21	**1.00**	0.18	0.35	0.30
0.38	0.17	0.05	0.22	0.32	0.11	0.17	0.48	0.32	0.18	**1.00**	0.38	0.23
0.26	0.13	0.16	0.26	0.26	0.09	0.12	0.48	0.31	0.35	0.38	**1.00**	0.29
0.15	0.00	0.12	0.13	0.19	0.11	0.03	0.20	0.37	0.30	0.23	0.29	**1.00**
0.31	0.10	-0.01	0.24	0.26	0.06	0.16	0.62	0.24	0.27	0.57	0.52	0.23
0.21	0.12	0.05	0.21	0.20	0.05	0.15	0.50	0.22	0.19	0.50	0.36	0.17
0.23	0.15	0.01	0.17	0.23	0.15	0.24	0.41	0.19	0.24	0.43	0.33	0.17
0.32	0.07	-0.04	0.17	0.24	0.06	0.09	0.41	0.17	0.22	0.40	0.34	0.19
0.22	0.14	0.02	0.15	0.21	0.07	0.14	0.32	0.13	0.18	0.33	0.38	0.12
0.17	0.07	0.20	0.35	0.17	0.09	0.15	0.24	0.31	0.47	0.20	0.36	0.34
0.19	0.15	0.23	0.33	0.23	0.18	0.15	0.30	0.37	0.26	0.28	0.43	0.30
0.31	0.15	0.21	0.36	0.30	0.25	0.20	0.41	0.26	0.28	0.33	0.33	0.24
0.19	0.04	0.21	0.31	0.28	0.15	0.19	0.23	0.29	0.46	0.22	0.36	0.31
0.30	0.14	0.25	0.36	0.28	0.24	0.21	0.30	0.22	0.27	0.29	0.31	0.19
-0.20	0.11	0.00	-0.03	-0.14	-0.01	-0.11	-0.05	0.09	-0.04	-0.06	-0.02	-0.02
0.11	0.16	0.02	0.00	-0.02	0.03	0.03	0.19	0.22	0.08	0.37	0.12	0.14
-0.02	0.16	0.11	0.15	0.09	0.17	-0.04	0.07	0.17	0.01	0.08	0.11	0.11
0.05	0.21	0.05	0.12	0.05	0.14	0.18	0.01	0.15	0.07	0.18	0.05	0.08
-0.14	0.12	-0.01	0.02	-0.13	0.02	-0.11	0.05	0.14	0.06	-0.02	0.06	0.08
0.15	0.15	0.12	0.13	0.07	0.12	0.04	0.10	0.23	0.08	0.19	0.29	0.15
0.07	-0.01	0.13	0.16	0.07	0.10	-0.05	0.18	0.27	0.25	0.18	0.26	0.28

Table A-1 (Continued)

SSP, Correlation Matrix

F-48	F-5	F-53	F-60	F-65	F-72	F-77	F-84	F-89	F-96	I-1	I-13	I-20
0.09	0.06	0.08	0.09	0.06	0.08	0.13	0.03	0.05	-0.01	0.20	0.19	0.22
0.15	0.15	0.18	0.06	0.15	0.25	0.20	0.20	0.29	0.14	0.04	0.05	0.02
0.10	0.12	0.14	0.08	0.08	0.11	0.13	0.15	0.15	0.09	0.09	0.06	0.19
0.16	0.08	0.20	0.07	0.13	0.22	0.30	0.23	0.22	0.19	0.10	0.08	0.28
0.05	0.07	0.14	0.00	0.10	0.30	0.23	0.22	0.34	0.10	0.17	0.03	0.15
0.08	0.07	0.16	0.06	0.11	0.31	0.31	0.27	0.36	0.21	0.06	-0.05	0.13
0.18	0.15	0.21	0.16	0.18	0.24	0.24	0.26	0.24	0.23	0.10	0.10	0.21
0.35	0.12	0.27	0.21	0.23	0.31	0.28	0.31	0.34	0.23	0.00	0.14	0.12
0.14	0.14	0.13	0.09	0.11	0.17	0.24	0.25	0.17	0.20	0.08	0.08	0.34
0.21	0.15	0.24	0.13	0.16	0.39	0.34	0.32	0.39	0.26	0.04	-0.01	0.16
0.23	0.14	0.22	0.23	0.24	0.23	0.42	0.24	0.25	0.24	0.02	0.20	0.14
0.12	0.04	0.13	0.06	0.11	0.16	0.15	0.21	0.15	0.14	0.12	0.13	0.18
0.13	0.08	0.23	0.15	0.21	0.18	0.30	0.25	0.25	0.15	0.08	0.08	0.07
0.03	0.06	0.08	0.00	0.04	0.05	0.08	0.07	0.00	0.00	0.09	0.02	0.08
0.15	0.05	0.16	0.11	0.14	0.18	0.29	0.21	0.25	0.19	0.11	0.10	0.19
0.24	0.15	0.25	0.21	0.18	0.25	0.31	0.25	0.27	0.22	0.09	0.13	0.16
0.23	0.24	0.17	0.20	0.12	0.18	0.20	0.27	0.21	0.33	-0.17	-0.14	0.09
0.16	0.19	0.23	0.17	0.14	0.12	0.09	0.14	0.14	0.21	-0.03	0.12	-0.01
0.20	0.23	0.25	0.20	0.18	0.17	0.11	0.27	0.17	0.27	-0.36	0.00	-0.07
0.08	0.12	0.06	0.09	0.07	0.23	0.15	0.18	0.27	0.19	-0.01	-0.02	0.11
0.33	0.32	0.31	0.26	0.17	0.19	0.23	0.31	0.26	0.34	-0.27	0.07	0.00
0.05	0.03	0.08	0.02	-0.03	0.29	0.10	0.25	0.24	0.22	-0.09	-0.08	0.08
0.20	0.19	0.20	0.19	0.21	0.09	0.15	0.18	0.07	0.14	-0.11	0.07	0.03
0.12	0.15	0.20	0.06	0.05	0.14	0.18	0.20	0.15	0.18	-0.06	0.10	0.07
0.26	0.28	0.27	0.22	0.19	0.24	0.28	0.39	0.29	0.39	-0.05	-0.01	0.15
0.31	0.21	0.23	0.32	0.22	0.17	0.19	0.31	0.19	0.30	-0.20	0.11	-0.02
0.10	0.12	0.15	0.07	0.14	0.07	0.15	0.15	0.04	0.14	0.11	0.16	0.16
-0.01	0.05	0.01	-0.04	0.02	0.20	0.23	0.21	0.21	0.25	0.00	0.02	0.11
0.24	0.21	0.17	0.17	0.15	0.35	0.33	0.36	0.31	0.36	-0.03	0.00	0.15
0.26	0.20	0.23	0.24	0.21	0.17	0.23	0.30	0.28	0.28	-0.14	-0.02	0.09
0.06	0.05	0.15	0.06	0.07	0.09	0.18	0.25	0.15	0.24	-0.01	0.03	0.17
0.16	0.15	0.24	0.09	0.14	0.15	0.15	0.20	0.19	0.21	-0.11	0.03	-0.04
0.62	0.50	0.41	0.41	0.32	0.24	0.30	0.41	0.23	0.30	-0.05	0.19	0.07
0.24	0.22	0.19	0.17	0.13	0.31	0.37	0.26	0.29	0.22	0.09	0.22	0.17
0.27	0.19	0.24	0.22	0.18	0.47	0.26	0.28	0.46	0.27	-0.04	0.08	0.01
0.57	0.50	0.43	0.40	0.33	0.20	0.28	0.33	0.22	0.29	-0.06	0.37	0.08
0.52	0.36	0.33	0.34	0.38	0.36	0.43	0.33	0.36	0.31	-0.02	0.12	0.11
0.23	0.17	0.17	0.19	0.12	0.34	0.30	0.24	0.31	0.19	-0.02	0.14	0.11
1.00	0.53	0.53	0.49	0.42	0.26	0.33	0.40	0.25	0.35	-0.10	0.19	0.04
0.53	**1.00**	0.42	0.34	0.27	0.18	0.20	0.26	0.16	0.25	-0.02	0.18	0.08
0.53	0.42	**1.00**	0.39	0.33	0.28	0.29	0.34	0.31	0.30	-0.04	0.18	0.04
0.49	0.34	0.39	**1.00**	0.34	0.13	0.24	0.28	0.20	0.30	-0.11	0.16	0.04
0.42	0.27	0.33	0.34	**1.00**	0.20	0.24	0.23	0.24	0.20	-0.03	0.10	0.00
0.26	0.18	0.28	0.13	0.20	**1.00**	0.29	0.28	0.52	0.25	0.06	0.05	0.03
0.33	0.20	0.29	0.24	0.24	0.29	**1.00**	0.39	0.33	0.29	0.03	0.11	0.13
0.40	0.26	0.34	0.28	0.23	0.28	0.39	**1.00**	0.40	0.52	-0.07	0.05	0.12
0.25	0.16	0.31	0.20	0.24	0.52	0.33	0.40	**1.00**	0.32	0.08	0.05	0.11
0.35	0.25	0.30	0.30	0.20	0.25	0.29	0.52	0.32	**1.00**	-0.13	-0.02	0.07
-0.10	-0.02	-0.04	-0.11	-0.03	0.06	0.03	-0.07	0.08	-0.13	**1.00**	0.17	0.27
0.19	0.18	0.18	0.16	0.10	0.05	0.11	0.05	0.05	-0.02	0.17	**1.00**	0.12
0.04	0.08	0.04	0.04	0.00	0.03	0.13	0.12	0.11	0.07	0.27	0.12	**1.00**
0.02	0.08	0.11	0.09	0.12	0.04	0.18	0.05	0.06	0.00	0.19	0.27	0.18
-0.01	0.03	-0.03	0.01	0.00	0.10	0.08	0.03	0.09	-0.03	0.48	0.19	0.31
0.12	0.09	0.14	0.11	0.15	0.19	0.27	0.08	0.13	0.08	0.17	0.22	0.13
0.21	0.11	0.17	0.21	0.09	0.27	0.25	0.16	0.26	0.13	0.08	0.22	0.21

Table A-1 (Continued)

SSP, Correlation Matrix

I-25	I-32	I-37	I-44	I-49	I-56	I-61	I-68	I-73	I-8	I-80	I-85	I-92
0.32	0.11	0.24	0.20	0.12	0.05	0.15	0.26	0.28	0.22	0.15	0.14	0.09
0.10	0.09	0.18	0.11	0.09	0.00	-0.01	0.18	0.09	0.10	0.05	0.12	0.09
0.13	0.08	0.12	0.11	0.13	0.10	0.11	0.13	0.14	0.20	0.14	0.17	0.08
0.31	0.10	0.30	0.31	0.27	-0.03	0.03	0.28	0.29	0.05	0.16	0.28	0.17
0.21	0.01	0.16	0.18	0.19	-0.09	0.04	0.16	0.19	-0.01	0.05	0.12	0.13
0.16	0.10	0.22	0.22	0.21	-0.07	-0.01	0.13	0.18	-0.01	0.03	0.15	0.16
0.28	0.07	0.20	0.22	0.27	-0.05	0.09	0.13	0.31	0.14	0.13	0.21	0.14
0.16	0.06	0.20	0.30	0.18	0.04	0.03	0.28	0.13	0.09	0.15	0.37	0.16
0.20	0.03	0.11	0.24	0.35	-0.02	0.07	0.22	0.20	0.03	0.09	0.20	0.21
0.21	0.09	0.17	0.25	0.28	-0.03	0.05	0.21	0.20	0.04	0.15	0.18	0.17
0.26	0.13	0.26	0.27	0.20	0.06	0.08	0.29	0.25	0.13	0.24	0.29	0.13
0.21	0.11	0.20	0.17	0.20	0.04	0.10	0.26	0.29	0.06	0.20	0.24	0.14
0.29	0.05	0.21	0.15	0.17	0.09	0.09	0.13	0.43	0.12	0.08	0.16	0.12
0.10	0.03	0.15	0.09	0.07	0.06	0.00	0.10	0.10	0.04	0.05	0.07	0.07
0.26	0.14	0.23	0.24	0.18	0.02	0.13	0.27	0.23	0.08	0.22	0.33	0.14
0.20	0.09	0.28	0.27	0.24	0.10	0.05	0.33	0.26	0.09	0.22	0.32	0.20
0.04	-0.13	0.00	0.01	0.14	-0.22	-0.25	0.05	0.02	0.06	-0.17	0.05	-0.02
0.25	-0.07	0.12	0.03	0.04	0.03	-0.01	0.04	0.07	0.17	-0.01	0.08	-0.16
0.09	-0.24	0.05	-0.01	0.06	-0.12	-0.24	0.01	-0.02	0.04	-0.13	0.01	-0.21
-0.19	0.05	0.10	0.06	0.14	0.02	-0.07	0.03	-0.05	-0.07	-0.01	0.05	0.13
0.16	-0.27	0.10	0.10	0.06	-0.08	-0.21	0.09	-0.01	0.07	-0.10	0.10	-0.09
0.02	0.00	-0.14	0.09	0.15	-0.09	-0.09	0.07	-0.04	-0.01	-0.08	0.03	0.01
0.16	-0.07	0.05	-0.15	0.13	0.05	-0.04	0.01	0.07	0.12	-0.01	0.06	-0.07
0.22	-0.04	0.12	0.08	0.04	0.02	0.02	0.10	0.12	0.10	0.05	0.07	-0.11
0.16	-0.05	0.06	0.07	0.20	-0.41	-0.06	0.14	0.11	0.02	0.02	0.20	0.06
0.05	-0.14	0.15	0.07	0.14	0.02	-0.31	0.13	0.03	-0.05	-0.06	0.15	-0.03
0.21	0.12	0.15	-0.01	0.14	0.07	0.14	-0.03	0.15	0.15	0.11	0.05	0.07
0.05	-0.01	0.12	0.13	0.10	-0.13	-0.04	0.16	0.05	-0.31	0.01	0.09	0.12
0.12	0.02	0.13	0.16	0.19	-0.11	-0.08	0.18	-0.07	-0.04	0.05	0.18	0.07
0.05	-0.13	0.07	0.07	0.19	-0.10	-0.22	0.10	0.09	0.03	-0.11	0.14	0.08
0.14	0.02	0.12	0.10	0.22	-0.03	0.01	0.05	0.17	0.04	0.04	0.01	0.11
0.18	-0.11	0.04	-0.05	-0.01	-0.07	-0.01	-0.02	0.07	0.13	-0.01	0.11	-0.22
0.01	0.05	0.10	0.18	0.09	-0.07	-0.01	0.19	-0.06	0.10	0.08	0.26	0.10
0.15	0.14	0.23	0.27	0.22	-0.02	0.15	0.30	0.08	0.04	0.17	0.27	0.18
0.07	0.06	0.08	0.25	0.08	0.00	-0.02	0.18	-0.02	-0.01	0.08	0.14	0.13
0.18	-0.02	0.19	0.18	0.12	0.00	-0.06	0.16	-0.02	0.10	0.13	0.28	0.09
0.05	0.06	0.29	0.26	0.15	0.00	-0.02	0.34	-0.03	0.09	0.13	0.27	0.23
0.08	0.08	0.15	0.28	0.24	0.06	0.12	0.22	0.07	0.01	0.08	0.16	0.22
0.02	-0.01	0.12	0.21	0.06	-0.07	-0.03	0.20	-0.04	0.11	0.11	0.30	0.08
0.08	0.03	0.09	0.11	0.12	-0.09	0.00	0.10	-0.04	0.16	0.04	0.17	0.06
0.11	-0.03	0.14	0.17	0.09	-0.01	0.02	0.19	0.06	0.15	0.09	0.27	0.05
0.09	0.01	0.11	0.21	0.12	-0.01	0.03	0.17	0.02	0.11	0.13	0.23	0.15
0.12	0.00	0.15	0.09	0.01	-0.01	0.02	0.14	0.03	0.10	0.07	0.18	0.04
0.04	0.10	0.19	0.27	0.17	-0.05	0.06	0.24	0.10	0.01	0.11	0.22	0.16
0.18	0.08	0.27	0.25	0.17	-0.02	0.04	0.35	0.13	0.01	0.21	0.31	0.16
0.05	0.03	0.08	0.16	0.19	-0.17	-0.03	0.22	0.02	-0.01	0.12	0.29	0.13
0.06	0.09	0.13	0.26	0.19	-0.02	0.03	0.24	0.08	0.03	0.13	0.27	0.22
0.00	-0.03	0.08	0.13	0.14	-0.18	-0.11	0.15	-0.05	-0.07	0.07	0.23	0.08
0.19	0.48	0.17	0.08	0.12	0.15	0.33	0.15	0.22	0.18	0.30	0.12	0.30
0.27	0.19	0.22	0.22	0.04	0.30	0.26	0.23	0.08	0.14	0.34	0.25	0.11
0.18	0.31	0.13	0.21	0.34	0.01	0.18	0.26	0.18	0.16	0.18	0.20	0.34
1.00	0.11	0.27	0.18	0.11	0.11	0.19	0.16	0.33	0.28	0.18	0.16	0.08
0.11	**1.00**	0.17	0.14	0.24	0.21	0.36	0.18	0.19	0.12	0.35	0.17	0.36
0.27	0.17	**1.00**	0.23	0.14	0.16	0.12	0.30	0.25	0.11	0.24	0.26	0.21
0.18	0.14	0.23	**1.00**	0.18	0.11	0.09	0.39	0.13	0.04	0.24	0.37	0.23

Table A-1 (Continued)

