
An Examination of the Relationship Between Personality Type and Cognitive Style

Scott G. Isaksen and Kenneth J. Lauer

The Creativity Research Unit, The Creative Problem Solving Group, Inc.

Glenn V. Wilson

CEO Consultants

ABSTRACT: This study investigated the relationship between psychological type, as measured by the Myers-Briggs Type Indicator® (MBTI; Myers & McCaulley, 1985), and cognitive style as measured by the Kirton Adaptation–Innovation Inventory (KAI; Kirton, 1999b). These 2 measures are widely used by creativity researchers and practitioners, yet little is known about the conceptual relationship between the theories and measures. The study built upon 8 previously published studies that correlated the 2 measures as a base for comparison with a sample of 1483 individuals from both education and business settings.

The results of correlations between the measures showed a statistically significant relationship between the MBTI and KAI. Stronger relationships were found between the MBTI function scales of Sensing–Intuitive and Judging–Perceiving, which respectfully accounted for 30 and 19 percent of the variance with the KAI total score. The relationship was further explored through an analysis of previous studies and a conceptual understanding of the core constructs. Implications and recommendations for future study were outlined.

Scholarly interest in individual differences has been well established (Dillon, 1985; Dillon & Schmeck, 1983; Willerman, 1979). Our interest in the area of individual differences stems from the Cognitive Styles Project initiated by Isaksen and Treffinger (1985) at the Buffalo State College Center for Studies in Creativity. This program of research investigated the conceptual and practical relationships between aspects and characteristics of the creative person, and the operations of the creative process. The program of research is described

in more detail in Isaksen (1987, 1995) and Isaksen and Dorval (1993).

This study was designed to examine the relationship between psychological type and cognitive style. Both psychological type and cognitive style have explicit theoretical foundations and specific operational measures, allowing a conceptual as well as empirical exploration of their relationship. Specifically, this study examined Jung's (Jung, 1923) construct of psychological type and Kirton's (Kirton, 1987) theory of cognitive style. The study used the Myers-Briggs Type Indicator® (MBTI; Myers & McCaulley, 1985) as the measure of psychological type and the Kirton Adaptation–Innovation Inventory (KAI; Kirton, 1999b) as the measure of cognitive style.

Both of these measures are widely used by creativity researchers and practitioners. They are used to provide insights into one's personal orientation to creativity, creative problem solving, and organizational innovation (Fleenor, 1997; Grysiewicz, 1982; Isaksen, 1987). Although both concepts are frequently used, there has been very little attention paid to how they may actually be related on a conceptual level. Are

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Correspondence and reprint requests should be sent to S. G. Isaksen, c/o The Creative Problem Solving Group, Inc., 1325 North Forest Road, Suite 340, Williamsville, NY 14221. E-mail: cpsb@cpsb.com

they equivalent, completely unrelated, or are some aspects related?

On the surface, both constructs focus on the nature and constructive use of different preferences. Both have more than 200 published empirical studies and are well commercialized in that they offer manuals, qualification courses, and functional networks of researchers and practitioners. The assessment instruments both use dichotomous scaling in that the interpretation is based on a continuous scale with both ends emphasizing opposite preferences with equal value and importance.

There are also some obvious differences. Psychological Type, as measured by the MBTI includes four independent factors. Kirton's theory and measure describes three, ipsative, subtrait factors. Both approaches are based on different theoretical and conceptual origins. The Jungian-based MBTI, introduced in 1942, has been revised and is offered in a number of different forms, while Kirton's measure, known as the KAI, has remained relatively unchanged since its original publication in 1976.

The following sections provide the theoretical and conceptual basis for this study and will focus on the concepts of psychological type and cognitive style.

Psychological Type

The concept of type has a long history, dating back to the Romans and Greeks (Vernon, 1973). One of the earliest classifications was that of the four temperaments of sanguine, choleric, melancholic, and phlegmatic (Vernon, 1933). These temperaments went through various modifications and eventually resulted in Kretschmer's (1925) and Sheldon's (1942) well-known typologies. Jung's (1923, 1921/1971) typology may have been influenced by the more classical division of the temperaments, but was certainly influenced by his psychoanalytic practice and empirical research.