SSP, Correlation Matrix

L-11	L-18	L-23	L-30	L-35	L-42	L-47	L-54	L-59	L-6	L-66	L-71	L-78
0.25	0.11	0.17	0.30	0.21	0.11	0.29	0.17	0.24	0.33	0.11	0.11	0.24
0.05	-0.09	-0.16	0.10	-0.07	-0.07	0.03	-0.09	0.08	-0.06	-0.03	-0.22	-0.01
0.07	0.06	0.11	0.16	0.09	0.05	0.07	0.07	0.15	0.07	-0.01	0.06	0.16
0.14	-0.05	0.10	0.23	0.18	0.06	0.25	0.15	0.27	0.13	-0.05	0.01	0.11
0.14	-0.12	-0.08	0.13	-0.03	-0.08	0.13	-0.03	0.28	0.04	-0.06	-0.14	0.01
0.07	-0.08	-0.05	0.22	0.07	-0.02	0.13	0.00	0.24	0.01	-0.08	-0.10	0.04
0.15	0.04	0.12	0.24	0.11	0.05	0.23	0.07	0.19	0.09	-0.06	-0.01	0.07
-0.03	-0.12	-0.05	0.10	-0.04	-0.01	0.09	-0.03	0.13	0.01	-0.09	-0.05	0.00
0.17	0.06	0.13	0.22	0.12	0.12	0.22	0.19	0.20	0.10	-0.01	0.12	0.03
0.15	-0.08	-0.06	0.18	0.04	0.00	0.14	0.01	0.26	0.03	-0.07	-0.03	0.07
0.02	-0.04	0.03	0.17	0.07	-0.04	0.16	0.06	0.17	0.02	0.03	-0.03	0.13
0.18	0.00	0.11	0.16	0.15	0.07	0.20	0.10	0.26	0.09	0.10	0.05	0.18
0.13	0.03	0.12	0.16	0.14	0.06	0.29	0.12	0.23	0.09	-0.01	0.16	0.21
0.04	0.05	0.09	0.07	0.11	0.05	0.09	0.07	0.10	0.08	0.08	0.06	0.12
0.08	0.04	0.12	0.23	0.14	0.10	0.22	0.15	0.22	0.12	0.04	0.05	0.15
0.09	-0.03	0.04	0.20	0.04	-0.03	0.18	0.08	0.20	0.08	-0.02	-0.01	0.12
0.06	0.08	0.08	0.20	0.04	0.07	0.04	0.07	0.08	0.06	-0.04	0.05	-0.01
0.22	0.13	0.23	0.21	0.20	0.19	0.14	0.16	0.18	0.18	0.11	0.12	0.14
0.03	-0.03	0.02	0.09	0.02	0.08	0.00	0.07	0.08	0.04	-0.03	0.00	0.04
0.10	0.04	0.04	0.21	0.06	0.03	0.01	0.10	0.15	0.06	-0.02	-0.01	-0.02
0.09	-0.08	0.05	0.19	0.11	0.10	0.02	0.03	0.08	0.00	-0.06	0.05	0.04
0.13	0.01	0.02	0.17	0.12	0.07	0.06	0.11	0.18	0.08	0.05	0.09	0.08
0.05	0.10	0.20	0.22	0.07	0.07	0.11	0.18	0.11	0.04	0.02	0.14	0.11
0.19	0.11	0.15	0.19	0.21	0.18	0.18	0.23	0.14	0.16	0.09	0.14	0.14
0.05	0.03	0.14	0.16	0.08	0.06	0.06	0.09	0.12	0.05	0.02	0.10	0.07
-0.03	-0.03	0.06	0.08	0.05	0.06	0.00	0.06	0.07	0.00	-0.02	0.08	0.06
0.20	0.26	0.27	0.30	0.30	0.28	0.23	0.27	0.16	0.29	0.08	0.26	0.30
0.12	0.04	0.05	0.16	0.11	0.09	0.07	0.16	0.17	0.12	0.08	0.03	0.07
0.17	0.04	0.04	0.16	0.05	0.08	0.04	0.13	0.21	0.05	0.02	0.02	0.04
-0.01	-0.05	0.06	0.15	0.05	0.00	0.06	0.04	0.09	-0.01	0.02	0.14	0.09
0.16	0.12	0.22	0.26	0.25	0.14	0.20	0.28	0.23	0.15	0.14	0.22	0.23
0.14	0.14	0.16	0.18	0.19	0.21	0.11	0.20	0.12	0.10	0.10	0.11	0.11
-0.28	-0.07	-0.08	0.03	-0.18	-0.05	-0.25	-0.16	-0.19	-0.14	-0.13	-0.05	-0.08
0.03	-0.22	-0.04	0.15	0.02	-0.12	0.07	-0.05	0.05	0.02	-0.01	-0.10	0.03
-0.07	-0.11	-0.34	0.04	-0.15	-0.09	-0.11	-0.13	-0.02	-0.06	-0.08	-0.23	-0.09
-0.14	-0.15	0.04	-0.03	-0.01	-0.03	-0.10	-0.04	-0.13	-0.07	-0.10	0.01	0.04
-0.16	-0.16	-0.10	0.10	-0.15	-0.02	-0.15	-0.12	-0.06	-0.06	-0.06	-0.11	-0.02
-0.09	-0.26	-0.07	0.07	-0.06	-0.39	-0.02	-0.13	-0.01	-0.04	-0.02	-0.08	-0.05
-0.24	-0.14	-0.09	-0.03	-0.19	-0.06	-0.25	-0.13	-0.17	-0.15	-0.15	-0.12	-0.07
-0.09	-0.06	-0.04	0.05	-0.13	-0.01	-0.22	-0.11	-0.14	-0.15	-0.11	-0.01	-0.01
-0.15	-0.06	-0.07	0.04	-0.06	-0.02	-0.09	-0.12	-0.08	-0.05	-0.09	-0.02	0.05
-0.17	-0.07	-0.02	0.06	-0.12	-0.04	-0.13	-0.06	-0.17	-0.10	-0.07	0.01	0.03
-0.13	-0.02	0.00	0.03	-0.07	-0.04	-0.10	-0.06	0.01	-0.12	-0.18	-0.06	0.03
0.02	-0.15	-0.24	0.06	-0.03	-0.09	-0.06	-0.10	0.11	-0.10	-0.06	-0.26	-0.06
-0.10	-0.10	0.04	0.15	0.03	-0.06	0.03	0.01	0.04	-0.06	-0.01	-0.02	-0.05
-0.10	-0.09	-0.01	0.12	-0.12	-0.04	-0.07	-0.06	0.11	-0.04	-0.06	-0.01	-0.05
-0.02	-0.14	-0.24	0.12	-0.09	-0.11	-0.04	-0.10	0.14	-0.06	-0.01	-0.14	-0.08
-0.06	-0.05	-0.04	0.13	-0.05	0.03	-0.09	0.04	0.03	-0.05	0.02	-0.01	-0.06
0.18	0.22	0.10	0.11	0.13	0.13	0.19	0.11	0.13	0.15	0.10	0.11	0.17
0.06	0.08	0.13	0.05	0.13	0.06	0.10	0.05	0.02	0.12	0.08	0.08	0.16
0.18	0.16	0.23	0.20	0.15	0.14	0.22	0.23	0.14	0.21	0.06	0.16	0.15
0.28	0.14	0.34	0.18	0.35	0.21	0.37	0.22	0.22	0.21	0.09	0.18	0.26
0.09	0.16	0.10	0.14	0.09	0.14	0.13	0.16	0.10	0.11	0.08	0.14	0.17
0.08	0.05	0.14	0.14	0.18	0.11	0.18	0.12	0.11	0.06	0.04	0.09	0.23
0.02	-0.07	-0.04	0.16	0.08	0.01	0.13	-0.01	0.02	0.05	-0.02	-0.03	0.06

Table A-1 (Continued)

SSP, Correlation Matrix

L-83	L-90	L-95	P-16	P-21	P-28	P-33	P-40	P-45	P-52	P-57	P-64	P-69
0.21	0.08	0.25	0.14	0.17	0.06	0.12	0.19	0.17	0.06	0.09	0.18	-0.03
0.02	-0.15	-0.05	-0.26	0.06	-0.06	-0.16	0.03	-0.10	0.16	-0.13	-0.09	0.05
0.15	0.08	0.17	0.07	-0.02	-0.09	0.09	0.09	0.10	0.05	0.10	0.14	0.01
0.15	0.03	0.08	0.00	0.08	-0.16	-0.05	0.08	-0.07	0.04	-0.04	0.07	0.06
0.02	-0.14	0.08	-0.12	0.05	-0.10	-0.30	-0.04	-0.17	0.05	-0.28	-0.06	-0.04
0.06	-0.04	-0.05	-0.13	0.10	-0.14	-0.21	-0.01	-0.10	0.17	-0.19	-0.08	0.03
0.04	0.08	0.05	-0.06	0.10	-0.03	-0.06	-0.06	0.01	0.17	-0.02	0.01	0.09
-0.01	-0.09	0.06	-0.11	0.07	-0.09	-0.10	0.20	-0.20	0.24	-0.09	-0.05	0.21
0.12	0.15	0.08	0.06	0.12	-0.11	0.00	0.10	0.06	0.00	0.06	0.11	0.17
0.06	-0.07	-0.02	-0.06	0.16	-0.02	-0.21	0.05	-0.09	0.20	-0.16	0.07	0.12
0.17	-0.01	0.09	-0.09	0.13	0.03	-0.08	0.11	-0.02	0.16	0.04	-0.01	0.14
0.14	0.05	0.14	-0.01	0.07	0.04	-0.05	0.04	0.04	0.10	-0.07	0.10	-0.03
0.25	0.14	0.20	-0.03	0.11	0.04	0.04	-0.04	0.05	0.14	0.12	0.07	0.12
0.11	0.10	0.09	0.05	-0.02	-0.03	0.04	0.07	0.09	0.07	0.05	0.06	0.05
0.20	0.02	0.17	0.07	0.22	-0.09	0.03	0.10	0.06	0.09	0.09	0.19	0.17
0.14	0.05	0.12	-0.10	0.11	0.03	-0.01	0.15	0.02	0.21	0.05	0.14	0.16
0.00	0.04	0.01	0.11	0.08	-0.03	0.09	0.13	0.10	0.13	0.05	0.06	0.18
0.10	0.14	0.20	0.12	0.19	0.08	0.20	0.17	0.12	0.19	0.17	0.13	0.10
-0.03	0.05	0.02	-0.03	0.07	0.02	0.07	0.09	-0.01	0.18	-0.01	0.00	0.11
0.03	-0.01	0.01	-0.02	0.07	-0.03	-0.01	0.11	0.00	0.11	0.01	0.08	0.05
0.03	0.04	0.01	-0.03	0.12	-0.09	0.07	0.12	0.05	0.20	0.04	0.09	0.23
0.06	0.10	0.07	0.06	0.11	0.07	0.08	0.20	0.07	0.13	0.07	0.16	0.23
0.11	0.15	0.16	0.05	0.08	0.08	0.12	0.08	0.17	0.16	0.16	0.13	0.20
0.10	0.11	0.17	0.07	0.17	0.07	0.13	0.18	0.10	0.17	0.13	0.08	0.15
0.04	0.04	-0.02	0.08	0.12	0.04	0.05	0.15	0.11	0.19	0.08	0.10	0.26
0.00	0.10	-0.01	0.01	0.07	-0.06	0.12	0.11	0.04	0.17	0.10	0.09	0.20
0.23	0.23	0.25	0.22	0.21	0.14	0.27	0.20	0.22	0.10	0.27	0.23	0.18
0.08	0.04	-0.09	0.00	0.19	-0.01	0.03	0.10	0.00	0.10	0.06	0.14	0.12
0.02	0.07	0.00	0.01	0.16	0.02	0.02	0.19	0.02	0.16	0.02	0.08	0.32
0.02	0.07	0.07	-0.03	0.07	-0.09	0.06	0.09	0.09	0.19	0.15	0.13	0.30
0.20	0.22	0.20	0.18	0.16	0.09	0.20	0.15	0.20	0.15	0.23	0.28	0.20
0.13	0.19	0.21	0.07	0.18	0.02	0.13	0.08	0.09	0.12	0.15	0.08	0.15
-0.19	-0.08	-0.06	0.00	0.03	0.04	0.04	0.19	0.04	0.31	0.01	-0.01	0.21
0.02	-0.12	0.06	-0.07	0.10	-0.03	-0.06	0.23	0.03	0.19	0.03	0.09	0.21
-0.11	-0.29	-0.12	-0.16	0.06	-0.04	-0.10	0.10	-0.12	0.21	-0.11	-0.03	0.14
-0.08	-0.04	-0.03	0.00	0.10	0.06	0.12	0.23	0.11	0.28	0.09	0.05	0.25
-0.08	-0.12	-0.02	-0.11	0.06	0.08	-0.01	0.21	0.03	0.35	0.01	0.08	0.27
-0.08	-0.21	-0.01	-0.10	0.09	-0.03	-0.01	0.14	0.03	0.15	0.01	0.13	0.27
-0.19	-0.14	-0.03	-0.05	0.04	0.01	-0.02	0.19	0.07	0.38	-0.02	0.02	0.28
-0.15	-0.10	0.00	-0.01	0.04	0.05	0.07	0.20	0.11	0.24	0.02	0.06	0.19
-0.08	-0.08	0.02	-0.06	0.08	0.01	0.07	0.11	0.07	0.37	0.08	0.08	0.14
-0.05	-0.01	-0.03	0.01	0.09	0.06	0.09	0.12	0.09	0.29	0.10	0.09	0.19
-0.06	-0.04	0.02	-0.04	0.02	0.01	-0.03	0.07	0.08	0.25	0.01	0.05	0.14
-0.05	-0.21	-0.01	-0.20	0.07	-0.09	-0.10	0.10	-0.08	0.24	-0.13	0.04	0.20
0.02	-0.05	0.05	-0.07	0.10	-0.06	-0.04	0.13	0.08	0.24	0.02	0.08	0.25
-0.17	-0.07	-0.09	-0.04	0.09	-0.03	0.01	0.17	-0.01	0.23	0.00	0.06	0.32
-0.06	-0.28	0.01	-0.14	0.14	-0.07	-0.10	0.11	-0.06	0.25	-0.08	0.05	0.25
-0.10	-0.06	-0.26	-0.04	0.13	-0.03	0.03	0.16	0.04	0.20	0.00	0.02	0.26
0.18	0.11	0.15	0.18	0.11	0.04	0.10	0.06	0.10	0.02	0.17	0.18	0.03
0.10	0.07	0.18	0.14	0.15	0.09	0.16	0.18	0.14	0.14	0.21	0.15	0.05
0.17	0.14	0.15	0.18	0.18	-0.02	0.11	0.14	0.15	-0.01	0.17	0.20	0.16
0.32	0.25	0.27	0.22	0.23	0.04	0.23	0.16	0.16	0.06	0.25	0.18	0.12
0.17	0.11	0.12	0.10	0.16	0.18	0.16	0.13	0.13	0.12	0.14	0.22	0.09
0.19	0.11	0.11	0.07	0.14	-0.03	0.10	0.16	0.13	0.14	0.11	0.17	0.10
0.02	-0.05	0.04	0.02	0.04	-0.09	0.04	0.18	0.08	0.14	0.04	0.14	0.18

Table A-1 (Continued)

SSP, Correlation Matrix

P-76	P-81	P-88	P-9	P-93	P-4
0.13	-0.01	0.07	-0.03	0.11	0.09
0.00	0.11	0.03	0.19	-0.10	-0.17
0.12	0.06	0.13	0.05	0.09	0.08
0.08	0.07	0.01	0.12	0.09	-0.09
0.00	0.01	0.01	0.13	-0.06	-0.38
0.04	0.08	0.06	0.16	-0.01	-0.21
0.00	0.13	0.09	0.18	0.04	-0.12
0.11	0.20	0.12	0.22	-0.03	-0.12
0.13	0.14	0.12	0.17	0.07	-0.04
0.12	0.18	0.20	0.28	0.04	-0.20
0.16	0.19	0.05	0.15	0.01	-0.08
0.06	0.00	0.15	-0.02	0.13	-0.06
0.01	0.19	0.10	0.13	0.16	-0.03
0.08	-0.06	-0.04	0.03	0.06	-0.04
0.18	0.14	0.01	0.09	0.14	0.01
0.21	0.13	0.17	0.19	-0.08	0.00
0.18	0.18	0.15	0.25	0.11	0.09
0.18	0.09	0.16	0.20	0.19	0.15
0.12	0.14	0.04	0.20	0.08	0.15
0.09	0.04	0.19	0.14	0.02	0.04
0.14	0.27	0.12	0.18	0.07	0.04
0.16	0.17	0.19	0.34	0.12	0.06
0.10	0.15	0.11	0.13	0.11	0.19
0.20	0.14	0.19	0.12	0.13	0.12
0.21	0.22	0.20	0.27	0.14	0.04
0.16	0.25	0.11	0.19	0.09	0.10
0.26	0.13	0.31	0.14	0.28	0.18
0.15	0.05	0.12	0.18	0.09	0.03
0.31	0.22	0.22	0.36	0.15	-0.03
0.21	0.33	0.12	0.23	0.15	0.07
0.27	0.14	0.32	0.09	0.26	0.12
0.17	0.12	0.21	0.16	0.27	0.18
0.12	0.26	0.11	0.26	0.03	0.03
0.15	0.31	0.11	0.24	0.02	-0.05
0.11	0.20	0.07	0.25	-0.08	-0.10
0.14	0.33	0.15	0.19	0.08	0.08
0.23	0.31	0.14	0.26	0.08	0.03
0.09	0.28	0.09	0.24	-0.06	0.01
0.12	0.36	0.14	0.24	0.02	0.01
0.12	0.27	0.05	0.23	0.01	0.12
0.15	0.25	0.11	0.08	0.09	0.03
0.18	0.28	0.11	0.16	0.07	0.08
0.11	0.21	0.06	0.10	0.08	-0.03
0.15	0.24	0.13	0.28	0.02	-0.16
0.26	0.29	0.14	0.20	0.10	-0.09
0.22	0.34	0.19	0.31	0.07	-0.07
0.21	0.31	0.18	0.31	0.09	-0.11
0.19	0.26	0.16	0.26	0.07	-0.01
0.13	0.01	0.10	-0.02	0.15	0.07
0.13	0.17	0.08	0.07	0.10	0.12
0.16	0.10	0.19	0.17	0.15	0.04
0.18	0.13	0.09	0.09	0.23	0.11
0.15	0.13	0.20	0.08	0.14	0.10
0.21	0.14	0.13	0.04	0.17	0.06
0.19	0.19	0.11	0.17	0.05	-0.07

Table A-1 (Continued)

SSP, Correlation Matrix

	C-10	C-15	C-22	C-27	C-3	C-34	C-39	C-46	C-51	C-58	C-63	C-70
I-49	0.12	0.09	0.13	0.27	0.19	0.21	0.27	0.18	0.35	0.28	0.20	0.20
I-56	0.05	0.00	0.10	-0.03	-0.09	-0.07	-0.05	0.04	-0.02	-0.03	0.06	0.04
I-61	0.15	-0.01	0.11	0.03	0.04	-0.01	0.09	0.03	0.07	0.05	0.08	0.10
I-68	0.26	0.18	0.13	0.28	0.16	0.13	0.13	0.28	0.22	0.21	0.29	0.26
I-73	0.28	0.09	0.14	0.29	0.19	0.18	0.31	0.13	0.20	0.20	0.25	0.29
I-8	0.22	0.10	0.20	0.05	-0.01	-0.01	0.14	0.09	0.03	0.04	0.13	0.06
I-80	0.15	0.05	0.14	0.16	0.05	0.03	0.13	0.15	0.09	0.15	0.24	0.20
I-85	0.14	0.12	0.17	0.28	0.12	0.15	0.21	0.37	0.20	0.18	0.29	0.24
I-92	0.09	0.09	0.08	0.17	0.13	0.16	0.14	0.16	0.21	0.17	0.13	0.14
L-11	0.25	0.05	0.07	0.14	0.14	0.07	0.15	-0.03	0.17	0.15	0.02	0.18
L-18	0.11	-0.09	0.06	-0.05	-0.12	-0.08	0.04	-0.12	0.06	-0.08	-0.04	0.00
L-23	0.17	-0.16	0.11	0.10	-0.08	-0.05	0.12	-0.05	0.13	-0.06	0.03	0.11
L-30	0.30	0.10	0.16	0.23	0.13	0.22	0.24	0.10	0.22	0.18	0.17	0.16
L-35	0.21	-0.07	0.09	0.18	-0.03	0.07	0.11	-0.04	0.12	0.04	0.07	0.15
L-42	0.11	-0.07	0.05	0.06	-0.08	-0.02	0.05	-0.01	0.12	0.00	-0.04	0.07
L-47	0.29	0.03	0.07	0.25	0.13	0.13	0.23	0.09	0.22	0.14	0.16	0.20
L-54	0.17	-0.09	0.07	0.15	-0.03	0.00	0.07	-0.03	0.19	0.01	0.06	0.10
L-59	0.24	0.08	0.15	0.27	0.28	0.24	0.19	0.13	0.20	0.26	0.17	0.26
L-6	0.33	-0.06	0.07	0.13	0.04	0.01	0.09	0.01	0.10	0.03	0.02	0.09
L-66	0.11	-0.03	-0.01	-0.05	-0.06	-0.08	-0.06	-0.09	-0.01	-0.07	0.03	0.10
L-71	0.11	-0.22	0.06	0.01	-0.14	-0.10	-0.01	-0.05	0.12	-0.03	-0.03	0.05
L-78	0.24	-0.01	0.16	0.11	0.01	0.04	0.07	0.00	0.03	0.07	0.13	0.18
L-83	0.21	0.02	0.15	0.15	0.02	0.06	0.04	-0.01	0.12	0.06	0.17	0.14
L-90	0.08	-0.15	0.08	0.03	-0.14	-0.04	0.08	-0.09	0.15	-0.07	-0.01	0.05
L-95	0.25	-0.05	0.17	0.08	0.08	-0.05	0.05	0.06	0.08	-0.02	0.09	0.14
P-16	0.14	-0.26	0.07	0.00	-0.12	-0.13	-0.06	-0.11	0.06	-0.06	-0.09	-0.01
P-21	0.17	0.06	-0.02	0.08	0.05	0.10	0.10	0.07	0.12	0.16	0.13	0.07
P-28	0.06	-0.06	-0.09	-0.16	-0.10	-0.14	-0.03	-0.09	-0.11	-0.02	0.03	0.04
P-33	0.12	-0.16	0.09	-0.05	-0.30	-0.21	-0.06	-0.10	0.00	-0.21	-0.08	-0.05
P-40	0.19	0.03	0.09	0.08	-0.04	-0.01	-0.06	0.20	0.10	0.05	0.11	0.04
P-45	0.17	-0.10	0.10	-0.07	-0.17	-0.10	0.01	-0.20	0.06	-0.09	-0.02	0.04
P-52	0.06	0.16	0.05	0.04	0.05	0.17	0.17	0.24	0.00	0.20	0.16	0.10
P-57	0.09	-0.13	0.10	-0.04	-0.28	-0.19	-0.02	-0.09	0.06	-0.16	0.04	-0.07
P-64	0.18	-0.09	0.14	0.07	-0.06	-0.08	0.01	-0.05	0.11	0.07	-0.01	0.10
P-69	-0.03	0.05	0.01	0.06	-0.04	0.03	0.09	0.21	0.17	0.12	0.14	-0.03
P-76	0.13	0.00	0.12	0.08	0.00	0.04	0.00	0.11	0.13	0.12	0.16	0.06
P-81	-0.01	0.11	0.06	0.07	0.01	0.08	0.13	0.20	0.14	0.18	0.19	0.00
P-88	0.07	0.03	0.13	0.01	0.01	0.06	0.09	0.12	0.12	0.20	0.05	0.15
P-9	-0.03	0.19	0.05	0.12	0.13	0.16	0.18	0.22	0.17	0.28	0.15	-0.02
P-93	0.11	-0.10	0.09	0.09	-0.06	-0.01	0.04	-0.03	0.07	0.04	0.01	0.13
P-4	0.09	-0.17	0.08	-0.09	-0.38	-0.21	-0.12	-0.12	-0.04	-0.20	-0.08	-0.06