Jung (1923) defined type as a specimen, or example, that reproduces in a characteristic way, the character of a species or general class. He stated, "in the narrower meaning used in this particular work, a type is a characteristic model of a general attitude occurring in many individual forms" (p. 612). Jung was interested in explaining individual differences. He developed his theory of psychological type over many years and offered numerous and increasingly more devel-

oped statements of his approach. Detailed sources of information regarding Jung's theory of psychological type are available in Jung (1923), Campbell (1971), and Myers, McCaulley, Quenk, and Hammer (1998).

Jung's (1923) description of type focused initially on preferences for introversion and extraversion. He indicated that those with a preference for introversion primarily focused inwardly, and their energy was oriented toward thoughts and experiences in their inner environment. He stated that an introverted orientation meant

a turning inwards of the libido whereby a negative relation of subject to object is expressed. Interest does not move towards the object, but recedes towards the subject. Everyone whose attitude is introverted thinks, feels, and acts in a way that clearly demonstrates that the subject is the chief factor of motivation while the object at most receives only secondary value ... when introversion is habitual, one speaks of an introverted type. (p. 567)

Those with a preference for extroversion focused their energy outward, toward people and events in their external environment. Jung (1923) stated:

Extraversion means an outward-turning of the libido. With this concept I denote a manifest relatedness of subject to object in the sense of a positive movement of subjective interest toward the object. Everyone in the state of extraversion thinks, feels, and acts in relation to the object, and moreover in a direct and clearly observable fashion, so that no doubt can exist about his positive dependence upon the object. In a sense, therefore, extraversion is an outgoing transference of interest from the subject to the object. (p. 542)

Myers et al., (1998) described introversion and extroversion as complementary attitudes and orientations of personal energy. They indicated that those with a preference for introversion were more likely to draw energy from the environment toward inner experience and reflection. They see the main interests of those who are more introverted as focused on concepts, ideas, and inner experiences. Introverts are characterized as wanting to think things through before talking about them. In contrast, energy and attention flows outward toward people and things in the external environment for those who are more extraverted. The main interest for the extrovert is to act on, and interact with, the outer world.

Jung (1923) also identified two pairs of opposing mental functions. He defined psychological function as a certain form of psychic activity that remained the-

oretically the same under varying circumstances. Myers et al. (1998) refer to these as two opposing perceptual functions, referred to as sensation and intuition; and two opposing judging functions called thinking and feeling. The perceptual functions refer to gathering information, and the judging functions refer to making decisions and reaching conclusions. According to Jung (1923), one of the basic psychological functions was sensation. He stated:

Sensation, or sensing, is that psychological function which transmits a physical stimulus to perception...[it] is sense-perception, i.e. perception transmitted via the sense organs and bodily senses (kinaesthetic, vasomotor sensation, etc.). On the one hand, it is an element of presentation, since it transmits to the presenting function the perceived image of the outer object; on the other hand, it is an element of feeling, because through the perception of bodily changes it lends the character of affect to feeling. Because sensation transmits physical changes to consciousness, it also represents the physiological impulse. But it is not identical with it, since it is merely a perceptive function. (p. 585–586)

He differentiated sensing from its opposing perceptual function of intuition. Jung (1923) defined intuition as

that psychological function which transmits perceptions in an unconscious way. Everything, whether outer or inner objects or their associations, can be the object of this perception. ... Through intuition any one content is presented as a complete whole, without our being able to explain or discover in what way this content has been arrived at. Intuition is a kind of instinctive apprehension, irrespective of the nature of its contents. (p. 567–568)

Myers et al. (1998) identified sensing and intuition as two kinds of perception. They saw perception as all the ways of becoming aware of things, people, events, or ideas and included the gathering of information, seeking of sensation and inspiration, as well as the selection of various stimuli. They asserted that those who prefer sensing tend to focus on immediate experiences available to the five senses, realism, and a practical emphasis on details from both past and present experiences. Those who prefer sensing may become so focused on observing and experiencing the present, they may not attend sufficiently to future possibilities. Those who prefer intuition are more oriented toward possibilities, meanings, and relationships obtained through insight. Intuitives may become so focused on pursuing possibilities that they overlook realities.

The two judging functions were identified as thinking and feeling. Jung (1923) regarded thinking as

that psychological function which, in accordance with its own laws, brings given presentations into conceptual connection ... the term thinking should, in my view, be confined to the linking up of representations by means of a concept, where, in other words, an act of judgment prevails, whether such act be the product of one's intentions or not. (p. 611)

Jung (1923) defined feeling as a judging or deciding process that takes place between the ego and a given content. The feeling function imparts to the content a definite value in the sense of acceptance or rejection, similar to liking or disliking. He stated that

Feeling ... is an entirely subjective process, which may be in every respect independent of external stimuli, although chiming in with every sensation. ... Hence, feeling is also a kind of judging, differing, however, from an intellectual judgment, in that it does not aim at establishing an intellectual connection but is solely concerned with the setting up of a subjective criterion of acceptance or rejection. (p. 544)

Myers et al. (1998) also indicated that thinking and feeling are two kinds of judgment that include all the ways of coming to conclusions and making decisions about what has been perceived and includes evaluating, choosing, decision making, and selecting responses after perceiving stimuli. They saw thinking as relying on the principle of cause and effect, objective, and impersonal, when applied to the reason for a decision. Thinkers are more likely to rely on analysis, justice, fairness, and a more detached perspective to their judging. Feeling, according to Myers et al. (1998), relies more on personal and group values and is more subjective than thinking. People who prefer feeling judgment are more attuned to feelings and values of self and other. They prefer to consider the implications and effect of their decisions on the people involved and what is important to them.

Myers et al. (1998) built on Jung's explicit theory by adding the concept of two differing orientations to the outer world. They call these judging and perceiving. This development was based on the observation that some people habitually use judgment (thinking or feeling) when interacting with the outside world by being more likely to come to conclusions and achieve closure. Others appeared to prefer perception (sensing or intuition) by continuing to gather information as long as possible before reaching closure. This addi-

tional dichotomy describes the individual's orientation to the outer or extroverted world. Those who prefer perceiving remain in an observing mode longer than those who prefer judging. They are characterized as spontaneous, curious, adaptable, and open to novelty and change. Those who prefer judging seek closure, planning, and getting things organized. They are characterized as purposeful and decisive.

The MBTI is a measure that is based on Jungian theory and concepts and is, therefore, an instrument designed to assess psychological type. It has been widely used in marriage and career counseling and by many practitioners concerned with helping people understand and appreciate differences.

Cognitive Style

The construct of cognitive style has been approached by a number of scholars within the field of psychology (Goldstein & Blackman, 1978; Messick, 1984; Witkin, 1977; Witkin & Goodenough, 1981). Martinsen and Kaufmann (1999) stated that "cognitive style can be placed at the intersection between personality and cognition" (p. 274). They see personality and cognition as independent constructs, with cognitive style overlapping both. Messick (1976) defined cognitive style as "consistent individual differences in preferred ways of organizing and processing information and experience" (p. 5). Vernon (1973) indicated that "it appears that most researchers conceive cognitive styles as a super-ordinate construct which is involved in many cognitive operations and which accounts for individual differences in a variety of cognitive, perceptual and personality variables" (p. 139).

Kirton's work on cognitive style was shaped by his earlier work to understand management initiative while he was working with the Acton Society Trust (Kirton, 1961). Kirton (1999b) defined cognitive style as the preferred style with which the individual undertakes problem solving and creativity. He asserted that cognitive style is highly resistant to change. The Kirton Adaption-Innovation (AI) continuum of cognitive style ranges from more adaptive preferences for creativity, decision making, and problem solving at one end, to more innovative preferences at the other. He asserted that both ends of the continuum are important and valuable for the successful functioning of any organization.

Kirton (1994) described those with more adaptive preferences as being seen by others as more precise, sound, reliable, disciplined, and dependable. They are more concerned about how things get done—the means. They tend to accept the given problem definition and are more concerned with resolving problems rather than finding them. People with more adaptive preferences will generally focus on change that promotes incremental improvement, perfecting existing systems or "doing things better."

Kirton (1994) described those with a more innovative preference as being seen as unique, visionary, and ingenious. Those with a more innovative preference prefer to challenge the definition of the problem by manipulating and questioning existing assumptions. They may be seen as undisciplined and the kind of change on which they focus is perceived as more radical and often described as breakthrough. When these characteristics are operating together, more innovative people will generally prefer changing the existing system or "doing things differently." A more detailed description of more adaptive and more innovative preferences is provided in Kirton (1976, 1987, 1999b).

Kirton's (1996b) measure of the AI theory, the KAI, included three subscales of style. The first is labeled Sufficiency-Proliferation of Originality (SO) and Kirton asserted that it is similar to Rogers' (1959) concept of the "creative loner." The second subscale is Efficiency (E) and is similar to Weber's (1948) analysis of the aims of bureaucratic structure to be more concerned with precision and reliability. The final subscale is labeled Rule/Group Conformity (R), and is similar to Merton's (1968) analysis of bureaucratic structure that puts pressure on people to conform, be methodical, and disciplined.