Note: 585 obsrvations or cases.
(four were missing values)

Table A-1 (Continued)

SSP, Correlation Matrix

C-75	C-82	C-87	C-94	E-14	E-19	E-2	E-26	E-31	E-38	E-43	E-50	E-55
0.17	0.07	0.18	0.24	0.14	0.04	0.06	0.14	0.06	0.15	0.13	0.04	0.20
0.09	0.06	0.02	0.10	-0.22	0.03	-0.12	0.02	-0.08	-0.09	0.05	0.02	-0.41
0.09	0.00	0.13	0.05	-0.25	-0.01	-0.24	-0.07	-0.21	-0.09	-0.04	0.02	-0.06
0.13	0.10	0.27	0.33	0.05	0.04	0.01	0.03	0.09	0.07	0.01	0.10	0.14
0.43	0.10	0.23	0.26	0.02	0.07	-0.02	-0.05	-0.01	-0.04	0.07	0.12	0.11
0.12	0.04	0.08	0.09	0.06	0.17	0.04	-0.07	0.07	-0.01	0.12	0.10	0.02
0.08	0.05	0.22	0.22	-0.17	-0.01	-0.13	-0.01	-0.10	-0.08	-0.01	0.05	0.02
0.16	0.07	0.33	0.32	0.05	0.08	0.01	0.05	0.10	0.03	0.06	0.07	0.20
0.12	0.07	0.14	0.20	-0.02	-0.16	-0.21	0.13	-0.09	0.01	-0.07	-0.11	0.06
0.13	0.04	0.08	0.09	0.06	0.22	0.03	0.10	0.09	0.13	0.05	0.19	0.05
0.03	0.05	0.04	-0.03	0.08	0.13	-0.03	0.04	-0.08	0.01	0.10	0.11	0.03
0.12	0.09	0.12	0.04	0.08	0.23	0.02	0.04	0.05	0.02	0.20	0.15	0.14
0.16	0.07	0.23	0.20	0.20	0.21	0.09	0.21	0.19	0.17	0.22	0.19	0.16
0.14	0.11	0.14	0.04	0.04	0.20	0.02	0.06	0.11	0.12	0.07	0.21	0.08
0.06	0.05	0.10	-0.03	0.07	0.19	0.08	0.03	0.10	0.07	0.07	0.18	0.06
0.29	0.09	0.22	0.18	0.04	0.14	0.00	0.01	0.02	0.06	0.11	0.18	0.06
0.12	0.07	0.15	0.08	0.07	0.16	0.07	0.10	0.03	0.11	0.18	0.23	0.09
0.23	0.10	0.22	0.20	0.08	0.18	0.08	0.15	0.08	0.18	0.11	0.14	0.12
0.09	0.08	0.12	0.08	0.06	0.18	0.04	0.06	0.00	0.08	0.04	0.16	0.05
-0.01	0.08	0.04	-0.02	-0.04	0.11	-0.03	-0.02	-0.06	0.05	0.02	0.09	0.02
0.16	0.06	0.05	-0.01	0.05	0.12	0.00	-0.01	0.05	0.09	0.14	0.14	0.10
0.21	0.12	0.15	0.12	-0.01	0.14	0.04	-0.02	0.04	0.08	0.11	0.14	0.07
0.25	0.11	0.20	0.14	0.00	0.10	-0.03	0.03	0.03	0.06	0.11	0.10	0.04
0.14	0.10	0.02	0.05	0.04	0.14	0.05	-0.01	0.04	0.10	0.15	0.11	0.04
0.20	0.09	0.17	0.12	0.01	0.20	0.02	0.01	0.01	0.07	0.16	0.17	-0.02
-0.03	0.05	0.07	-0.10	0.11	0.12	-0.03	-0.02	-0.03	0.06	0.05	0.07	0.08
0.11	-0.02	0.22	0.11	0.08	0.19	0.07	0.07	0.12	0.11	0.08	0.17	0.12
0.04	-0.03	-0.09	0.03	-0.03	0.08	0.02	-0.03	-0.09	0.07	0.08	0.07	0.04
0.04	0.04	0.03	-0.01	0.09	0.20	0.07	-0.01	0.07	0.08	0.12	0.13	0.05
-0.04	0.07	0.10	0.15	0.13	0.17	0.09	0.11	0.12	0.20	0.08	0.18	0.15
0.05	0.09	0.06	0.02	0.10	0.12	-0.01	0.00	0.05	0.07	0.17	0.10	0.11
0.14	0.07	0.09	0.21	0.13	0.19	0.18	0.11	0.20	0.13	0.16	0.17	0.19
0.12	0.05	0.09	0.05	0.05	0.17	-0.01	0.01	0.04	0.07	0.16	0.13	0.08
0.07	0.06	0.19	0.14	0.06	0.13	0.00	0.08	0.09	0.16	0.13	0.08	0.10
0.12	0.05	0.17	0.16	0.18	0.10	0.11	0.05	0.23	0.23	0.20	0.15	0.26
0.01	0.08	0.18	0.21	0.18	0.18	0.12	0.09	0.14	0.16	0.10	0.20	0.21
0.19	-0.06	0.14	0.13	0.18	0.09	0.14	0.04	0.27	0.17	0.15	0.14	0.22
0.10	-0.04	0.01	0.17	0.15	0.16	0.04	0.19	0.12	0.19	0.11	0.19	0.20
0.13	0.03	0.09	0.19	0.25	0.20	0.20	0.14	0.18	0.34	0.13	0.12	0.27
0.16	0.06	0.14	-0.08	0.11	0.19	0.08	0.02	0.07	0.12	0.11	0.13	0.14
-0.03	-0.04	0.01	0.00	0.09	0.15	0.15	0.04	0.04	0.06	0.19	0.12	0.04

Table A-1 (Continued)

SSP, Correlation Matrix

E-62	E-67	E-7	E-74	E-79	E-86	E-91	F-12	F-17	F-24	F-29	F-36	F-41
0.14	0.14	0.10	0.19	0.19	0.22	-0.01	0.09	0.22	0.08	0.12	0.15	0.24
0.02	0.07	-0.13	-0.11	-0.10	-0.03	-0.07	-0.07	-0.02	0.00	0.00	0.00	0.06
-0.31	0.14	-0.04	-0.08	-0.22	0.01	-0.01	-0.01	0.15	-0.02	-0.06	-0.02	0.12
0.13	-0.03	0.16	0.18	0.10	0.05	-0.02	0.19	0.30	0.18	0.16	0.34	0.22
0.03	0.15	0.05	-0.07	0.09	0.17	0.07	-0.06	0.08	-0.02	-0.02	-0.03	0.07
-0.05	0.15	-0.31	-0.04	0.03	0.04	0.13	0.10	0.04	-0.01	0.10	0.09	0.01
-0.06	0.11	0.01	0.05	-0.11	0.04	-0.01	0.08	0.17	0.08	0.13	0.13	0.08
0.15	0.05	0.09	0.18	0.14	0.01	0.11	0.26	0.27	0.14	0.28	0.27	0.16
-0.03	0.07	0.12	0.07	0.08	0.11	-0.22	0.10	0.18	0.13	0.09	0.23	0.22
-0.03	0.20	0.12	0.17	-0.01	0.16	0.14	-0.28	0.03	-0.07	-0.14	-0.16	-0.09
-0.03	0.26	0.04	0.04	-0.05	0.12	0.14	-0.07	-0.22	-0.11	-0.15	-0.16	-0.26
0.06	0.27	0.05	0.04	0.06	0.22	0.16	-0.08	-0.04	-0.34	0.04	-0.10	-0.07
0.08	0.30	0.16	0.16	0.15	0.26	0.18	0.03	0.15	0.04	-0.03	0.10	0.07
0.05	0.30	0.11	0.05	0.05	0.25	0.19	-0.18	0.02	-0.15	-0.01	-0.15	-0.06
0.06	0.28	0.09	0.08	0.00	0.14	0.21	-0.05	-0.12	-0.09	-0.03	-0.02	-0.39
0.00	0.23	0.07	0.04	0.06	0.20	0.11	-0.25	0.07	-0.11	-0.10	-0.15	-0.02
0.06	0.27	0.16	0.13	0.04	0.28	0.20	-0.16	-0.05	-0.13	-0.04	-0.12	-0.13
0.07	0.16	0.17	0.21	0.09	0.23	0.12	-0.19	0.05	-0.02	-0.13	-0.06	-0.01
0.00	0.29	0.12	0.05	-0.01	0.15	0.10	-0.14	0.02	-0.06	-0.07	-0.06	-0.04
-0.02	0.08	0.08	0.02	0.02	0.14	0.10	-0.13	-0.01	-0.08	-0.10	-0.06	-0.02
0.08	0.26	0.03	0.02	0.14	0.22	0.11	-0.05	-0.10	-0.23	0.01	-0.11	-0.08
0.06	0.30	0.07	0.04	0.09	0.23	0.11	-0.08	0.03	-0.09	0.04	-0.02	-0.05
0.00	0.23	0.08	0.02	0.02	0.20	0.13	-0.19	0.02	-0.11	-0.08	-0.08	-0.08
0.10	0.23	0.04	0.07	0.07	0.22	0.19	-0.08	-0.12	-0.29	-0.04	-0.12	-0.21
-0.01	0.25	-0.09	0.00	0.07	0.20	0.21	-0.06	0.06	-0.12	-0.03	-0.02	-0.01
0.01	0.22	0.00	0.01	-0.03	0.18	0.07	0.00	-0.07	-0.16	0.00	-0.11	-0.10
0.07	0.21	0.19	0.16	0.07	0.16	0.18	0.03	0.10	0.06	0.10	0.06	0.09
-0.06	0.14	-0.01	0.02	-0.09	0.09	0.02	0.04	-0.03	-0.04	0.06	0.08	-0.03
0.12	0.27	0.03	0.02	0.06	0.20	0.13	0.04	-0.06	-0.10	0.12	-0.01	-0.01
0.11	0.20	0.10	0.19	0.09	0.15	0.08	0.19	0.23	0.10	0.23	0.21	0.14
0.04	0.22	0.00	0.02	0.09	0.20	0.09	0.04	0.03	-0.12	0.11	0.03	0.03
0.17	0.10	0.10	0.16	0.19	0.15	0.12	0.31	0.19	0.21	0.28	0.35	0.15
0.10	0.27	0.06	0.02	0.15	0.23	0.15	0.01	0.03	-0.11	0.09	0.01	0.01
0.09	0.23	0.14	0.08	0.13	0.28	0.08	-0.01	0.09	-0.03	0.05	0.08	0.13
0.20	0.18	0.12	0.32	0.30	0.20	0.15	0.21	0.21	0.14	0.25	0.27	0.27
0.16	0.26	0.15	0.31	0.21	0.27	0.17	0.12	0.15	0.11	0.14	0.23	0.09
0.25	0.13	0.05	0.22	0.33	0.14	0.12	0.26	0.31	0.20	0.33	0.31	0.28
0.11	0.31	0.12	0.22	0.12	0.32	0.21	0.11	0.11	0.07	0.15	0.14	0.09
0.19	0.14	0.18	0.36	0.23	0.09	0.16	0.26	0.24	0.25	0.19	0.26	0.24
0.09	0.28	0.09	0.15	0.15	0.26	0.27	0.03	0.02	-0.08	0.08	0.08	-0.06
0.10	0.18	0.03	-0.03	0.07	0.12	0.18	0.03	-0.05	-0.10	0.08	0.03	0.01

Table A-1 (Continued)

SSP, Correlation Matrix

F-49	F-5	F-53	F-60	F-65	F-72	F-77	F-84	F-89	F-96	I-1	I-13	I-20
0.06	0.12	0.09	0.12	0.01	0.17	0.17	0.19	0.19	0.14	0.12	0.04	0.34
-0.07	-0.09	-0.01	-0.01	-0.01	-0.05	-0.02	-0.17	-0.02	-0.18	0.15	0.30	0.01
-0.03	0.00	0.02	0.03	0.02	0.06	0.04	-0.03	0.03	-0.11	0.33	0.26	0.18
0.20	0.10	0.19	0.17	0.14	0.24	0.35	0.22	0.24	0.15	0.15	0.23	0.26
-0.04	-0.04	0.06	0.02	0.03	0.10	0.13	0.02	0.08	-0.05	0.22	0.08	0.18
0.11	0.16	0.15	0.11	0.10	0.01	0.01	-0.01	0.03	-0.07	0.18	0.14	0.16
0.11	0.04	0.09	0.13	0.07	0.11	0.21	0.12	0.13	0.07	0.30	0.34	0.18
0.30	0.17	0.27	0.23	0.18	0.22	0.31	0.29	0.27	0.23	0.12	0.25	0.20
0.08	0.06	0.05	0.15	0.04	0.16	0.16	0.13	0.22	0.08	0.30	0.11	0.34
-0.24	-0.09	-0.15	-0.17	-0.13	0.02	-0.10	-0.10	-0.02	-0.06	0.18	0.06	0.18
-0.14	-0.06	-0.06	-0.07	-0.02	-0.15	-0.10	-0.09	-0.14	-0.05	0.22	0.08	0.16
-0.09	-0.04	-0.07	-0.02	0.00	-0.24	0.04	-0.01	-0.24	-0.04	0.10	0.13	0.23
-0.03	0.05	0.04	0.06	0.03	0.06	0.15	0.12	0.12	0.13	0.11	0.05	0.20
-0.19	-0.13	-0.06	-0.12	-0.07	-0.03	0.03	-0.12	-0.09	-0.05	0.13	0.13	0.15
-0.06	-0.01	-0.02	-0.04	-0.04	-0.09	-0.06	-0.04	-0.11	0.03	0.13	0.06	0.14
-0.25	-0.22	-0.09	-0.13	-0.10	-0.06	0.03	-0.07	-0.04	-0.09	0.19	0.10	0.22
-0.13	-0.11	-0.12	-0.06	-0.06	-0.10	0.01	-0.06	-0.10	0.04	0.11	0.05	0.23
-0.17	-0.14	-0.08	-0.17	0.01	0.11	0.04	0.11	0.14	0.03	0.13	0.02	0.14
-0.15	-0.15	-0.05	-0.10	-0.12	-0.10	-0.06	-0.04	-0.06	-0.05	0.15	0.12	0.21
-0.15	-0.11	-0.09	-0.07	-0.18	-0.06	-0.01	-0.06	-0.01	0.02	0.10	0.08	0.06
-0.12	-0.01	-0.02	0.01	-0.06	-0.26	-0.02	-0.01	-0.14	-0.01	0.11	0.08	0.16
-0.07	-0.01	0.05	0.03	0.03	-0.06	-0.05	-0.05	-0.08	-0.06	0.17	0.16	0.15
-0.19	-0.15	-0.08	-0.05	-0.06	-0.05	0.02	-0.17	-0.06	-0.10	0.18	0.10	0.17
-0.14	-0.10	-0.08	-0.01	-0.04	-0.21	-0.05	-0.07	-0.28	-0.06	0.11	0.07	0.14
-0.03	0.00	0.02	-0.03	0.02	-0.01	0.05	-0.09	0.01	-0.26	0.15	0.18	0.15
-0.05	-0.01	-0.06	0.01	-0.04	-0.20	-0.07	-0.04	-0.14	-0.04	0.18	0.14	0.18
0.04	0.04	0.08	0.09	0.02	0.07	0.10	0.09	0.14	0.13	0.11	0.15	0.18
0.01	0.05	0.01	0.06	0.01	-0.09	-0.06	-0.03	-0.07	-0.03	0.04	0.09	-0.02
-0.02	0.07	0.07	0.09	-0.03	-0.10	-0.04	0.01	-0.10	0.03	0.10	0.16	0.11
0.19	0.20	0.11	0.12	0.07	0.10	0.13	0.17	0.11	0.16	0.06	0.18	0.14
0.07	0.11	0.07	0.09	0.08	-0.08	0.08	-0.01	-0.06	0.04	0.10	0.14	0.15
0.38	0.24	0.37	0.29	0.25	0.24	0.24	0.23	0.25	0.20	0.02	0.14	-0.01
-0.02	0.02	0.08	0.10	0.01	-0.13	0.02	0.00	-0.08	0.00	0.17	0.21	0.17
0.02	0.06	0.08	0.09	0.05	0.04	0.08	0.06	0.05	0.02	0.18	0.15	0.20
0.28	0.19	0.14	0.19	0.14	0.20	0.25	0.32	0.25	0.26	0.03	0.05	0.16
0.12	0.12	0.15	0.18	0.11	0.15	0.26	0.22	0.21	0.19	0.13	0.13	0.16
0.36	0.27	0.25	0.28	0.21	0.24	0.29	0.34	0.31	0.26	0.01	0.17	0.10
0.14	0.05	0.11	0.11	0.06	0.13	0.14	0.19	0.18	0.16	0.10	0.08	0.19
0.24	0.23	0.08	0.16	0.10	0.28	0.20	0.31	0.31	0.26	-0.02	0.07	0.17
0.02	0.01	0.09	0.07	0.08	0.02	0.10	0.07	0.09	0.07	0.15	0.10	0.15
0.01	0.12	0.03	0.08	-0.03	-0.16	-0.09	-0.07	-0.11	-0.01	0.07	0.12	0.04

Table A-1 (Continued)

SSP, Correlation Matrix

I-25	I-32	I-37	I-44	I-49	I-56	I-61	I-68	I-73	I-8	I-80	I-85	I-92
0.11	0.24	0.14	0.18	**1.00**	0.04	0.10	0.10	0.19	0.04	0.14	0.10	0.34
0.11	0.21	0.16	0.11	0.04	**1.00**	0.17	0.09	0.14	0.12	0.20	0.03	0.12
0.19	0.36	0.12	0.09	0.10	0.17	**1.00**	0.12	0.14	0.17	0.36	0.12	0.21
0.16	0.18	0.30	0.39	0.10	0.09	0.12	**1.00**	0.13	0.07	0.33	0.46	0.27
0.33	0.19	0.25	0.13	0.19	0.14	0.14	0.13	**1.00**	0.12	0.12	0.17	0.20
0.28	0.12	0.11	0.04	0.04	0.12	0.17	0.07	0.12	**1.00**	0.15	0.05	0.09
0.18	0.35	0.24	0.24	0.14	0.20	0.36	0.33	0.12	0.15	**1.00**	0.34	0.27
0.16	0.17	0.26	0.37	0.10	0.03	0.12	0.46	0.17	0.05	0.34	**1.00**	0.21
0.08	0.36	0.21	0.23	0.34	0.12	0.21	0.27	0.20	0.09	0.27	0.21	**1.00**
0.28	0.09	0.08	0.02	0.11	0.08	0.12	0.02	0.20	0.09	0.03	-0.05	-0.01
0.14	0.16	0.05	-0.07	-0.01	0.02	0.12	-0.03	0.08	0.18	0.11	0.02	0.05
0.34	0.10	0.14	-0.04	0.10	0.08	0.14	0.04	0.22	0.18	0.10	0.03	0.00
0.18	0.14	0.14	0.16	0.26	-0.02	0.11	0.09	0.13	0.11	0.13	0.06	0.15
0.35	0.09	0.18	0.08	0.07	0.11	0.09	0.03	0.24	0.07	0.07	0.07	0.06
0.21	0.14	0.11	0.01	0.02	0.08	0.05	0.01	0.08	0.12	0.14	0.11	0.07
0.37	0.13	0.18	0.13	0.20	0.17	0.13	0.12	0.40	0.09	0.13	0.11	0.06
0.22	0.16	0.12	-0.01	0.11	0.07	0.07	0.02	0.20	0.03	0.13	0.03	0.05
0.22	0.10	0.11	0.02	0.10	0.07	0.13	0.08	0.24	0.02	0.11	0.06	0.08
0.21	0.11	0.06	0.05	0.07	0.04	0.16	0.04	0.17	0.15	0.06	-0.02	0.07
0.09	0.08	0.04	-0.02	0.00	0.06	0.12	0.01	-0.01	0.08	0.10	0.00	0.01
0.18	0.14	0.09	-0.03	0.14	0.20	0.09	0.02	0.28	0.14	0.07	0.06	0.07
0.26	0.17	0.23	0.06	0.08	0.14	0.13	0.16	0.28	0.16	0.19	0.14	0.15
0.32	0.17	0.19	0.02	0.09	0.17	0.13	0.12	0.35	0.16	0.18	0.17	0.13
0.25	0.11	0.11	-0.05	0.10	0.19	0.08	0.02	0.22	0.14	0.10	0.04	0.09
0.27	0.12	0.11	0.04	0.04	0.21	0.22	0.14	0.28	0.28	0.17	0.16	0.11
0.22	0.10	0.07	0.02	0.00	0.05	0.16	-0.01	0.07	0.19	0.10	0.01	0.04
0.23	0.16	0.14	0.04	0.03	0.04	0.13	0.13	0.16	0.13	0.14	0.09	0.14
0.04	0.18	-0.03	-0.09	0.06	0.09	0.11	-0.08	-0.06	0.07	0.09	-0.10	0.09
0.23	0.16	0.10	0.04	0.04	0.17	0.13	0.04	0.12	0.17	0.11	0.04	0.03
0.16	0.13	0.16	0.18	0.10	0.06	0.08	0.17	-0.01	0.12	0.13	0.19	0.13
0.16	0.13	0.13	0.08	0.08	0.13	0.14	0.09	0.18	0.17	0.14	0.05	0.10
0.06	0.12	0.14	0.14	0.08	0.11	0.10	0.15	0.04	0.14	0.11	0.18	0.16
0.25	0.14	0.11	0.04	0.09	0.21	0.16	0.07	0.19	0.22	0.13	0.09	0.13
0.18	0.22	0.17	0.14	0.21	0.13	0.12	0.18	0.16	0.11	0.20	0.09	0.22
0.12	0.09	0.10	0.18	0.19	-0.02	0.01	0.21	0.11	0.08	0.09	0.26	0.18
0.18	0.15	0.21	0.19	0.13	0.06	0.08	0.24	0.08	0.11	0.25	0.24	0.22
0.13	0.13	0.14	0.19	0.18	0.00	0.07	0.23	0.08	0.15	0.18	0.24	0.22
0.09	0.20	0.13	0.11	0.14	0.04	0.12	0.11	0.10	0.06	0.18	0.17	0.21
0.09	0.08	0.04	0.17	0.19	-0.06	0.00	0.13	-0.01	0.06	0.04	0.19	0.09
0.23	0.14	0.17	0.05	0.10	0.04	0.15	0.04	0.22	0.14	0.15	0.10	0.16
0.11	0.10	0.06	-0.07	0.02	0.09	0.10	0.00	0.03	0.23	0.06	0.05	-0.01