The SO subscale deals with differences in the handling of original ideas or concepts. According to Kirton's (1994) theory, all people produce original ideas, but there are differences in the way they are produced. Adaptors prefer to generate a smaller, yet sufficient quantity of original ideas, but not an abundance. They prefer novel ideas that are likely to be viewed as useful and relevant to the situation at hand.

Kirton (1999a) indicated that "adaptors choose to confine their idea and solution generation to agreed structure more closely than innovators. ... Adaptive strategy is to produce spontaneously a sufficiency of ideas that are all linked to the problem in consensually agreed ways" (p.6).

Innovators, on the other hand, prefer a profusion or proliferation of original ideas. The ideas they prefer to generate may cut across traditional boundaries or paradigms. Their ideas are less likely to be accepted immediately, and more likely to “stretch” in new ways, or to challenge the way the problem was defined. Kirton (1999a) indicated that

the more innovative preferred style is more likely, spontaneously, to produce many more ideas, some of which appear to be adaptive and others innovative. Those who are more innovative do not confine themselves to innovative idea production only—that would suggest that they know (or care) enough about the structure always to elect to work outside it. The more innovative often have problems in choosing among the ideas they proliferate and picking one that pays off. (p. 6)

The E subscale indicates preference for detail, precision, and thoroughness. Those with more adaptive preferences tend to be thorough, to pay attention to the details and fine points when handling tasks, and define the problem more carefully and tight. As Kirton (1999a) indicated, those with a more adaptive E preference will

note precedent, search more methodically for relevant information and arrange data in more orderly ways. By working closer within the system (structure) they are more likely to get the system to work for them and use their creativity to refine, order, improve, and make more immediately efficient the current structures and paradigms. They like their creative change to keep the general structure stable. They like to achieve progress and avoid inflexibility at a more controlled speed and at lower risk than innovators. (p. 6)

Those with a more innovative E preference tend to deal with the task in a broader, more spontaneous way, and to be less concerned (and often clearly bored) with the details. As Kirton (1999a) explained,

the more innovative problem solvers trade off the benefits of immediate efficiency and lower risk by paying less attention to the immediate structure enveloping the problem as perceived and less attention to meticulous detail and thoroughness. They gain, thereby, a wider overview, taking themselves out of the system in which they began, often producing a much needed set-breaking idea, sometimes threatening their organizational fit. ... Yet this is the most efficient way of producing something different, as distinct from something better. (p. 6)

The R subscale deals with preferences for working within established rules, guidelines, or systems and differences in the management of structures within

which problem solving occurs. The adaptor places greater emphasis on conforming to the established procedures or ways of doing things. As Kirton (1999a) indicated,

adaptors abide by Rule Conformity (impersonal structure) to better solve their problems. They accept Group Conformity (staying within personal or informal structures) to ensure group cohesion and collaboration in problem solving. ... More than innovators, adaptors use agreed structure to solve problems. The more adaptive abide by both rule and group structure in order to make changes efficiently. (p. 7)

Those with more innovative R preferences are more likely to emphasize the importance of unique pathways and less likely to feel constrained by rules or pressures toward conformity or consensus. As Kirton (1999a) indicated,

the more innovative, having less regard for structure, consensus, tradition or cohesion, are more likely to solve problems by bending or even breaking the rules. ... [They] are much more capable of bringing about challenging, unexpected changes swiftly at the expense of a current order within the group. (p. 7)

Hypothesized Conceptual Relationships

From an examination of the core constructs under investigation for this study, it would appear that psychological type and cognitive style ought to have some relationship, given the conceptual overlap in their actual definitions. Both theories attempt to explain individual differences in the way people take in and process information.

Hypothesis 1: A stronger correlation would be expected between an innovative cognitive style (as measured by the KAI) and intuition (as measured by the MBTI) than the other dimensions of the MBTI.

The MBTI dimension of sensing–intuitive (S–N) would appear to have a high degree of conceptual relationship with Kirton’s innovator due to the common focus on possibilities and insights. A preference for innovation and intuition appear to be related to the larger domain of perceptual processing.

Hypothesis 2: A strong relationship between an innovative cognitive style and a perceptive (as opposed to judging) psychological type would be expected. This hypothesis is related to the first in that if Kirton's innovators are more intuitive, then they should also prefer perception (S–N) over judgment (thinking–feeling; T–F). They are more likely to stay open to possibilities rather than seek order and closure.

Hypothesis 3: Lower magnitude correlations would be predicted between the KAI and the judging functions (T–F) and extraversion–introversion (E–I) as measured by the MBTI.

The judging dimension (T–F) of psychological type would appear to be independent of Kirton's (1994) AI theory. Kirton's (1994) theory appears to be more related to the defining of problems and generating ideas rather than on the cognitive processes associated with making judgments. Although the qualitative preparation for his theory included observation of the complete creative process, including acceptance and implementation, the theory does not appear to offer a direct explanation of these aspects. Certainly, an indirect relationship may exist between someone's AI orientation and the kinds of challenges or opportunities they will face when seeking acceptance and implementing their new ideas.

E–I would appear to be distinct from what Kirton (1994) is attempting to measure. Jung's explanation that this function relates to an inward or outward focus of relationships between subject and object does not appear in the theoretical descriptions provided by Kirton. The only potential for a conceptual relationship appears to be with the concept of Roger's (1959) creative loner that Kirton (1999b) referred to as a theoretical basis for the SO subscale.

This study is not the first to venture into understanding the relationships between these two measures. The following section summarizes numerous other studies reporting correlations between the KAI and the MBTI.

Previous Research on the Relationship Between KAI and MBTI

The KAI and MBTI manuals reported research regarding correlations of the measures (Kirton, 1999b;

Myers et al., 1998). Two studies were cited in the MBTI manual showing clear and statistically significant correlations between the S–N and J–P factors with the KAI total score and its subscales (Fleenor, 1997; Gryskiewicz & Tullar, 1995). Fleenor was excluded from our table because no statistical significance levels were reported. The KAI manual cites four studies of the relationship between the KAI and MBTI (Carne & Kirton, 1982; Goldsmith, 1986; Gryskiewicz, 1982; Tefft, 1990). Goldsmith was not included in our table because his study only included results of the relationship between the S–N MBTI factor and the KAI.

We identified eight studies that have reported correlations, sample sizes, and significance levels between the KAI and MBTI. The results of these studies are reported in Table 1. All eight previous studies found statistically significant positive Pearson correlation coefficients between the KAI total score (KAI-T) and S–N and the J–P dimensions of the MBTI.

Three studies (Carne & Kirton, 1982; Jacobson, 1993; Tefft, 1990) reported correlations for the four dimensions of the MBTI (E–I, S–N, T–F, J–P) and also include the three subscales of the KAI (SO, E, and R) in their results. These studies report positive and statistically significant correlations between the MBTI S–N and J–P dimensions and all three KAI subscales of SO, E, and R. This is a logical finding, in that the KAI-T score is derived from the aggregation of the three subscale scores.

The relationships between KAI-T score and the E–I and T–F dimensions of the MBTI reported for the eight studies are inconclusive and contradictory. Of the ten statistically significant correlations reported for the MBTI E–I dimension with the KAI scores, seven are negative and three are positive. Assuming that the researchers in these studies used the standard conversion for preference scores to continuous scores for the MBTI E–I dimension, it is puzzling that the directionality of the relationships would change.

Of the seven statistically significant correlations reported for the MBTI T–F dimension with the KAI scores, four are negative and three are positive. (Note: The MBTI continuum produces scores that range from low for T to high for F.) On the basis of this previous research, it appears clear that many of the conceptual relationships hypothesized earlier are supported. However, the observation that the E–I and T–F dimensions have conflicting results is cause for further inquiry.

Table 1. Correlations (Pearson P) Between the Kirton Adaption–Innovation Inventory (KAI) and Myers-Briggs Type Indicator (MBTI) Functions