Table A-1 (Continued)

SSP, Correlation Matrix

L-11	L-18	L-23	L-30	L-35	L-42	L-47	L-54	L-59	L-6	L-66	L-71	L-78
0.11	-0.01	0.10	0.26	0.07	0.02	0.20	0.11	0.10	0.07	0.00	0.14	0.08
0.08	0.02	0.08	-0.02	0.11	0.08	0.17	0.07	0.07	0.04	0.06	0.20	0.14
0.12	0.12	0.14	0.11	0.09	0.05	0.13	0.07	0.13	0.16	0.12	0.09	0.13
0.02	-0.03	0.04	0.09	0.03	0.01	0.12	0.02	0.08	0.04	0.01	0.02	0.16
0.20	0.08	0.22	0.13	0.24	0.08	0.40	0.20	0.24	0.17	-0.01	0.28	0.28
0.09	0.18	0.18	0.11	0.07	0.12	0.09	0.03	0.02	0.15	0.08	0.14	0.16
0.03	0.11	0.10	0.13	0.07	0.14	0.13	0.13	0.11	0.06	0.10	0.07	0.19
-0.05	0.02	0.03	0.06	0.07	0.11	0.11	0.03	0.06	-0.02	0.00	0.06	0.14
-0.01	0.05	0.00	0.15	0.06	0.07	0.06	0.05	0.08	0.07	0.01	0.07	0.15
1.00	0.21	0.29	0.17	0.39	0.22	0.40	0.29	0.37	0.31	0.16	0.19	0.30
0.21	**1.00**	0.34	0.16	0.24	0.54	0.21	0.37	0.17	0.29	0.15	0.30	0.23
0.29	0.34	**1.00**	0.25	0.35	0.27	0.37	0.41	0.17	0.38	0.20	0.47	0.31
0.17	0.16	0.25	**1.00**	0.24	0.18	0.31	0.26	0.21	0.28	0.09	0.14	0.14
0.39	0.24	0.35	0.24	**1.00**	0.32	0.44	0.34	0.26	0.34	0.21	0.30	0.44
0.22	0.54	0.27	0.18	0.32	**1.00**	0.26	0.39	0.21	0.25	0.16	0.32	0.32
0.40	0.21	0.37	0.31	0.44	0.26	**1.00**	0.40	0.43	0.38	0.19	0.32	0.37
0.29	0.37	0.41	0.26	0.34	0.39	0.40	**1.00**	0.24	0.33	0.16	0.38	0.32
0.37	0.17	0.17	0.21	0.26	0.21	0.43	0.24	**1.00**	0.23	0.17	0.16	0.21
0.31	0.29	0.38	0.28	0.34	0.25	0.38	0.33	0.23	**1.00**	0.22	0.29	0.28
0.16	0.15	0.20	0.09	0.21	0.16	0.19	0.16	0.17	0.22	**1.00**	0.14	0.13
0.19	0.30	0.47	0.14	0.30	0.32	0.32	0.38	0.16	0.29	0.14	**1.00**	0.33
0.30	0.23	0.31	0.14	0.44	0.32	0.37	0.32	0.21	0.28	0.13	0.33	**1.00**
0.35	0.29	0.32	0.17	0.42	0.31	0.51	0.39	0.28	0.29	0.16	0.30	0.48
0.24	0.33	0.48	0.13	0.37	0.39	0.33	0.44	0.20	0.23	0.18	0.49	0.36
0.21	0.21	0.32	0.14	0.34	0.19	0.34	0.23	0.26	0.20	0.16	0.36	0.32
0.20	0.40	0.41	0.12	0.28	0.33	0.23	0.33	0.12	0.31	0.16	0.37	0.25
0.25	0.23	0.21	0.09	0.26	0.21	0.17	0.21	0.17	0.19	0.11	0.20	0.21
0.06	0.17	0.10	0.02	0.02	0.14	0.02	0.12	-0.05	0.05	0.06	0.10	0.12
0.16	0.33	0.39	0.08	0.33	0.35	0.20	0.30	0.05	0.24	0.19	0.43	0.30
0.09	0.09	0.13	0.08	0.10	0.19	0.08	0.12	0.07	0.12	0.07	0.15	0.20
0.11	0.25	0.35	0.13	0.29	0.26	0.25	0.29	0.05	0.25	0.14	0.38	0.28
-0.05	-0.04	-0.03	0.04	-0.03	0.04	-0.02	-0.01	-0.02	-0.04	0.00	0.01	0.12
0.18	0.31	0.38	0.15	0.33	0.31	0.25	0.29	0.09	0.27	0.22	0.46	0.33
0.15	0.17	0.21	0.20	0.26	0.19	0.20	0.18	0.19	0.22	0.12	0.35	0.35
0.04	-0.01	0.09	0.11	0.07	-0.02	0.04	0.07	0.01	0.00	0.00	0.13	0.07
0.07	0.18	0.15	0.11	0.21	0.23	0.12	0.20	0.18	0.16	0.12	0.21	0.33
-0.02	-0.03	-0.01	0.07	0.00	-0.03	-0.03	-0.02	-0.04	-0.03	-0.05	0.11	0.13
0.15	0.16	0.18	0.10	0.21	0.20	0.13	0.18	0.12	0.08	0.05	0.19	0.23
0.10	-0.08	0.00	0.08	-0.01	-0.04	-0.01	-0.04	0.08	0.05	-0.01	0.00	-0.01
0.13	0.25	0.31	0.16	0.32	0.39	0.21	0.28	0.13	0.24	0.14	0.38	0.30
0.05	0.28	0.26	0.07	0.18	0.25	0.08	0.21	-0.06	0.20	0.16	0.32	0.23

Table A-1 (Continued)

SSP, Correlation Matrix

L-83	L-90	L-95	P-16	P-21	P-28	P-33	P-40	P-45	P-52	P-57	P-64	P-69
0.09	0.10	0.04	0.00	0.03	0.06	0.04	0.10	0.08	0.08	0.09	0.21	0.19
0.17	0.19	0.21	0.05	0.04	0.09	0.17	0.06	0.13	0.11	0.21	0.13	-0.02
0.13	0.08	0.22	0.16	0.13	0.11	0.13	0.08	0.14	0.10	0.16	0.12	0.01
0.12	0.02	0.14	-0.01	0.13	-0.08	0.04	0.17	0.09	0.15	0.07	0.18	0.21
0.35	0.22	0.28	0.07	0.16	-0.06	0.12	-0.01	0.18	0.04	0.19	0.16	0.11
0.16	0.14	0.28	0.19	0.13	0.07	0.17	0.12	0.17	0.14	0.22	0.11	0.08
0.18	0.10	0.17	0.10	0.14	0.09	0.11	0.13	0.14	0.11	0.13	0.20	0.09
0.17	0.04	0.16	0.01	0.09	-0.10	0.04	0.19	0.05	0.18	0.09	0.09	0.26
0.13	0.09	0.11	0.04	0.14	0.09	0.03	0.13	0.10	0.16	0.13	0.22	0.18
0.35	0.24	0.21	0.20	0.25	0.06	0.16	0.09	0.11	-0.05	0.18	0.15	0.04
0.29	0.33	0.21	0.40	0.23	0.17	0.33	0.09	0.25	-0.04	0.31	0.17	-0.01
0.32	0.48	0.32	0.41	0.21	0.10	0.39	0.13	0.35	-0.03	0.38	0.21	0.09
0.17	0.13	0.14	0.12	0.09	0.02	0.08	0.08	0.13	0.04	0.15	0.20	0.11
0.42	0.37	0.34	0.28	0.26	0.02	0.33	0.10	0.29	-0.03	0.33	0.26	0.07
0.31	0.39	0.19	0.33	0.21	0.14	0.35	0.19	0.26	0.04	0.31	0.19	-0.02
0.51	0.33	0.34	0.23	0.17	0.02	0.20	0.08	0.25	-0.02	0.25	0.20	0.04
0.39	0.44	0.23	0.33	0.21	0.12	0.30	0.12	0.29	-0.01	0.29	0.18	0.07
0.28	0.20	0.26	0.12	0.17	-0.05	0.05	0.07	0.05	-0.02	0.09	0.19	0.01
0.29	0.23	0.20	0.31	0.19	0.05	0.24	0.12	0.25	-0.04	0.27	0.22	0.00
0.16	0.18	0.16	0.16	0.11	0.06	0.19	0.07	0.14	0.00	0.22	0.12	0.00
0.30	0.49	0.36	0.37	0.20	0.10	0.43	0.15	0.38	0.01	0.46	0.35	0.13
0.48	0.36	0.32	0.25	0.21	0.12	0.30	0.20	0.28	0.12	0.33	0.35	0.07
1.00	0.37	0.37	0.21	0.21	0.07	0.21	0.12	0.18	-0.05	0.35	0.23	0.10
0.37	**1.00**	0.33	0.35	0.14	0.10	0.42	0.13	0.27	0.02	0.43	0.25	0.09
0.37	0.33	**1.00**	0.24	0.16	0.09	0.28	0.18	0.27	0.02	0.33	0.25	0.11
0.21	0.35	0.24	**1.00**	0.21	0.13	0.41	0.19	0.32	-0.01	0.37	0.28	0.01
0.21	0.14	0.16	0.21	**1.00**	0.20	0.25	0.13	0.23	0.22	0.24	0.21	0.22
0.07	0.10	0.09	0.13	0.20	**1.00**	0.19	0.15	0.16	0.16	0.16	0.08	-0.01
0.21	0.42	0.28	0.41	0.25	0.19	**1.00**	0.30	0.44	0.10	0.58	0.33	0.14
0.12	0.13	0.18	0.19	0.13	0.15	0.30	**1.00**	0.19	0.13	0.28	0.18	0.25
0.18	0.27	0.27	0.32	0.23	0.16	0.44	0.19	**1.00**	0.10	0.47	0.32	0.12
-0.05	0.02	0.02	-0.01	0.22	0.16	0.10	0.13	0.10	**1.00**	0.07	0.07	0.26
0.35	0.43	0.33	0.37	0.24	0.16	0.58	0.28	0.47	0.07	**1.00**	0.31	0.14
0.23	0.25	0.25	0.28	0.21	0.08	0.33	0.18	0.32	0.07	0.31	**1.00**	0.18
0.10	0.09	0.11	0.01	0.22	-0.01	0.14	0.25	0.12	0.26	0.14	0.18	**1.00**
0.24	0.22	0.25	0.25	0.25	0.07	0.26	0.38	0.29	0.23	0.33	0.36	0.27
0.06	0.05	0.15	0.01	0.21	0.05	0.10	0.26	0.10	0.34	0.15	0.16	0.43
0.14	0.14	0.16	0.22	0.24	0.22	0.24	0.16	0.30	0.19	0.25	0.26	0.21
-0.02	-0.08	-0.01	-0.03	0.18	0.00	0.01	0.24	0.02	0.18	0.00	0.12	0.43
0.25	0.39	0.31	0.43	0.29	0.15	0.39	0.20	0.37	0.14	0.33	0.33	0.17
0.18	0.33	0.23	0.30	0.19	0.18	0.51	0.20	0.34	0.11	0.53	0.27	0.11

Table A-1 (Continued)

SSP, Correlation Matrix

P-76	P-81	P-88	P-9	P-93	P-4
0.13	0.18	0.14	0.19	0.10	0.02
0.06	0.00	0.04	-0.06	0.04	0.09
0.08	0.07	0.12	0.00	0.15	0.10
0.24	0.23	0.11	0.13	0.04	0.00
0.08	0.08	0.10	-0.01	0.22	0.03
0.11	0.15	0.06	0.06	0.14	0.23
0.25	0.18	0.18	0.04	0.15	0.06
0.24	0.24	0.17	0.19	0.10	0.05
0.22	0.22	0.21	0.09	0.16	-0.01
0.07	-0.02	0.15	0.10	0.13	0.05
0.18	-0.03	0.16	-0.08	0.25	0.28
0.15	-0.01	0.18	0.00	0.31	0.26
0.11	0.07	0.10	0.08	0.16	0.07
0.21	0.00	0.21	-0.01	0.32	0.18
0.23	-0.03	0.20	-0.04	0.39	0.25
0.12	-0.03	0.13	-0.01	0.21	0.08
0.20	-0.02	0.18	-0.04	0.28	0.21
0.18	-0.04	0.12	0.08	0.13	-0.06
0.16	-0.03	0.08	0.05	0.24	0.20
0.12	-0.05	0.05	-0.01	0.14	0.16
0.21	0.11	0.19	0.00	0.38	0.32
0.33	0.13	0.23	-0.01	0.30	0.23
0.24	0.06	0.14	-0.02	0.25	0.18
0.22	0.05	0.14	-0.08	0.39	0.33
0.25	0.15	0.16	-0.01	0.31	0.23
0.25	0.01	0.22	-0.03	0.43	0.30
0.25	0.21	0.24	0.18	0.29	0.19
0.07	0.05	0.22	0.00	0.15	0.18
0.26	0.10	0.24	0.01	0.39	0.51
0.38	0.26	0.16	0.24	0.20	0.20
0.29	0.10	0.30	0.02	0.37	0.34
0.23	0.34	0.19	0.18	0.14	0.11
0.33	0.15	0.25	0.00	0.33	0.53
0.36	0.16	0.26	0.12	0.33	0.27
0.27	0.43	0.21	0.43	0.17	0.11
1.00	0.30	0.30	0.22	0.37	0.20
0.30	**1.00**	0.20	0.30	0.16	0.15
0.30	0.20	**1.00**	0.20	0.31	0.15
0.22	0.30	0.20	**1.00**	0.04	-0.01
0.37	0.16	0.31	0.04	**1.00**	0.26
0.20	0.15	0.15	-0.01	0.26	**1.00**

Table A-2

Gregorc Style Delineator, Correlation Matrix.

	CS-OBJECTIVE	CS-PERFECTIONIST	CS-SOLID	CS-PRACTICAL	CS-CAREFULDETAIL	AS-EVALUATIVE	AS-RESEARCH	AS-QUALITY	AS-RATIONAL	AS-IDEAS	AR-SENSITIVE	AR-COLORFUL	AR-NONJUDGMENTAL
CS-OBJECTIVE	**1.00**	0.04	0.18	0.19	0.12	-0.08	0.08	0.02	0.19	0.02	-0.47	-0.21	-0.03
CS-PERFECTIONIST	0.04	**1.00**	0.10	0.08	0.27	0.06	-0.28	0.15	0.05	-0.08	-0.02	-0.37	-0.12
CS-SOLID	0.18	0.10	**1.00**	0.30	0.12	0.06	0.08	-0.14	0.09	-0.01	-0.12	-0.08	-0.44
CS-PRACTICAL	0.19	0.08	0.30	**1.00**	0.09	0.08	0.16	0.04	-0.16	-0.02	-0.08	-0.19	-0.16
CS-CAREFULDETAIL	0.12	0.27	0.12	0.09	**1.00**	0.11	0.01	0.08	0.23	-0.45	-0.04	-0.19	-0.03
AS-EVALUATIVE	-0.08	0.06	0.06	0.08	0.11	**1.00**	0.17	0.21	0.10	0.10	-0.44	-0.13	-0.13
AS-RESEARCH	0.08	-0.28	0.08	0.16	0.01	0.17	**1.00**	0.05	0.12	0.01	-0.18	-0.37	-0.05
AS-QUALITY	0.02	0.15	-0.14	0.04	0.08	0.21	0.05	**1.00**	-0.02	0.09	-0.02	-0.09	-0.36
AS-RATIONAL	0.19	0.05	0.09	-0.16	0.23	0.10	0.12	-0.02	**1.00**	-0.08	-0.25	-0.16	0.00
AS-IDEAS	0.02	-0.08	-0.01	-0.02	-0.45	0.10	0.01	0.09	-0.08	**1.00**	-0.12	0.01	-0.06
AR-SENSITIVE	-0.47	-0.02	-0.12	-0.08	-0.04	-0.44	-0.18	-0.02	-0.25	-0.12	**1.00**	0.26	0.15
AR-COLORFUL	-0.21	-0.37	-0.08	-0.19	-0.19	-0.13	-0.37	-0.09	-0.16	0.01	0.26	**1.00**	0.06
AR-NONJUDGMENTAL	-0.03	-0.12	-0.44	-0.16	-0.03	-0.13	-0.05	-0.36	0.00	-0.06	0.15	0.06	**1.00**
AR-LIVELY	-0.12	-0.13	-0.14	-0.39	-0.17	-0.08	-0.21	0.13	-0.42	0.15	0.23	0.31	0.14
AR-AWARE	-0.12	-0.01	0.03	-0.01	-0.18	-0.01	0.06	-0.10	0.00	-0.30	0.12	0.02	0.07
CR-INTUITIVE	-0.41	-0.08	-0.10	-0.18	-0.18	-0.39	-0.04	-0.19	-0.01	0.00	-0.20	0.06	-0.02
CR-RISK-TAKER	0.10	-0.43	-0.09	-0.04	-0.11	-0.09	-0.27	-0.13	-0.01	0.05	-0.07	-0.25	0.12
CR-INSIGHTFUL	-0.17	-0.09	-0.45	-0.17	-0.15	-0.11	-0.08	-0.33	-0.06	-0.02	-0.01	0.10	-0.26
CR-PERCEPTIVE	-0.25	0.01	-0.24	-0.47	-0.14	-0.09	-0.07	-0.16	-0.33	-0.05	0.08	0.02	0.04
CR-CREATIVE	-0.04	-0.19	-0.14	-0.06	-0.45	-0.18	-0.07	-0.06	-0.16	-0.09	0.02	0.15	0.01
CS-THOROUGH	0.10	0.34	0.18	0.15	0.31	-0.03	0.00	0.05	-0.03	-0.17	-0.03	-0.11	-0.13
CS-REALISTIC	0.25	0.20	0.20	0.28	0.13	0.03	0.04	0.19	0.13	-0.05	-0.14	-0.20	-0.15
CS-ORDERED	0.14	0.20	0.19	0.27	0.20	0.08	0.11	0.09	0.13	-0.15	-0.15	-0.14	-0.12
CS-PERSISTENT	0.02	0.26	0.22	0.08	0.15	-0.05	-0.06	0.07	-0.02	-0.10	0.05	-0.07	-0.11
CS-PRODUCTORIENTED	0.23	0.11	0.17	0.20	0.19	0.12	0.10	0.09	0.04	0.02	-0.25	-0.12	-0.10
AS-LOGICAL	0.16	0.08	0.10	0.15	0.11	0.12	0.21	0.03	0.26	-0.04	-0.15	-0.21	-0.01
AS-REFERENTIAL	0.12	0.02	0.17	0.09	0.18	0.22	0.16	0.09	0.14	0.04	-0.14	-0.11	-0.04
AS-PROOF	0.02	0.04	0.09	-0.02	0.08	0.11	0.08	0.12	0.01	0.06	0.10	-0.02	0.06
AS-ANALYTICAL	0.20	0.08	0.09	0.08	0.15	0.25	0.18	0.10	0.23	-0.06	-0.33	-0.21	-0.12
AS-JUDGE	0.12	0.13	0.13	0.07	0.10	0.14	0.06	0.05	0.13	0.04	-0.12	-0.15	-0.11
AR-SPONTANEOUS	-0.22	-0.21	-0.20	-0.28	-0.23	-0.13	-0.22	0.05	-0.22	0.06	0.28	0.30	0.12
AR-EMPATHY	-0.28	-0.08	-0.26	-0.19	-0.09	-0.11	-0.11	-0.17	-0.12	-0.09	0.28	0.27	0.23
AR-ATTUNED	-0.17	-0.09	-0.16	-0.22	-0.09	-0.10	-0.13	-0.14	-0.04	-0.05	0.12	0.14	0.08
AR-AESTHETIC	-0.15	-0.13	-0.18	-0.09	-0.13	-0.12	-0.01	-0.16	-0.03	0.01	0.18	0.21	0.18
AR-PERSONORIENTED	-0.13	-0.04	-0.10	-0.08	-0.06	-0.12	-0.07	0.07	-0.10	-0.10	0.19	0.17	0.14
CR-TROUBLESHOOTER	-0.03	-0.17	-0.05	0.00	-0.16	0.07	0.03	-0.12	0.02	0.13	-0.13	0.01	0.00
CR-INNOVATIVE	-0.03	-0.12	-0.06	-0.14	-0.16	-0.11	-0.08	-0.09	-0.12	0.09	-0.04	-0.02	-0.08
CR-MULTISOLUTIONS	0.01	-0.14	-0.11	-0.04	-0.17	-0.08	-0.06	-0.06	-0.12	0.14	-0.04	0.02	-0.01
CR-EXPERIMENTING	-0.08	-0.23	-0.14	-0.08	-0.19	-0.08	-0.14	-0.02	-0.17	0.15	0.10	0.11	0.06
CR-PRACTICALDREAMER	-0.19	-0.18	-0.17	-0.17	-0.20	-0.13	-0.07	-0.20	-0.06	0.04	0.16	0.09	0.07

Note: 466 observations or cases.
(Two cases missing)

Table A-2 (Continued)

Gregorc Style Delineator, Correlation Matrix.

AR-LIVELY	AR-AWARE	CR-INTUITIVE	CR-RISK-TAKER	CR-INSIGHTFUL	CR-PERCEPTINVE	CR-CREATIVE	CS-THOROUGH	CS-REALISTIC	CS-ORDERED	CS-PERSISTENT	CS-PRODUCTORIENTED	AS-LOGICAL	AS-REFERENTIAL	AS-PROOF	AS-ANALYTICAL	AS-JUDGE
-0.12	-0.12	-0.41	0.10	-0.17	-0.25	-0.04	0.10	0.25	0.14	0.02	0.23	0.16	0.12	0.02	0.20	0.12
-0.13	-0.01	-0.08	-0.43	-0.09	0.01	-0.19	0.34	0.20	0.20	0.26	0.11	0.08	0.02	0.04	0.08	0.13
-0.14	0.03	-0.10	-0.09	-0.45	-0.24	-0.14	0.18	0.20	0.19	0.22	0.17	0.10	0.17	0.09	0.09	0.13
-0.39	-0.01	-0.18	-0.04	-0.17	-0.47	-0.06	0.15	0.28	0.27	0.08	0.20	0.15	0.09	-0.02	0.08	0.07
-0.17	-0.18	-0.18	-0.11	-0.15	-0.14	-0.45	0.31	0.13	0.20	0.15	0.19	0.11	0.18	0.08	0.15	0.10
-0.08	-0.01	-0.39	-0.09	-0.11	-0.09	-0.18	-0.03	0.03	0.08	-0.05	0.12	0.12	0.22	0.11	0.25	0.14
-0.21	0.06	-0.04	-0.27	-0.08	-0.07	-0.07	0.00	0.04	0.11	-0.06	0.10	0.21	0.16	0.08	0.18	0.06
0.13	-0.10	-0.19	-0.13	-0.33	-0.16	-0.06	0.05	0.19	0.09	0.07	0.09	0.03	0.09	0.12	0.10	0.05
-0.42	0.00	-0.01	-0.01	-0.06	-0.33	-0.16	-0.03	0.13	0.13	-0.02	0.04	0.26	0.14	0.01	0.23	0.13
0.15	-0.30	0.00	0.05	-0.02	-0.05	-0.09	-0.17	-0.05	-0.15	-0.10	0.02	-0.04	0.04	0.06	-0.06	0.04
0.23	0.12	-0.20	-0.07	-0.01	0.08	0.02	-0.03	-0.14	-0.15	0.05	-0.25	-0.15	-0.14	0.10	-0.33	-0.12
0.31	0.02	0.06	-0.25	0.10	0.02	0.15	-0.11	-0.20	-0.14	-0.07	-0.12	-0.21	-0.11	-0.02	-0.21	-0.15
0.14	0.07	-0.02	0.12	-0.26	0.04	0.01	-0.13	-0.15	-0.12	-0.11	-0.10	-0.01	-0.04	0.06	-0.12	-0.11
1.00	-0.03	-0.06	0.01	-0.10	-0.22	0.07	-0.11	-0.22	-0.19	0.00	-0.15	-0.23	0.04	0.11	-0.22	-0.07
-0.03	**1.00**	0.00	-0.04	-0.02	0.04	-0.48	0.00	0.08	0.05	0.15	-0.12	0.06	0.01	0.03	-0.05	0.05
-0.06	0.00	**1.00**	0.07	0.28	0.25	0.20	-0.05	-0.14	-0.05	-0.03	-0.06	-0.12	-0.17	-0.23	-0.07	-0.14
0.01	-0.04	0.07	**1.00**	0.08	0.05	0.11	-0.25	-0.06	-0.17	-0.15	-0.10	-0.09	-0.08	-0.10	-0.06	-0.04
-0.10	-0.02	0.28	0.08	**1.00**	0.34	0.19	-0.10	-0.20	-0.14	-0.16	-0.14	-0.10	-0.21	-0.26	-0.05	-0.06
-0.22	0.04	0.25	0.05	0.34	**1.00**	0.15	-0.03	-0.17	-0.21	-0.06	-0.08	-0.16	-0.26	-0.10	-0.08	-0.13
0.07	-0.48	0.20	0.11	0.19	0.15	**1.00**	-0.17	-0.17	-0.12	-0.21	-0.08	-0.12	-0.20	-0.15	-0.05	-0.15
-0.11	0.00	-0.05	-0.25	-0.10	-0.03	-0.17	**1.00**	0.15	0.22	0.19	0.11	-0.12	-0.01	-0.09	0.08	0.01
-0.22	0.08	-0.14	-0.06	-0.20	-0.17	-0.17	0.15	**1.00**	0.25	0.25	0.17	0.31	-0.09	0.06	0.23	-0.06
-0.19	0.05	-0.05	-0.17	-0.14	-0.21	-0.12	0.22	0.25	**1.00**	0.22	0.16	0.15	0.03	-0.21	0.09	0.05
0.00	0.15	-0.03	-0.15	-0.16	-0.06	-0.21	0.19	0.25	0.22	**1.00**	0.06	-0.03	-0.06	-0.04	-0.23	-0.01
-0.15	-0.12	-0.06	-0.10	-0.14	-0.08	-0.08	0.11	0.17	0.16	0.06	**1.00**	0.16	0.11	0.04	0.20	-0.10
-0.23	0.06	-0.12	-0.09	-0.10	-0.16	-0.12	-0.12	0.31	0.15	-0.03	0.16	**1.00**	0.07	0.15	0.32	0.06
0.04	0.01	-0.17	-0.08	-0.21	-0.26	-0.20	-0.01	-0.09	0.03	-0.06	0.11	0.07	**1.00**	0.20	0.10	0.29
0.11	0.03	-0.23	-0.10	-0.26	-0.10	-0.15	-0.09	0.06	-0.21	-0.04	0.04	0.15	0.20	**1.00**	0.08	0.15
-0.22	-0.05	-0.07	-0.06	-0.05	-0.08	-0.05	0.08	0.23	0.09	-0.23	0.20	0.32	0.10	0.08	**1.00**	0.04
-0.07	0.05	-0.14	-0.04	-0.06	-0.13	-0.15	0.01	-0.06	0.05	-0.01	-0.10	0.06	0.29	0.15	0.04	**1.00**
0.42	-0.04	0.05	0.14	0.04	0.07	0.22	-0.42	-0.27	-0.25	-0.11	-0.27	-0.39	-0.03	0.04	-0.29	-0.08
0.17	0.16	0.07	-0.07	0.18	0.12	0.02	0.00	-0.48	-0.13	-0.10	-0.22	-0.23	-0.34	-0.01	-0.26	-0.07
0.11	0.08	0.15	0.08	0.20	0.14	0.07	0.06	-0.24	-0.36	-0.01	-0.13	-0.25	-0.04	-0.35	-0.15	-0.09
0.09	0.10	0.07	-0.06	0.12	0.03	0.03	-0.06	-0.36	-0.14	-0.44	-0.18	-0.12	0.08	-0.03	-0.35	0.02
0.11	0.10	0.03	-0.07	-0.08	0.05	0.03	0.12	0.12	-0.01	0.09	-0.43	-0.08	-0.20	-0.09	0.02	-0.39
-0.12	0.01	0.11	0.16	0.14	0.10	0.06	-0.41	-0.16	-0.09	-0.04	0.02	-0.39	-0.04	-0.09	-0.06	0.02
-0.01	-0.23	0.19	0.22	0.20	0.26	0.30	-0.13	-0.35	-0.11	-0.07	-0.03	-0.12	-0.40	-0.22	-0.03	-0.10
-0.01	-0.14	0.12	0.18	0.17	0.16	0.18	-0.20	-0.07	-0.44	-0.15	-0.07	-0.04	-0.16	-0.34	-0.02	-0.10
0.14	-0.21	0.05	0.25	0.10	0.10	0.27	-0.23	-0.18	-0.19	-0.38	-0.08	-0.16	-0.10	-0.01	-0.42	-0.05
0.10	-0.02	0.14	0.19	0.26	0.14	0.18	-0.23	-0.23	-0.18	-0.13	-0.44	-0.14	-0.15	-0.08	-0.23	-0.43

Table A-2 (Continued)

Gregorc Style Delineator, Correlation Matrix.

AR-SPONTANEOUS	AR-EMPATHY	AR-ATTUNED	AR-AESTHETIC	AR-PERSONORIENTED	CR-TROUBLESHOOTER	CR-INNOVATIVE	CR-MULTISOLUTIONS	CR-EXPERIMENTING	CR-PRACTICALDREAMER
-0.22	-0.28	-0.17	-0.15	-0.13	-0.03	-0.03	0.01	-0.08	-0.19
-0.21	-0.08	-0.09	-0.13	-0.04	-0.17	-0.12	-0.14	-0.23	-0.18
-0.20	-0.26	-0.16	-0.18	-0.10	-0.05	-0.06	-0.11	-0.14	-0.17
-0.28	-0.19	-0.22	-0.09	-0.08	0.00	-0.14	-0.04	-0.08	-0.17
-0.23	-0.09	-0.09	-0.13	-0.06	-0.16	-0.16	-0.17	-0.19	-0.20
-0.13	-0.11	-0.10	-0.12	-0.12	0.07	-0.11	-0.08	-0.08	-0.13
-0.22	-0.11	-0.13	-0.01	-0.07	0.03	-0.08	-0.06	-0.14	-0.07
0.05	-0.17	-0.14	-0.16	0.07	-0.12	-0.09	-0.06	-0.02	-0.20
-0.22	-0.12	-0.04	-0.03	-0.10	0.02	-0.12	-0.12	-0.17	-0.06
0.06	-0.09	-0.05	0.01	-0.10	0.13	0.09	0.14	0.15	0.04
0.28	0.28	0.12	0.18	0.19	-0.13	-0.04	-0.04	0.10	0.16
0.30	0.27	0.14	0.21	0.17	0.01	-0.02	0.02	0.11	0.09
0.12	0.23	0.08	0.18	0.14	0.00	-0.08	-0.01	0.06	0.07
0.42	0.17	0.11	0.09	0.11	-0.12	-0.01	-0.01	0.14	0.10
-0.04	0.16	0.08	0.10	0.10	0.01	-0.23	-0.14	-0.21	-0.02
0.05	0.07	0.15	0.07	0.03	0.11	0.19	0.12	0.05	0.14
0.14	-0.07	0.08	-0.06	-0.07	0.16	0.22	0.18	0.25	0.19
0.04	0.18	0.20	0.12	-0.08	0.14	0.20	0.17	0.10	0.26
0.07	0.12	0.14	0.03	0.05	0.10	0.26	0.16	0.10	0.14
0.22	0.02	0.07	0.03	0.03	0.06	0.30	0.18	0.27	0.18
-0.42	0.00	0.06	-0.06	0.12	-0.41	-0.13	-0.20	-0.23	-0.23
-0.27	-0.48	-0.24	-0.36	0.12	-0.16	-0.35	-0.07	-0.18	-0.23
-0.25	-0.13	-0.36	-0.14	-0.01	-0.09	-0.11	-0.44	-0.19	-0.18
-0.11	-0.10	-0.01	-0.44	0.09	-0.04	-0.07	-0.15	-0.38	-0.13
-0.27	-0.22	-0.13	-0.18	-0.43	0.02	-0.03	-0.07	-0.08	-0.44
-0.39	-0.23	-0.25	-0.12	-0.08	-0.39	-0.12	-0.04	-0.16	-0.14
-0.03	-0.34	-0.04	0.08	-0.20	-0.04	-0.40	-0.16	-0.10	-0.15
0.04	-0.01	-0.35	-0.03	-0.09	-0.09	-0.22	-0.34	-0.01	-0.08
-0.29	-0.26	-0.15	-0.35	0.02	-0.06	-0.03	-0.02	-0.42	-0.23
-0.08	-0.07	-0.09	0.02	-0.39	0.02	-0.10	-0.10	-0.05	-0.43
1.00	0.17	0.14	0.15	0.08	-0.24	0.10	0.09	0.29	0.25
0.17	**1.00**	0.20	0.29	0.12	0.06	-0.30	-0.05	0.09	0.16
0.14	0.20	**1.00**	0.21	0.12	0.04	0.05	-0.27	-0.02	0.09
0.15	0.29	0.21	**1.00**	-0.03	0.03	-0.05	-0.03	-0.14	0.17
0.08	0.12	0.12	-0.03	**1.00**	-0.10	-0.05	-0.03	-0.08	-0.20
-0.24	0.06	0.04	0.03	-0.10	**1.00**	0.13	0.13	0.06	0.08
0.10	-0.30	0.05	-0.05	-0.05	0.13	**1.00**	0.25	0.16	0.17
0.09	-0.05	-0.27	-0.03	-0.03	0.13	0.25	**1.00**	0.21	0.17
0.29	0.09	-0.02	-0.14	-0.08	0.06	0.16	0.21	**1.00**	0.20
0.25	0.16	0.09	0.17	-0.20	0.08	0.17	0.17	0.20	**1.00**

Table A-3

CPPI, Correlation Matrix.

	action/reflection	outgoing/reserved	calm/active	hasty/hesitant	alone/crowd	verbal/nonverbal	doing/rehearsal	listening/talking	outside/inside	acting/watching	facts/theories	horizon/nearby	real/imagination
action/reflection	**1.00**	0.44	0.26	0.35	0.22	0.26	0.45	0.27	0.22	0.44	0.20	-0.01	0.17
outgoing/reserved	0.44	**1.00**	0.33	0.33	0.44	0.49	0.35	0.39	0.24	0.38	0.05	-0.03	-0.02
calm/active	0.26	0.33	**1.00**	0.25	0.24	0.30	0.22	0.37	0.20	0.30	-0.08	-0.02	-0.07
hasty/hesitant	0.35	0.33	0.25	**1.00**	0.16	0.27	0.29	0.37	0.15	0.32	-0.03	-0.02	-0.01
alone/crowd	0.22	0.44	0.24	0.16	**1.00**	0.25	0.15	0.27	0.22	0.21	0.00	0.00	-0.05
verbal/nonverbal	0.26	0.49	0.30	0.27	0.25	**1.00**	0.26	0.43	0.16	0.34	-0.05	-0.02	-0.03
doing/rehearsal	0.45	0.35	0.22	0.29	0.15	0.26	**1.00**	0.19	0.19	0.37	0.04	-0.08	0.03
listening/talking	0.27	0.39	0.37	0.37	0.27	0.43	0.19	**1.00**	0.11	0.30	-0.10	-0.03	-0.09
outside/inside	0.22	0.24	0.20	0.15	0.22	0.16	0.19	0.11	**1.00**	0.25	0.01	-0.08	0.01
acting/watching	0.44	0.38	0.30	0.32	0.21	0.34	0.37	0.30	0.25	**1.00**	0.00	-0.12	0.03
facts/theories	0.20	0.05	-0.08	-0.03	0.00	-0.05	0.04	-0.10	0.01	0.00	**1.00**	0.35	0.56
horizon/nearby	-0.01	-0.03	-0.02	-0.02	0.00	-0.02	-0.08	-0.03	-0.08	-0.12	0.35	**1.00**	0.32
real/imagination	0.17	-0.02	-0.07	-0.01	-0.05	-0.03	0.03	-0.09	0.01	0.03	0.56	0.32	**1.00**
detail/global	0.03	-0.05	-0.10	-0.10	-0.08	-0.09	-0.08	-0.18	-0.08	-0.15	0.50	0.35	0.47
conceptual/factual	0.15	-0.02	-0.05	-0.05	-0.02	-0.06	-0.03	-0.12	-0.04	-0.05	0.62	0.41	0.56
literal/figurative	0.11	-0.07	-0.08	-0.07	-0.08	-0.06	-0.04	-0.09	-0.04	0.02	0.48	0.29	0.51
specifics/possibilities	0.14	-0.02	-0.07	-0.06	-0.04	-0.04	-0.05	-0.08	-0.09	-0.02	0.52	0.40	0.57
estimate/precise	0.08	-0.10	-0.03	-0.10	-0.03	-0.05	-0.04	-0.08	-0.06	-0.01	0.36	0.24	0.34
present/future	0.05	-0.04	-0.10	-0.02	-0.04	-0.07	0.00	-0.10	0.01	-0.09	0.27	0.44	0.35
abstract/concrete	0.17	-0.05	-0.07	-0.03	-0.06	-0.07	0.00	-0.15	-0.04	-0.02	0.55	0.38	0.55
logic/values	0.10	-0.09	0.00	-0.05	-0.09	-0.07	0.04	0.02	0.01	0.02	0.24	0.11	0.23
rational/compassion	0.15	-0.12	-0.01	-0.05	-0.09	-0.06	0.01	0.03	0.00	0.08	0.18	0.00	0.25
sentiment/pragmatic	0.08	-0.14	0.01	-0.01	-0.07	-0.03	-0.01	0.01	0.02	0.05	0.04	-0.02	0.13
analytic/considerate	0.11	-0.13	0.03	0.01	-0.12	-0.04	0.05	0.07	-0.03	0.12	0.02	-0.08	0.08
person/impersonal	0.01	-0.20	-0.05	-0.03	-0.15	-0.10	-0.05	0.00	0.00	0.02	0.03	-0.06	0.02
thoughtful/practical	0.09	-0.10	-0.02	0.01	-0.13	-0.08	-0.02	0.02	0.02	0.00	0.23	0.10	0.21
helpful/sensible	0.01	-0.16	-0.01	-0.05	-0.12	-0.10	0.00	-0.03	0.01	-0.05	0.11	0.00	0.09
impartial/partial	0.01	-0.12	-0.05	-0.03	-0.08	-0.07	0.04	-0.10	0.01	0.05	0.00	-0.08	0.05
reasons/feelings	0.07	-0.17	-0.01	-0.05	-0.12	-0.06	0.02	-0.05	0.04	0.09	0.14	-0.01	0.25
subjective/objective	0.12	-0.11	-0.03	-0.04	-0.11	-0.08	0.07	-0.03	-0.01	0.05	0.15	0.01	0.16

Note: 336 Observations or cases.
(One case missing)

Table A-3 (Continued)

CPPI, Correlation Matrix.

detail/global	conceptual/factual	literal/figurative	specifics/possibilities	estimate/precise	present/future	abstract/concrete	logic/values	rational/compassion	sentiment/pragmatic	analytic/considerate	person/impersonal	thoughtful/practical	helpful/sensible	impartial/partial	reasons/feelings	subjective/objective
0.03	0.15	0.11	0.14	0.08	0.05	0.17	0.10	0.15	0.08	0.11	0.01	0.09	0.01	0.01	0.07	0.12
-0.05	-0.02	-0.07	-0.02	-0.10	-0.04	-0.05	-0.09	-0.12	-0.14	-0.13	-0.20	-0.10	-0.16	-0.12	-0.17	-0.11
-0.10	-0.05	-0.08	-0.07	-0.03	-0.10	-0.07	0.00	-0.01	0.01	0.03	-0.05	-0.02	-0.01	-0.05	-0.01	-0.03
-0.10	-0.05	-0.07	-0.06	-0.10	-0.02	-0.03	-0.05	-0.05	-0.01	0.01	-0.03	0.01	-0.05	-0.03	-0.05	-0.04
-0.08	-0.02	-0.08	-0.04	-0.03	-0.04	-0.06	-0.09	-0.09	-0.07	-0.12	-0.15	-0.13	-0.12	-0.08	-0.12	-0.11
-0.09	-0.06	-0.06	-0.04	-0.05	-0.07	-0.07	-0.07	-0.06	-0.03	-0.04	-0.10	-0.08	-0.10	-0.07	-0.06	-0.08
-0.08	-0.03	-0.04	-0.05	-0.04	0.00	0.00	0.04	0.01	-0.01	0.05	-0.05	-0.02	0.00	0.04	0.02	0.07
-0.18	-0.12	-0.09	-0.08	-0.08	-0.10	-0.15	0.02	0.03	0.01	0.07	0.00	0.02	-0.03	-0.10	-0.05	-0.03
-0.08	-0.04	-0.04	-0.09	-0.06	0.01	-0.04	0.01	0.00	0.02	-0.03	0.00	0.02	0.01	0.01	0.04	-0.01
-0.15	-0.05	0.02	-0.02	-0.01	-0.09	-0.02	0.02	0.08	0.05	0.12	0.02	0.00	-0.05	0.05	0.09	0.05
0.50	0.62	0.48	0.52	0.36	0.27	0.55	0.24	0.18	0.04	0.02	0.03	0.23	0.11	0.00	0.14	0.15
0.35	0.41	0.29	0.40	0.24	0.44	0.38	0.11	0.00	-0.02	-0.08	-0.06	0.10	0.00	-0.08	-0.01	0.01
0.47	0.56	0.51	0.57	0.34	0.35	0.55	0.23	0.25	0.13	0.08	0.02	0.21	0.09	0.05	0.25	0.16
1.00	0.52	0.48	0.61	0.43	0.34	0.49	0.19	0.13	0.01	0.02	-0.01	0.10	0.05	-0.02	0.12	0.14
0.52	**1.00**	0.53	0.55	0.43	0.38	0.60	0.20	0.12	0.05	0.02	0.00	0.19	0.05	0.01	0.10	0.17
0.48	0.53	**1.00**	0.56	0.42	0.32	0.56	0.19	0.26	0.13	0.15	0.04	0.23	0.13	0.06	0.20	0.20
0.61	0.55	0.56	**1.00**	0.48	0.41	0.53	0.25	0.25	0.07	0.10	0.06	0.19	0.09	0.02	0.21	0.15
0.43	0.43	0.42	0.48	**1.00**	0.27	0.48	0.22	0.24	0.06	0.18	0.13	0.15	0.11	0.07	0.22	0.23
0.34	0.38	0.32	0.41	0.27	**1.00**	0.33	0.12	0.07	0.01	-0.03	-0.01	0.14	0.08	-0.01	0.04	0.05
0.49	0.60	0.56	0.53	0.48	0.33	**1.00**	0.22	0.22	0.13	0.05	0.04	0.24	0.09	0.02	0.24	0.20
0.19	0.20	0.19	0.25	0.22	0.12	0.22	**1.00**	0.56	0.34	0.43	0.31	0.40	0.30	0.17	0.46	0.34
0.13	0.12	0.26	0.25	0.24	0.07	0.22	0.56	**1.00**	0.53	0.61	0.44	0.51	0.45	0.26	0.69	0.38
0.01	0.05	0.13	0.07	0.06	0.01	0.13	0.34	0.53	**1.00**	0.46	0.39	0.44	0.43	0.27	0.53	0.24
0.02	0.02	0.15	0.10	0.18	-0.03	0.05	0.43	0.61	0.46	**1.00**	0.38	0.34	0.35	0.21	0.56	0.32
-0.01	0.00	0.04	0.06	0.13	-0.01	0.04	0.31	0.44	0.39	0.38	**1.00**	0.41	0.40	0.19	0.42	0.23
0.10	0.19	0.23	0.19	0.15	0.14	0.24	0.40	0.51	0.44	0.34	0.41	**1.00**	0.52	0.13	0.44	0.24
0.05	0.05	0.13	0.09	0.11	0.08	0.09	0.30	0.45	0.43	0.35	0.40	0.52	**1.00**	0.20	0.39	0.23
-0.02	0.01	0.06	0.02	0.07	-0.01	0.02	0.17	0.26	0.27	0.21	0.19	0.13	0.20	**1.00**	0.30	0.20
0.12	0.10	0.20	0.21	0.22	0.04	0.24	0.46	0.69	0.53	0.56	0.42	0.44	0.39	0.30	**1.00**	0.37
0.14	0.17	0.20	0.15	0.23	0.05	0.20	0.34	0.38	0.24	0.32	0.23	0.24	0.23	0.20	0.37	**1.00**

Table A-4

CPPI, Correlation Matrix, Female.

	action/reflection	outgoing/reserved	calm/active	hasty/hesitant	alone/crowd	verbal/nonverbal	doing/rehearsal	listening/talking	outside/inside	acting/watching	facts/theories	horizon/nearby	real/imagination
action/reflection	**1.00**	0.48	0.23	0.38	0.22	0.38	0.52	0.39	0.23	0.51	0.21	0.07	0.13
outgoing/reserved	0.48	**1.00**	0.32	0.37	0.41	0.47	0.37	0.43	0.28	0.47	0.00	0.01	-0.02
calm/active	0.23	0.32	**1.00**	0.24	0.27	0.26	0.17	0.38	0.22	0.28	-0.06	0.04	-0.05
hasty/hesitant	0.38	0.37	0.24	**1.00**	0.15	0.32	0.30	0.39	0.21	0.38	-0.07	-0.02	-0.03
alone/crowd	0.22	0.41	0.27	0.15	**1.00**	0.21	0.12	0.28	0.30	0.20	-0.06	-0.03	-0.05
verbal/nonverbal	0.38	0.47	0.26	0.32	0.21	**1.00**	0.28	0.50	0.19	0.40	-0.05	0.01	-0.04
doing/rehearsal	0.52	0.37	0.17	0.30	0.12	0.28	**1.00**	0.25	0.19	0.34	0.04	-0.09	-0.02
listening/talking	0.39	0.43	0.38	0.39	0.28	0.50	0.25	**1.00**	0.20	0.37	-0.11	-0.04	-0.08
outside/inside	0.23	0.28	0.22	0.21	0.30	0.19	0.19	0.20	**1.00**	0.27	0.02	-0.06	-0.01
acting/watching	0.51	0.47	0.28	0.38	0.20	0.40	0.34	0.37	0.27	**1.00**	-0.01	-0.08	0.00
facts/theories	0.21	0.00	-0.06	-0.07	-0.06	-0.05	0.04	-0.11	0.02	-0.01	**1.00**	0.39	0.61
horizon/nearby	0.07	0.01	0.04	-0.02	-0.03	0.01	-0.09	-0.04	-0.06	-0.08	0.39	**1.00**	0.42
real/imagination	0.13	-0.02	-0.05	-0.03	-0.05	-0.04	-0.02	-0.08	-0.01	0.00	0.61	0.42	**1.00**
detail/global	-0.02	-0.07	-0.08	-0.18	-0.10	-0.09	-0.10	-0.23	-0.12	-0.16	0.49	0.35	0.50
conceptual/factual	0.10	0.00	-0.04	-0.05	-0.06	-0.06	-0.07	-0.12	-0.03	-0.06	0.61	0.43	0.57
literal/figurative	0.10	-0.06	-0.06	-0.10	-0.10	-0.06	-0.10	-0.10	-0.03	-0.01	0.55	0.39	0.58
specifics/possibilities	0.11	-0.03	-0.03	-0.11	-0.07	-0.03	-0.08	-0.09	-0.13	-0.04	0.51	0.44	0.59
estimate/precise	0.09	-0.07	-0.02	-0.14	-0.02	0.00	-0.04	-0.02	-0.08	-0.01	0.37	0.32	0.42
present/future	0.07	-0.03	-0.05	0.01	-0.03	-0.08	0.04	-0.03	0.03	0.01	0.23	0.44	0.39
abstract/concrete	0.16	-0.03	-0.05	-0.04	-0.09	-0.02	-0.01	-0.11	-0.07	-0.01	0.60	0.46	0.58
logic/values	0.05	-0.01	0.10	-0.10	-0.08	-0.01	0.00	0.09	0.06	0.03	0.27	0.19	0.23
rational/compassion	0.15	-0.07	0.07	-0.07	-0.05	-0.03	-0.03	0.08	-0.03	0.06	0.25	0.12	0.27
sentiment/pragmatic	0.05	-0.10	0.03	-0.06	0.01	0.04	0.01	0.02	0.06	0.02	0.05	0.05	0.14
analytic/considerate	0.12	-0.07	0.05	-0.04	-0.15	0.03	0.03	0.14	0.03	0.14	0.06	0.03	0.08
person/impersonal	-0.04	-0.18	-0.04	-0.02	-0.14	-0.03	-0.13	0.04	0.01	-0.01	0.04	0.01	0.06
thoughtful/practical	0.04	-0.10	0.02	-0.05	-0.13	-0.08	-0.09	-0.03	0.03	-0.01	0.20	0.12	0.21
helpful/sensible	-0.03	-0.18	-0.01	-0.11	-0.10	-0.13	-0.08	-0.04	0.03	-0.06	0.11	0.10	0.11
impartial/partial	-0.01	-0.14	-0.05	-0.04	-0.11	-0.04	0.06	-0.12	-0.03	-0.01	-0.01	-0.06	0.04
reasons/feelings	0.04	-0.16	0.00	-0.15	-0.12	-0.03	-0.01	-0.04	0.03	0.02	0.19	0.12	0.26
subjective/objective	0.10	-0.03	-0.01	-0.07	-0.11	-0.04	0.04	-0.03	0.04	0.10	0.19	0.07	0.17

Note: 336 Observations or cases.
(One case missing)

Table A-4 (Continued)

CPPI, Correlation Matrix, Female.

detail/global	conceptual/factual	literal/figurative	specifics/possibilities	estimate/precise	present/future	abstract/concrete	logic/values	rational/compassion	sentiment/pragmatic	analytic/considerate	person/impersonal	thoughtful/practical	helpful/sensible	impartial/partial	reasons/feelings	subjective/objective
-0.02	0.10	0.10	0.11	0.09	0.07	0.16	0.05	0.15	0.05	0.12	-0.04	0.04	-0.03	-0.01	0.04	0.10
-0.07	0.00	-0.06	-0.03	-0.07	-0.03	-0.03	-0.01	-0.07	-0.10	-0.07	-0.18	-0.10	-0.18	-0.14	-0.16	-0.03
-0.08	-0.04	-0.06	-0.03	-0.02	-0.05	-0.05	0.10	0.07	0.03	0.05	-0.04	0.02	-0.01	-0.05	0.00	-0.01
-0.18	-0.05	-0.10	-0.11	-0.14	0.01	-0.04	-0.10	-0.07	-0.06	-0.04	-0.02	-0.05	-0.11	-0.04	-0.15	-0.07
-0.10	-0.06	-0.10	-0.07	-0.02	-0.03	-0.09	-0.08	-0.05	0.01	-0.15	-0.14	-0.13	-0.10	-0.11	-0.12	-0.11
-0.09	-0.06	-0.06	-0.03	0.00	-0.08	-0.02	-0.01	-0.03	0.04	0.03	-0.03	-0.08	-0.13	-0.04	-0.03	-0.04
-0.10	-0.07	-0.10	-0.08	-0.04	0.04	-0.01	0.00	-0.03	0.01	0.03	-0.13	-0.09	-0.08	0.06	-0.01	0.04
-0.23	-0.12	-0.10	-0.09	-0.02	-0.03	-0.11	0.09	0.08	0.02	0.14	0.04	-0.03	-0.04	-0.12	-0.04	-0.03
-0.12	-0.03	-0.03	-0.13	-0.08	0.03	-0.07	0.06	-0.03	0.06	0.03	0.01	0.03	0.03	-0.03	0.03	0.04
-0.16	-0.06	-0.01	-0.04	-0.01	0.01	-0.01	0.03	0.06	0.02	0.14	-0.01	-0.01	-0.06	-0.01	0.02	0.10
0.49	0.61	0.55	0.51	0.37	0.23	0.60	0.27	0.25	0.05	0.06	0.04	0.20	0.11	-0.01	0.19	0.19
0.35	0.43	0.39	0.44	0.32	0.44	0.46	0.19	0.12	0.05	0.03	0.01	0.12	0.10	-0.06	0.12	0.07
0.50	0.57	0.58	0.59	0.42	0.39	0.58	0.23	0.27	0.14	0.08	0.06	0.21	0.11	0.04	0.26	0.17
1.00	0.48	0.52	0.62	0.43	0.24	0.52	0.19	0.20	-0.01	0.01	0.01	0.08	0.04	0.03	0.16	0.17
0.48	**1.00**	0.54	0.53	0.44	0.33	0.59	0.18	0.15	0.03	0.01	0.05	0.10	0.04	0.01	0.12	0.18
0.52	0.54	**1.00**	0.62	0.39	0.31	0.54	0.17	0.30	0.10	0.11	-0.03	0.16	0.05	0.05	0.27	0.18
0.62	0.53	0.62	**1.00**	0.53	0.40	0.53	0.19	0.26	0.05	0.06	0.03	0.14	0.05	0.00	0.24	0.13
0.43	0.44	0.39	0.53	**1.00**	0.31	0.49	0.20	0.29	0.06	0.14	0.18	0.17	0.15	0.04	0.28	0.24
0.24	0.33	0.31	0.40	0.31	**1.00**	0.27	0.09	0.13	0.00	-0.03	-0.01	0.10	0.10	-0.01	0.08	0.07
0.52	0.59	0.54	0.53	0.49	0.27	**1.00**	0.19	0.23	0.07	-0.01	0.03	0.16	0.02	-0.01	0.27	0.18
0.19	0.18	0.17	0.19	0.20	0.09	0.19	**1.00**	0.56	0.29	0.43	0.29	0.41	0.37	0.18	0.44	0.35
0.20	0.15	0.30	0.26	0.29	0.13	0.23	0.56	**1.00**	0.45	0.59	0.33	0.52	0.46	0.21	0.67	0.32
-0.01	0.03	0.10	0.05	0.06	0.00	0.07	0.29	0.45	**1.00**	0.41	0.31	0.47	0.42	0.27	0.48	0.12
0.01	0.01	0.11	0.06	0.14	-0.03	-0.01	0.43	0.59	0.41	**1.00**	0.32	0.37	0.35	0.16	0.51	0.24
0.01	0.05	-0.03	0.03	0.18	-0.01	0.03	0.29	0.33	0.31	0.32	**1.00**	0.36	0.33	0.15	0.39	0.21
0.08	0.10	0.16	0.14	0.17	0.10	0.16	0.41	0.52	0.47	0.37	0.36	**1.00**	0.60	0.06	0.50	0.21
0.04	0.04	0.05	0.05	0.15	0.10	0.02	0.37	0.46	0.42	0.35	0.33	0.60	**1.00**	0.12	0.38	0.19
0.03	0.01	0.05	0.00	0.04	-0.01	-0.01	0.18	0.21	0.27	0.16	0.15	0.06	0.12	**1.00**	0.24	0.20
0.16	0.12	0.27	0.24	0.28	0.08	0.27	0.44	0.67	0.48	0.51	0.39	0.50	0.38	0.24	**1.00**	0.32
0.17	0.18	0.18	0.13	0.24	0.07	0.18	0.35	0.32	0.12	0.24	0.21	0.21	0.19	0.20	0.32	**1.00**

Table A-5

CPPI, Correlation Matrix, Male

	action/reflection	outgoing/reserved	calm/active	hasty/hesitant	alone/crowd	verbal/nonverbal	doing/rehearsal	listening/talking	outside/inside	acting/watching	facts/theories	horizon/nearby	real/imagination
action/reflection	**1.00**	0.46	0.32	0.32	0.23	0.17	0.38	0.16	0.18	0.34	0.20	-0.06	0.21
outgoing/reserved	0.46	**1.00**	0.35	0.33	0.47	0.49	0.35	0.36	0.23	0.36	0.09	-0.08	-0.02
calm/active	0.32	0.35	**1.00**	0.26	0.21	0.35	0.29	0.37	0.21	0.35	-0.08	-0.11	-0.09
hasty/hesitant	0.32	0.33	0.26	**1.00**	0.17	0.26	0.28	0.35	0.09	0.28	0.02	-0.02	0.02
alone/crowd	0.23	0.47	0.21	0.17	**1.00**	0.29	0.18	0.25	0.14	0.22	0.07	0.03	-0.04
verbal/nonverbal	0.17	0.49	0.35	0.26	0.29	**1.00**	0.24	0.37	0.16	0.32	-0.04	-0.07	-0.01
doing/rehearsal	0.38	0.35	0.29	0.28	0.18	0.24	**1.00**	0.14	0.18	0.40	0.04	-0.07	0.08
listening/talking	0.16	0.36	0.37	0.35	0.25	0.37	0.14	**1.00**	0.04	0.25	-0.08	-0.04	-0.08
outside/inside	0.18	0.23	0.21	0.09	0.14	0.16	0.18	0.04	**1.00**	0.20	0.00	-0.08	0.04
acting/watching	0.34	0.36	0.35	0.28	0.22	0.32	0.40	0.25	0.20	**1.00**	0.00	-0.13	0.06
facts/theories	0.20	0.09	-0.08	0.02	0.07	-0.04	0.04	-0.08	0.00	0.00	**1.00**	0.32	0.49
horizon/nearby	-0.06	-0.08	-0.11	-0.02	0.03	-0.07	-0.07	-0.04	-0.08	-0.13	0.32	**1.00**	0.23
real/imagination	0.21	-0.02	-0.09	0.02	-0.04	-0.01	0.08	-0.08	0.04	0.06	0.49	0.23	**1.00**
detail/global	0.09	-0.04	-0.11	0.00	-0.06	-0.09	-0.06	-0.12	-0.04	-0.14	0.50	0.35	0.43
conceptual/factual	0.18	-0.03	-0.05	-0.06	0.04	-0.06	0.02	-0.10	-0.05	-0.06	0.62	0.40	0.55
literal/figurative	0.11	-0.05	-0.09	-0.03	-0.06	-0.05	0.02	-0.08	-0.07	0.02	0.39	0.20	0.43
specifics/possibilities	0.16	0.02	-0.12	-0.01	0.00	-0.03	-0.02	-0.07	-0.06	-0.01	0.53	0.38	0.55
estimate/precise	0.06	-0.12	-0.02	-0.06	-0.02	-0.09	-0.06	-0.13	-0.06	-0.02	0.34	0.18	0.26
present/future	0.05	-0.06	-0.16	-0.04	-0.06	-0.08	-0.05	-0.16	0.00	-0.16	0.31	0.45	0.31
abstract/concrete	0.18	-0.06	-0.08	-0.01	-0.02	-0.10	0.01	-0.19	-0.02	-0.04	0.50	0.30	0.51
logic/values	0.09	-0.09	-0.09	-0.04	-0.09	-0.07	0.09	-0.04	-0.09	-0.04	0.22	0.07	0.24
rational/compassion	0.10	-0.10	-0.07	-0.07	-0.12	-0.02	0.05	-0.02	-0.04	0.04	0.12	-0.07	0.26
sentiment/pragmatic	0.05	-0.12	0.02	-0.01	-0.14	-0.03	-0.03	0.01	-0.07	0.00	0.03	-0.05	0.13
analytic/considerate	0.05	-0.12	0.03	0.03	-0.07	-0.03	0.07	0.02	-0.13	0.06	-0.02	-0.15	0.09
person/impersonal	-0.01	-0.17	-0.03	-0.05	-0.15	-0.11	0.01	-0.02	-0.06	-0.01	0.00	-0.07	-0.03
thoughtful/practical	0.10	-0.06	-0.03	0.05	-0.12	-0.03	0.05	0.07	-0.03	-0.05	0.26	0.12	0.21
helpful/sensible	0.00	-0.12	0.02	0.01	-0.14	-0.03	0.08	-0.01	-0.04	-0.08	0.12	-0.06	0.07
impartial/partial	-0.01	-0.07	-0.02	-0.04	-0.03	-0.08	0.02	-0.06	0.02	0.07	0.00	-0.08	0.05
reasons/feelings	0.04	-0.11	0.01	0.01	-0.11	-0.02	0.06	-0.04	-0.01	0.09	0.09	-0.10	0.25
subjective/objective	0.11	-0.14	-0.02	-0.03	-0.09	-0.08	0.10	-0.02	-0.10	-0.05	0.10	-0.02	0.15

Note: 390 Observations or cases.
(Four cases missing)

Table A-5 (Continued)

CPPI, Correlation Matrix, Male.

detail/global	conceptual/factual	literal/figurative	specifics/possibilities	estimate/precise	present/future	abstract/concrete	logic/values	rational/compassion	sentiment/pragmatic	analytic/considerate	person/impersonal	thoughtful/practical	helpful/sensible	impartial/partial	reasons/feelings	subjective/objective
0.09	0.18	0.11	0.16	0.06	0.05	0.18	0.09	0.10	0.05	0.05	-0.01	0.10	0.00	-0.01	0.04	0.11
-0.04	-0.03	-0.05	0.02	-0.12	-0.06	-0.06	-0.09	-0.10	-0.12	-0.12	-0.17	-0.06	-0.12	-0.07	-0.11	-0.14
-0.11	-0.05	-0.09	-0.12	-0.02	-0.16	-0.08	-0.09	-0.07	0.02	0.03	-0.03	-0.03	0.02	-0.02	0.01	-0.02
0.00	-0.06	-0.03	-0.01	-0.06	-0.04	-0.01	-0.04	-0.07	-0.01	0.03	-0.05	0.05	0.01	-0.04	0.01	-0.03
-0.06	0.04	-0.06	0.00	-0.02	-0.06	-0.02	-0.09	-0.12	-0.14	-0.07	-0.15	-0.12	-0.14	-0.03	-0.11	-0.09
-0.09	-0.06	-0.05	-0.03	-0.09	-0.08	-0.10	-0.07	-0.02	-0.03	-0.03	-0.11	-0.03	-0.03	-0.08	-0.02	-0.08
-0.06	0.02	0.02	-0.02	-0.06	-0.05	0.01	0.09	0.05	-0.03	0.07	0.01	0.05	0.08	0.02	0.06	0.10
-0.12	-0.10	-0.08	-0.07	-0.13	-0.16	-0.19	-0.04	-0.02	0.01	0.02	-0.02	0.07	-0.01	-0.06	-0.04	-0.02
-0.04	-0.05	-0.07	-0.06	-0.06	0.00	-0.02	-0.09	-0.04	-0.07	-0.13	-0.06	-0.03	-0.04	0.02	-0.01	-0.10
-0.14	-0.06	0.02	-0.01	-0.02	-0.16	-0.04	-0.04	0.04	0.00	0.06	-0.01	-0.05	-0.08	0.07	0.09	-0.05
0.50	0.62	0.39	0.53	0.34	0.31	0.50	0.22	0.12	0.03	-0.02	0.00	0.26	0.12	0.00	0.09	0.10
0.35	0.40	0.20	0.38	0.18	0.45	0.30	0.07	-0.07	-0.05	-0.15	-0.07	0.12	-0.06	-0.08	-0.10	-0.02
0.43	0.55	0.43	0.55	0.26	0.31	0.51	0.24	0.26	0.13	0.09	-0.03	0.21	0.07	0.05	0.25	0.15
1.00	0.55	0.43	0.61	0.44	0.43	0.46	0.23	0.09	0.04	0.04	-0.03	0.13	0.07	-0.08	0.09	0.10
0.55	**1.00**	0.51	0.56	0.43	0.43	0.62	0.22	0.09	0.05	0.02	-0.08	0.27	0.05	-0.02	0.06	0.15
0.43	0.51	**1.00**	0.48	0.45	0.33	0.57	0.17	0.21	0.13	0.16	0.06	0.27	0.18	0.03	0.10	0.19
0.61	0.56	0.48	**1.00**	0.43	0.44	0.52	0.30	0.22	0.05	0.11	0.06	0.21	0.11	0.02	0.17	0.15
0.44	0.43	0.45	0.43	**1.00**	0.24	0.47	0.23	0.20	0.05	0.23	0.06	0.11	0.05	0.09	0.15	0.21
0.43	0.43	0.33	0.44	0.24	**1.00**	0.39	0.18	0.07	0.04	0.01	0.03	0.22	0.09	0.00	0.04	0.05
0.46	0.62	0.57	0.52	0.47	0.39	**1.00**	0.24	0.23	0.18	0.10	0.04	0.32	0.16	0.04	0.21	0.21
0.23	0.22	0.17	0.30	0.23	0.18	0.24	**1.00**	0.50	0.29	0.34	0.26	0.32	0.18	0.12	0.39	0.29
0.09	0.09	0.21	0.22	0.20	0.07	0.23	0.50	**1.00**	0.53	0.57	0.47	0.46	0.40	0.28	0.66	0.39
0.04	0.05	0.13	0.05	0.05	0.04	0.18	0.29	0.53	**1.00**	0.42	0.42	0.37	0.41	0.23	0.50	0.31
0.04	0.02	0.16	0.11	0.23	0.01	0.10	0.34	0.57	0.42	**1.00**	0.37	0.24	0.31	0.24	0.55	0.36
-0.03	-0.08	0.06	0.06	0.06	0.03	0.04	0.26	0.47	0.42	0.37	**1.00**	0.38	0.41	0.20	0.39	0.19
0.13	0.27	0.27	0.21	0.11	0.22	0.32	0.32	0.46	0.37	0.24	0.38	**1.00**	0.40	0.15	0.30	0.22
0.07	0.05	0.18	0.11	0.05	0.09	0.16	0.18	0.40	0.41	0.31	0.41	0.40	**1.00**	0.26	0.36	0.22
-0.08	-0.02	0.03	0.02	0.09	0.00	0.04	0.12	0.28	0.23	0.24	0.20	0.15	0.26	**1.00**	0.32	0.16
0.09	0.06	0.10	0.17	0.15	0.04	0.21	0.39	0.66	0.50	0.55	0.39	0.30	0.36	0.32	**1.00**	0.37
0.10	0.15	0.19	0.15	0.21	0.05	0.21	0.29	0.39	0.31	0.36	0.19	0.22	0.22	0.16	0.37	1.00

Table A-6

Correlation Matrix, Four Instruments, MBTI, CPPI, SSP, and Gregorc Style Delineator.

	E-MBTI	I-MBTI	S-MBTI	N-MBTI	T-MBTI	F-MBTI	INNER-CPPI	ABST-CPPI	SUBJ-CPPI	E-SSP	I-SSP
E-MBTI	**1.00**	-0.96	-0.17	0.12	-0.08	0.11	-0.57	0.17	0.24	0.49	-0.15
I-MBTI	-0.96	**1.00**	0.19	-0.14	0.04	-0.07	0.60	-0.20	-0.20	-0.50	0.15
S-MBTI	-0.17	0.19	**1.00**	-0.90	0.24	-0.21	0.10	-0.68	-0.14	0.03	0.05
N-MBTI	0.12	-0.14	-0.90	**1.00**	-0.31	0.30	-0.06	0.69	0.22	-0.05	-0.01
T-MBTI	-0.08	0.04	0.24	-0.31	**1.00**	-0.89	-0.27	-0.20	-0.69	0.08	0.00
F-MBTI	0.11	-0.07	-0.21	0.30	-0.89	**1.00**	0.22	0.19	0.74	-0.07	-0.02
INNER-CPPI	-0.57	0.60	0.10	-0.06	-0.27	0.22	**1.00**	-0.11	0.10	-0.42	0.20
ABST-CPPI	0.17	-0.20	-0.68	0.69	-0.20	0.19	-0.11	**1.00**	0.24	-0.09	-0.11
SUBJ-CPPI	0.24	-0.20	-0.14	0.22	-0.69	0.74	0.10	0.24	**1.00**	0.10	0.06
E-SSP	0.49	-0.50	0.03	-0.05	0.08	-0.07	-0.42	-0.09	0.10	**1.00**	0.25
I-SSP	-0.15	0.15	0.05	-0.01	0.00	-0.02	0.20	-0.11	0.06	0.25	**1.00**
P-SSP	0.11	-0.09	0.26	-0.25	0.00	0.05	-0.04	-0.30	0.15	0.50	0.63
C-SSP	0.24	-0.25	-0.42	0.35	0.12	-0.09	-0.17	0.32	-0.01	0.41	0.41
L-SSP	-0.12	0.08	0.32	-0.37	0.52	-0.49	-0.01	-0.33	-0.39	0.23	0.23
F-SSP	0.38	-0.35	-0.31	0.33	-0.46	0.47	-0.17	0.24	0.56	0.46	0.27
CS-GREG	-0.22	0.23	0.57	-0.58	0.43	-0.42	0.07	-0.54	-0.44	-0.08	0.04
AS-GREG	-0.22	0.20	0.25	-0.23	0.45	-0.49	0.04	-0.19	-0.48	-0.01	0.05
AR-GREG	0.25	-0.23	-0.15	0.23	-0.67	0.71	0.03	0.19	0.72	0.07	-0.04
CR-GREG	0.15	-0.17	-0.61	0.53	-0.17	0.14	-0.12	0.52	0.15	0.03	-0.04

Note: 200 observations were used in this computation.
One case was omitted due to missing values.

Table A-6 (Continued)

P-SSP	C-SSP	L-SSP	F-SSP	CS-GREG	AS-GREG	AR-GREG	CR-GREG
0.11	0.24	-0.12	0.38	-0.22	-0.22	0.25	0.15
-0.09	-0.25	0.08	-0.35	0.23	0.20	-0.23	-0.17
0.26	-0.42	0.32	-0.31	0.57	0.25	-0.15	-0.61
-0.25	0.35	-0.37	0.33	-0.58	-0.23	0.23	0.53
0.00	0.12	0.52	-0.46	0.43	0.45	-0.67	-0.17
0.05	-0.09	-0.49	0.47	-0.42	-0.49	0.71	0.14
-0.04	-0.17	-0.01	-0.17	0.07	0.04	0.03	-0.12
-0.30	0.32	-0.33	0.24	-0.54	-0.19	0.19	0.52
0.15	-0.01	-0.39	0.56	-0.44	-0.48	0.72	0.15
0.50	0.41	0.23	0.46	-0.08	-0.01	0.07	0.03
0.63	0.41	0.23	0.27	0.04	0.05	-0.04	-0.04
1.00	0.16	0.36	0.32	0.14	0.01	0.06	-0.20
0.16	**1.00**	0.26	0.51	-0.22	-0.04	-0.09	0.33
0.36	0.26	**1.00**	-0.17	0.49	0.36	-0.49	-0.32
0.32	0.51	-0.17	**1.00**	-0.50	-0.40	0.49	0.36
0.14	-0.22	0.49	-0.50	**1.00**	0.33	-0.60	-0.71
0.01	-0.04	0.36	-0.40	0.33	**1.00**	-0.60	-0.53
0.06	-0.09	-0.49	0.49	-0.60	-0.60	**1.00**	0.14
-0.20	0.33	-0.32	0.36	-0.71	-0.53	0.14	**1.00**

Table A-7

Correlation Matrix, Four Instruments, MBTI, CPPI, SSP, and Gregorc Style Delineator, Females.

	E-MBTI	I-MBTI	S-MBTI	N-MBTI	T-MBTI	F-MBTI	INNER-CPPI	ABST-CPPI	SUBJ-CPPI	E-SSP	I-SSP
E-MBTI	**1.00**	-0.94	0.00	-0.05	0.05	-0.03	-0.55	0.05	0.30	0.53	-0.15
I-MBTI	-0.94	**1.00**	0.06	0.01	-0.06	0.03	0.60	-0.12	-0.24	-0.52	0.22
S-MBTI	0.00	0.06	**1.00**	-0.87	0.30	-0.26	-0.14	-0.69	-0.16	0.09	0.00
N-MBTI	-0.05	0.01	-0.87	**1.00**	-0.35	0.34	0.14	0.69	0.25	-0.09	0.12
T-MBTI	0.05	-0.06	0.30	-0.35	**1.00**	-0.89	-0.36	-0.25	-0.66	0.19	0.07
F-MBTI	-0.03	0.03	-0.26	0.34	-0.89	**1.00**	0.36	0.25	0.71	-0.20	-0.08
INNER-CPPI	-0.55	0.60	-0.14	0.14	-0.36	0.36	**1.00**	0.00	0.11	-0.47	0.35
ABST-CPPI	0.05	-0.12	-0.69	0.69	-0.25	0.25	0.00	**1.00**	0.32	0.03	-0.04
SUBJ-CPPI	0.30	-0.24	-0.16	0.25	-0.66	0.71	0.11	0.32	**1.00**	0.07	0.08
E-SSP	0.53	-0.52	0.09	-0.09	0.19	-0.20	-0.47	0.03	0.07	**1.00**	0.03
I-SSP	-0.15	0.22	0.00	0.12	0.07	-0.08	0.35	-0.04	0.08	0.03	**1.00**
P-SSP	0.24	-0.22	0.08	-0.04	0.00	0.01	-0.01	-0.03	0.21	0.30	0.58
C-SSP	0.30	-0.29	-0.26	0.23	0.06	-0.04	0.05	0.24	0.14	0.55	0.51
L-SSP	0.15	-0.15	0.29	-0.37	0.45	-0.44	-0.11	-0.32	-0.29	0.50	0.40
F-SSP	0.38	-0.37	-0.26	0.32	-0.34	0.31	-0.04	0.31	0.53	0.51	0.42
CS-GREG	-0.03	0.09	0.57	-0.57	0.37	-0.33	-0.07	-0.58	-0.39	-0.03	-0.02
AS-GREG	-0.13	0.11	0.20	-0.15	0.48	-0.44	-0.15	-0.20	-0.43	0.06	0.07
AR-GREG	0.17	-0.18	-0.25	0.30	-0.64	0.65	0.04	0.30	0.69	-0.04	-0.06
CR-GREG	-0.02	-0.02	-0.54	0.43	-0.21	0.12	0.16	0.49	0.14	0.03	0.01

Note: 81 observations were used in this computation.
One case was omitted due to missing values.

Table A-7 (Continued)

P-SSP	C-SSP	L-SSP	F-SSP	CS-GREG	AS-GREG	AR-GREG	CR-GREG
0.24	0.30	0.15	0.38	-0.03	-0.13	0.17	-0.02
-0.22	-0.29	-0.15	-0.37	0.09	0.11	-0.18	-0.02
0.08	-0.26	0.29	-0.26	0.57	0.20	-0.25	-0.54
-0.04	0.23	-0.37	0.32	-0.57	-0.15	0.30	0.43
0.00	0.06	0.45	-0.34	0.37	0.48	-0.64	-0.21
0.01	-0.04	-0.44	0.31	-0.33	-0.44	0.65	0.12
-0.01	0.05	-0.11	-0.04	-0.07	-0.15	0.04	0.16
-0.03	0.24	-0.32	0.31	-0.58	-0.20	0.30	0.49
0.21	0.14	-0.29	0.53	-0.39	-0.43	0.69	0.14
0.30	0.55	0.50	0.51	-0.03	0.06	-0.04	0.03
0.58	0.51	0.40	0.42	-0.02	0.07	-0.06	0.01
1.00	0.36	0.58	0.48	0.06	0.02	-0.02	-0.05
0.36	**1.00**	0.40	0.68	-0.17	0.02	0.02	0.15
0.58	0.40	**1.00**	0.10	0.43	0.31	-0.47	-0.26
0.48	0.68	0.10	**1.00**	-0.47	-0.28	0.44	0.33
0.06	-0.17	0.43	-0.47	**1.00**	0.32	-0.62	-0.72
0.02	0.02	0.31	-0.28	0.32	**1.00**	-0.66	-0.57
-0.02	0.02	-0.47	0.44	-0.62	-0.66	**1.00**	0.26
-0.05	0.15	-0.26	0.33	-0.72	-0.57	0.26	**1.00**

Table A-8

Correlation Matrix, Four Instruments, MBTI, CPPI, SSP, and Gregorc Style Delineator, Males.

	E-MBTI	I-MBTI	S-MBTI	N-MBTI	T-MBTI	F-MBTI	INNER-CPPI	ABST-CPPI	SUBJ-CPPI	E-SSP	I-SSP
E-MBTI	**1.00**	-0.97	-0.23	0.17	-0.04	0.10	-0.61	0.21	0.15	0.49	-0.16
I-MBTI	-0.97	**1.00**	0.24	-0.19	0.02	-0.08	0.62	-0.23	-0.15	-0.49	0.13
S-MBTI	-0.23	0.24	**1.00**	-0.92	0.11	-0.05	0.28	-0.68	-0.02	-0.01	0.11
N-MBTI	0.17	-0.19	-0.92	**1.00**	-0.16	0.13	-0.22	0.69	0.07	-0.01	-0.10
T-MBTI	-0.04	0.02	0.11	-0.16	**1.00**	-0.85	-0.20	-0.10	-0.61	0.00	0.01
F-MBTI	0.10	-0.08	-0.05	0.13	-0.85	**1.00**	0.10	0.08	0.66	0.05	-0.05
INNER-CPPI	-0.61	0.62	0.28	-0.22	-0.20	0.10	**1.00**	-0.20	0.07	-0.38	0.12
ABST-CPPI	0.21	-0.23	-0.68	0.69	-0.10	0.08	-0.20	**1.00**	0.14	-0.17	-0.15
SUBJ-CPPI	0.15	-0.15	-0.02	0.07	-0.61	0.66	0.07	0.14	**1.00**	0.15	0.00
E-SSP	0.49	-0.49	-0.01	-0.01	0.00	0.05	-0.38	-0.17	0.15	**1.00**	0.37
I-SSP	-0.16	0.13	0.11	-0.10	0.01	-0.05	0.12	-0.15	0.00	0.37	**1.00**
P-SSP	0.05	-0.04	0.38	-0.38	0.04	0.03	-0.06	-0.44	0.11	0.61	0.65
C-SSP	0.20	-0.22	-0.53	0.44	0.21	-0.20	-0.34	0.38	-0.15	0.31	0.36
L-SSP	-0.22	0.18	0.31	-0.32	0.51	-0.46	0.08	-0.32	-0.38	0.04	0.18
F-SSP	0.33	-0.33	-0.28	0.25	-0.37	0.40	-0.33	0.14	0.44	0.50	0.18
CS-GREG	-0.29	0.29	0.54	-0.55	0.32	-0.32	0.22	-0.50	-0.33	-0.15	0.12
AS-GREG	-0.25	0.25	0.26	-0.25	0.36	-0.49	0.24	-0.16	-0.49	-0.08	0.07
AR-GREG	0.24	-0.23	0.02	0.07	-0.57	0.64	-0.02	0.05	0.65	0.18	-0.10
CR-GREG	0.24	-0.24	-0.66	0.60	-0.11	0.14	-0.33	0.54	0.14	0.04	-0.07

Note: 118 observations were used in this computation.
One case was omitted due to missing values.

Table A-8 (Continued)

P-SSP	C-SSP	L-SSP	F-SSP	CS-GREG	AS-GREG	AR-GREG	CR-GREG
0.05	0.20	-0.22	0.33	-0.29	-0.25	0.24	0.24
-0.04	-0.22	0.18	-0.33	0.29	0.25	-0.23	-0.24
0.38	-0.53	0.31	-0.28	0.54	0.26	0.02	-0.66
-0.38	0.44	-0.32	0.25	-0.55	-0.25	0.07	0.60
0.04	0.21	0.51	-0.37	0.32	0.36	-0.57	-0.11
0.03	-0.20	-0.46	0.40	-0.32	-0.49	0.64	0.14
-0.06	-0.34	0.08	-0.33	0.22	0.24	-0.02	-0.33
-0.44	0.38	-0.32	0.14	-0.50	-0.16	0.05	0.54
0.11	-0.15	-0.38	0.44	-0.33	-0.49	0.65	0.14
0.61	0.31	0.04	0.50	-0.15	-0.08	0.18	0.04
0.65	0.36	0.18	0.18	0.12	0.07	-0.10	-0.07
1.00	0.06	0.29	0.25	0.23	0.03	0.07	-0.28
0.06	**1.00**	0.18	0.42	-0.26	-0.09	-0.22	0.47
0.29	0.18	**1.00**	-0.23	0.49	0.37	-0.44	-0.36
0.25	0.42	-0.23	**1.00**	-0.40	-0.45	0.37	0.39
0.23	-0.26	0.49	-0.40	**1.00**	0.26	-0.48	-0.72
0.03	-0.09	0.37	-0.45	0.26	**1.00**	-0.52	-0.49
0.07	-0.22	-0.44	0.37	-0.48	-0.52	**1.00**	0.01
-0.28	0.47	-0.36	0.39	-0.72	-0.49	0.01	**1.00**

APPENDIX B

SUPPLEMENTAL INFORMATION
DEMOGRAPHICS AND GENDER FACTOR STRUCTURES

Table B-1

Cognitive Preference Pattern Indicator (CPPI) Demographics

Frequency Distribution for AGE

From (≥)	To (<)	Count	Percent
17	24	49	6
24	31	60	8
31	38	143	20
38	44	233	32
44	51	169	24
51	58	50	7
58	72	15	3
Total		719	100

Frequency Distribution for GENDER

	Count	Percent
Female	337	46
Male	390	54
Total	727	100

Frequency Distribution for EDUCATION

	Count	Percent
High School	45	8
College	152	26
Graduate School	387	66
Total	584	100

Frequency Distribution for ETHNIC

	Count	Percent
African-American	57	8
Asian	66	9
Caucasian	553	76
Hispanic	22	3
Other	26	4
Total	724	100

Note: Totals vary as reported from the 730 subjects administered the CPPI.

Table B-2

Cognitive Preference Pattern Indicator (CPPI)
Frequency Distribution for VOCATION

	Count	Percent
accountant	1	0.14
administrator	23	3.21
analyst	1	0.14
artist	1	0.14
athletic director	1	0.14
bar manager	1	0.14
bar waitress	1	0.14
clerk	1	0.14
coal miner	1	0.14
college student	25	3.49
consultant	1	0.14
counselor	7	0.98
director	5	0.70
editor	1	0.14
educator	47	6.56
engineer	251	35.01
graduate student	12	1.67
H S student	3	0.42
home maker	1	0.14
HRD	15	2.09
instructor	1	0.14
librarian	1	0.14
manager	35	4.88
military officer	91	12.69
Navy Hospital	1	0.14
nurse	48	6.70
nurse aide	1	0.14
office staff	4	0.56
photographer	3	0.42
police officer	1	0.14
professor	58	8.09
program manager	23	3.21
secretary	3	0.42
service rep	21	2.93
supervisor	1	0.14
teacher	23	3.21
writer	3	0.42
Total	717	100.00

Note: 717 cases reported their vocation of the 730 total.

Table B-3

CPPI, Iterative or Common Factor Analysis, Orthogonal Solution, Female subjects.

	Factor 1	Factor 2	Factor 3	Factor 4
action/reflection	0.18	**0.74**	0.02	0.24
outgoing/reserved	0.02	**0.75**	-0.16	-0.11
calm/active	-0.04	**0.51**	0.11	**-0.30**
hasty/hesitant	-0.08	**0.60**	-0.11	0.01
alone/crowd	-0.04	**0.45**	-0.08	**-0.43**
verbal/nonverbal	-0.03	**0.66**	-0.04	0.00
doing/rehearsal	-0.04	**0.58**	-0.11	**0.38**
listening/talking	-0.12	**0.69**	0.10	-0.19
outside/inside	-0.06	**0.45**	0.10	-0.17
acting/watching	-0.03	**0.71**	0.03	0.18
facts/theories	**0.75**	0.03	0.08	0.12
horizon/nearby	**0.63**	-0.01	0.07	-0.26
real/imagination	**0.78**	0.01	0.14	0.05
detail/global	**0.72**	-0.18	0.00	0.09
conceptual/factual	**0.77**	-0.04	0.00	0.03
literal/figurative	**0.75**	-0.05	0.10	0.10
specifics/possibilities	**0.80**	-0.05	0.07	0.01
estimate/precise	**0.62**	-0.02	0.20	0.06
present/future	**0.51**	0.01	0.04	-0.17
abstract/concrete	**0.78**	-0.01	0.05	0.11
logic/values	0.22	0.06	**0.63**	0.10
rational/compassion	0.24	0.06	**0.78**	0.15
sentiment/pragmatic	-0.01	0.03	**0.68**	0.03
analytic/considerate	-0.01	0.10	**0.69**	0.21
person/impersonal	-0.03	-0.09	**0.57**	0.07
thoughtful/practical	0.13	-0.05	**0.75**	-0.11
helpful/sensible	0.02	-0.12	**0.72**	-0.14
impartial/partial	-0.05	-0.07	0.23	**0.58**
reasons/feelings	0.20	-0.04	**0.74**	0.22
subjective/objective	0.19	0.04	**0.33**	**0.45**

Note: 336 Cases (2 missing of 338)

Table B-4

CPPI, Iterative or Common Factor Analysis, Male subjects

	Factor 1	Factor 2	Factor 3	Factor 4
action/reflection	0.23	0.09	**0.63**	-0.14
outgoing/reserved	0.00	-0.18	**0.76**	0.08
calm/active	-0.13	0.03	**0.62**	0.03
hasty/hesitant	-0.02	0.00	**0.56**	0.23
alone/crowd	0.02	-0.20	**0.52**	0.01
verbal/nonverbal	-0.08	-0.06	**0.62**	0.20
doing/rehearsal	0.02	0.12	**0.59**	-0.16
listening/talking	-0.17	0.00	**0.54**	**0.43**
outside/inside	-0.02	-0.08	**0.35**	-0.19
acting/watching	-0.05	0.08	**0.65**	-0.26
facts/theories	**0.73**	0.02	0.08	0.07
horizon/nearby	**0.52**	-0.22	-0.14	**0.40**
real/imagination	**0.69**	0.15	0.08	-0.12
detail/global	**0.75**	-0.02	-0.09	0.05
conceptual/factual	**0.83**	0.00	0.01	0.03
literal/figurative	**0.66**	0.17	-0.02	-0.04
specifics/possibilities	**0.78**	0.11	0.01	0.05
estimate/precise	**0.58**	0.16	-0.07	-0.27
present/future	**0.59**	-0.02	-0.14	0.28
abstract/concrete	**0.76**	0.18	-0.02	-0.05
logic/values	**0.30**	**0.52**	-0.04	0.00
rational/compassion	0.15	**0.83**	-0.01	-0.01
sentiment/pragmatic	0.02	**0.70**	-0.04	0.18
analytic/considerate	0.02	**0.72**	0.02	-0.13
person/impersonal	-0.08	**0.64**	-0.11	0.26
thoughtful/practical	0.27	**0.52**	0.01	**0.46**
helpful/sensible	0.05	**0.59**	-0.05	**0.31**
impartial/partial	-0.04	**0.44**	-0.03	-0.18
reasons/feelings	0.09	**0.78**	0.02	-0.11
subjective/objective	0.17	**0.52**	-0.03	-0.18

Note: 390 male cases (Four missing of 394)

Table B-5

Four Instruments Demographics

Frequency Distribution for AGE

From (≥)	To (<)	Count	Percent
18	26	18	10
26	34	28	15
34	42	79	40
42	50	54	27
50	58	16	8
Total		195	100

Frequency Distribution for GENDER

	Count	Percent
Female	81	41
Male	119	60
Total	200	100

Frequency Distribution for EDUCATION

	Count	Percent
High school	24	12
College	52	26
Graduate school	124	62
Total	200	100

Frequency Distribution for ETHNIC

	Count	Percent
African-American	8	4
Asian	10	5
Caucasian	173	87
Hispanic	4	2
Other	5	3
Total	200	100

Note: Totals vary due to missing data.

Table B-6

Four Instruments Occupation Demographics

Frequency Distribution for Occupation

	Count	Percent
accountant	1	1
administrator	2	1
analyst	1	1
clerk	3	2
consultant	1	1
counselor	8	4
editor	1	1
grad student	5	3
high school student	1	1
instructor	1	1
manager	53	27
military officer	60	30
hospital	1	1
office staff	4	2
photographer	3	2
professor	3	2
service rep	21	11
supervisor	3	2
teacher	28	14
Total	200	100

Note: 200 cases (one missing).

Table B-7

Gregorc Style Delineator Demographics

Frequency Distribution for AGE

From (≥)	To (<)	Count	Percent
18	26	99	21
26	34	128	28
34	42	169	37
42	50	54	12
50	58	10	2
Total		460	100

Frequency Distribution for GENDER

	Count	Percent
Female	228	49
Male	238	51
Total	466	100

Frequency Distribution for EDUCATION

	Count	Percent
High school	24	5
College	332	71
Graduate school	110	24
Total	466	100

Frequency Distribution for ETHNIC

	Count	Percent
African-American	179	40
Asian	62	14
Caucasian	185	42
Hispanic	7	2
Other	10	2
Total	443	100

Note: Totals vary due to missing data.

APPENDIX C

COGNITIVE PREFERENCE PATTERN INDICATOR

Cognitive Preference Pattern Indicator (CPPI) © 1993

Purpose: The CPPI was developed for your use as an educator or trainer. It is a set of paired word choices for finding out your preferences and your adult learner's preferences. There are no right or wrong answers. The indicator will only indicate general preference patterns for the way you like to do things based on your semantic scores (your results will be kept confidential). These preferences are important, for they help shape your own unique style in life and provide you a useful frame of reference for successfully aligning your preference pattern with work and learning activities. Please take a few minutes (5-7) to fill out the worksheet. Score it and discover your profile or own unique style of learning.

Taking this instrument is voluntary, but the author would like to use your statistical results to better understand the relationships among cognitive instruments and to find out which are more accurate and appropriate. Your results or learning profile will be kept confidential. By filling out and returning this cover sheet and attached worksheet, you are giving permission to use your testing data in the author's statistical analyses. Thank you very much for your participation.

IMPORTANT:

For demographic purposes please mark as indicated.

- Identification number (if applicable) _____
- Female( ) Male( )
- Age ( )
- Education: High School( ) College( ) Graduate School ( )
- Ethnic category:

African-American( ) Asian( ) Caucasian( ) Hispanic( ) Other( )_____

Occupation: _____

Go to next page marked CPPI worksheet and follow the instructions.

For interest in or permission to use this instrument, contact Chris Hardy, Northern Va Grad Center, (703) 698-6044 or e- mail chrish6969@aol.com

Cognitive Preference Pattern Worksheet(CPPI) ©

"Circle" the appropriate block between each word pair based on your preference.

Consider each pair carefully. THINK OF THE MEANING (not the sound).

Example:

FAR	a	b	c	d	e	f	CLOSE

(The closer to the word, the stronger your preference and vice versa)

A) Your Preference for words or meanings which best describe YOU in most situations (your "focus or attention "):

ACTION	a	b	c	d	e	f	REFLECTION
OUTGOING	g	h	i	j	k	l	RESERVED
CALM	m	n	o	p	q	r	ACTIVE
HASTY	s	t	u	v	w	x	HESITANT
ALONE	y	z	aa	ab	ac	ad	CROWD
VERBAL	ae	af	ag	ah	ai	aj	NONVERBAL
DOING	ak	al	am	an	ao	ap	REHEARSING
LISTENING	aq	ar	as	at	au	av	TALKING
OUTSIDE	aw	ax	ay	az	ba	bb	INSIDE
ACTING	bc	bd	be	bf	bg	bh	WATCHING

B) Your Preference for words or meanings which best describe how you like to gather information or "Perceive Things:"

FACTS	a	b	c	d	e	f	THEORIES
HORIZON	g	h	i	j	k	l	NEARBY
REAL	m	n	o	p	q	r	IMAGINATION
DETAIL	s	t	u	v	w	x	GLOBAL
CONCEPTUAL	y	z	aa	ab	ac	ad	FACTUAL
LITERAL	ae	af	ag	ah	ai	aj	FIGURATIVE
SPECIFICS	ak	al	am	an	ao	ap	POSSIBILITIES
ESTIMATE	aq	ar	as	at	au	av	PRECISE
PRESENT	aw	ax	ay	az	ba	bb	FUTURE
ABSTRACT	bc	bd	be	bf	bg	bh	CONCRETE

C) Your Preference for words or meanings which best describe how you like to " Decide:"

LOGIC	a	b	c	d	e	f	VALUES
RATIONAL	g	h	i	j	k	l	COMPASSION
SENTIMENT	m	n	o	p	q	r	PRAGMATIC
ANALYTIC	s	t	u	v	w	x	CONSIDERATE
PERSONAL	y	z	aa	ab	ac	ad	IMPERSONAL
THOUGHTFUL	ae	af	ag	ah	ai	aj	PRACTICAL
HELPFUL	ak	al	am	an	ao	ap	SENSIBLE
IMPARTIAL	aq	ar	as	at	au	av	PARTIAL
REASONS	aw	ax	ay	az	ba	bb	FEELINGS
SUBJECTIVE	bc	bd	be	bf	bg	bh	OBJECTIVE

4/17/95

Cognitive Preference Pattern Scoring

1) To score: First--- On the previous page look at the "small letters" in the blocks you 'circled.'
Next--- Find the corresponding "small letters" in the three columums below.
Then--- Mark the values next to those letters below.

Example: If you circled the block "a" in the first section on the worksheet (CPPI),
You would mark or circle the value next to the "a" (below), in this example, the "6."

a	(6)	ae	6

2) After marking (circling) all your associated values, total them as instructed below:

A) "Focus of Attention"

Block#	Value	Block#	Value
a	6	ae	6
b	5	af	5
c	4	ag	4
d	3	ah	3
e	2	ai	2
f	1	aj	1
g	6	ak	6
h	5	al	5
i	4	am	4
j	3	an	3
k	2	ao	2
l	1	ap	1
m	1	aq	1
n	2	ar	2
o	3	as	3
p	4	at	4
q	5	au	5
r	6	av	6
s	6	aw	6
t	5	ax	5
u	4	ay	4
v	3	az	3
w	2	ba	2
x	1	bb	1
y	1	bc	6
z	2	bd	5
aa	3	be	4
ab	4	bf	3
ac	5	bg	2
ad	6	bh	1

Total the marked values above to obtain the "Outer" score.

Outer = ____

Subtract "Outer"total from 70. (70-total ="Inner" score)

Inner = ____

B) "Perceive Things"

Block#	Value	Block#	Value
a	6	ae	6
b	5	af	5
c	4	ag	4
d	3	ah	3
e	2	ai	2
f	1	aj	1
g	1	ak	6
h	2	al	6
i	3	am	4
j	4	an	3
k	5	ao	2
l	6	ap	1
m	6	aq	1
n	5	ar	2
o	4	as	3
p	3	at	4
q	2	au	5
r	1	av	6
s	6	aw	6
t	5	ax	5
u	4	ay	4
v	3	az	3
w	2	ba	2
x	1	bb	1
y	1	bc	1
z	2	bd	2
aa	3	be	3
ab	4	bf	4
ac	5	bg	5
ad	6	bh	6

Total the marked values above to obtain the "Concrete" score.

Concrete = ____

Subtract "Concrete" total from 70. (70-total ="Abstract" score)

Abstract = ____

C) "Make Decisions"

Block#	Value	Block#	Value
a	6	ae	1
b	5	af	2
c	4	ag	3
d	3	ah	4
e	2	ai	5
f	1	aj	6
g	6	ak	1
h	5	al	2
i	4	am	3
j	3	an	4
k	2	ao	5
l	1	ap	6
m	1	aq	6
n	2	ar	5
o	3	as	4
p	4	at	3
q	5	au	2
r	6	av	1
s	6	aw	6
t	5	ax	5
u	4	ay	4
v	3	az	3
w	2	ba	2
x	1	bb	1
y	1	bc	1
z	2	bd	2
aa	3	be	3
ab	4	bf	4
ac	5	bg	5
ad	6	bh	6

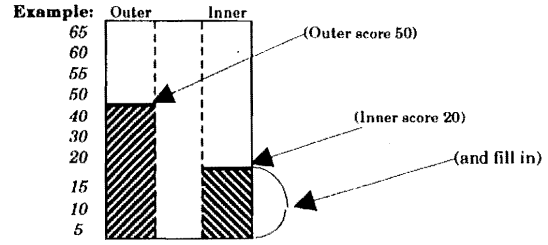
Total the marked values above to obtain the "Objective" score.

Objective = ____

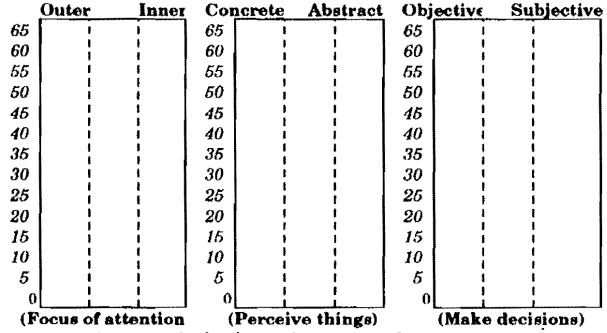
Subtract "Objective" total from 70. (70-total ="Subjective" score)

Subjective = ____

Example:



3) Similar to example above, plot your scores on the bar charts below:



As you see in the charts above, you prefer to use
all of your cognitive preferences (even if unequally).
Equal or "ties" are balanced preferences.
(You probably prefer both)

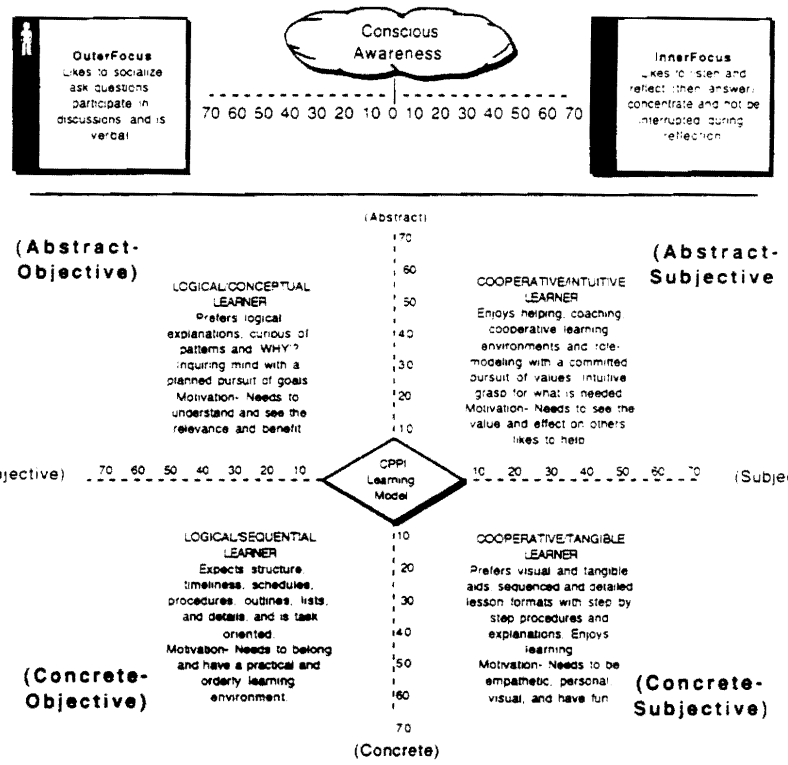
4) To find your Cognitive Preference Pattern:
--Compare each pair plotted above.
--From each pair, write the word of the larger in the spaces below.

Examples: **Inner / Abstract--Objective**
or **Outer / Concrete---Subjective & Objective** (Tie or close)

(Focus of attention)		**(Perceive things)***		**(Make decisions)***	
_____	/	_____	-----	_____	/

*(The Largest of the "Perceive things" or "Make decisions" preferences is your most preferred or dominant function)

LEARNING PROFILES (Create yours from your CPPI scoring results. Plot and connect your scores)



Teaching and Learning Strategy. During a learning transaction, it is important to connect to prior learning and experiences by relating new information or ideas in the way the learner uniquely prefers to learn. This cognitive connection can then be built upon and bridged to other ways of learning, for we initially tend to make sense of things relative to our own learning style which is anchored upon our cognitive structures and schemata.

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