Author(s)/Date	N	KAI Mean	KAI Scales	MBTI Functions			
				E–I	S–N	T–F	J–P
Gryskiewicz, 1982							
1981	99	(nr)	KAI-T	-.21*	.40***	.02	.40***
1980	161	(nr)	KAI-T	-.11	.56***	-.10	.48***
1979	83	(nr)	KAI-T	-.35***	.56***	.02	.48***
1978	95	(nr)	KAI-T	-.33***	.54***	.09	.53***
Carne & Kirton, 1982	109	101	KAI-T	.12	.44*	-.03	.53*
			SO	.31*	.49*	-.16*	.32*
			E	.02	.23*	.16*	.47*
			R	-.10	.28*	.01	.38*
Tefft, 1990	615	104	KAI-T	-.23***	.55***	-.11**	.40***
			SO	-.29***	.52***	-.10***	.33***
			E	-.09*	.27***	.04	.36***
			R	-.13**	.47***	-.17***	.30***
Jacobson, 1993	54	103	KAI-T	.25*	.66*	.23*	.49*
			SO	.32*	.56*	.17*	.35*
			E	-.11	.30*	-.02	.35*
			R	.00	.53*	-.09	.25*
Gryskiewicz, & Tullar, 1995	49	(nr)	KAI-T	.21	.41***	-.19	.41***

Note: (nr) = not reported, KAI-T = KAI total, SO = KAI Sufficiency of Originality subscale, E = KAI Efficiency subscale, R = KAI Rule Group Conformity subscale, E–I = extroversion–introversion, S–N = sensing–intuitive, T–F = thinking–feeling, J–P = judging–perceiving. *** $p < .001$, ** $p < .01$, * $p < .05$.

Method

Measures

As a measure of cognitive style, the KAI provides its user with insights into personal preferences toward problem solving, decision making, and individual creativity. The KAI is a 32-item, paper-and-pen, Likert-type, self-report instrument on which respondents are asked to indicate the degree of ease or difficulty they have in maintaining specific adaptive or innovative preferences over a long period of time. Respondents indicate their choice to each item on a 17 dot continuum anchored by four descriptors, “Very Hard” and “Hard” at the left and “Easy” and “Very Easy” to the right, with the pairs equally separated by neutral spaces. Responses are scored on a scale from 1 to 5.

The possible range of scores on the KAI is 32–160, with a theoretical mean of 96. The total score is a location on a scale ranging on a continuum from more adaptive to more innovative. This location is

derived by summing the three subscale scores (SO, E, and R) ranging from more adaptive to more innovative preferences. There is a great deal of literature regarding the KAI’s validity and reliability (Kirton, 1987; 1994; 1999b). Kirton (1999b) cited more than 200 studies in his current manual. Mudd (1986) reviewed 43 published reports using the KAI. He reported an observed mean for the general population on the KAI to be 95.0, with a standard deviation of 14.9 ($n = 1719$), a reliability of .86 (internal consistency; $n = 2777$) and a consistent factorial composition that loads into the three subscales ($n = 1280$). Kirton (1999b) and Mudd also reported on a variety of studies that support the convergent, divergent, criterion-related, and predictive validity of the KAI. Kirton’s (1987) assertion that cognitive style is highly resistant to change, and as a preference, does not alter as behavior does was supported by Murdock, Isaksen, and Lauer (1993).

The MBTI was designed to make the theory of psychological types understandable and useful (Myers & Myers, 1980). The MBTI, Form G, is a

self-administered, paper-and-pen instrument. There are 126 forced-choice items, of which 94 are scored. The items were rationally produced and comprise four bipolar scales intended to measure extraversion-introversion (E-I), thinking-feeling (T-F), sensing-intuiting (S-N), and judging-perceiving (J-P). The MBTI was designed to identify a person's preference on each of the four scales. One's preferences are presented in a four-letter code (e.g. ENTJ) which provides its user with insights into his or her preferences from the 16 type possibilities created by the various combinations of the factors.

When MBTI continuous scores are required (as in this study) between dichotomous preferences, a theoretical mean of 100 is used. Scores recorded below the mean represent ESTJ type preferences while scores recorded above the mean represent INFP type preferences. To calculate the continuous score for an E, S, T, or J preference, one subtracts the score from 100 (e.g. E19 would be represented by an E-I continuous score of 81). To calculate the continuous score for an I, N, F, or P preference, one adds the score to 100 (e.g. I9 would be represented by an E-I continuous score of 109). Ranges when using continuous scores for Form G, as reported by Myers and McCaulley (1985, p.10), are 33 to 99 for ESTJ preferences and 101 to 167 for INFP preferences.

There are more than 4,000 published sources regarding the MBTI's validity and reliability. Myers et al. (1998) provide a summary of some of these studies and report an internal consistency (split-half) for Form G from the CAPT Databank ($n = 32,671$) for E-I of .82, for S-N of .84, for T-F of .83, and for J-P of .86. Myers et al (1998) also report test-retest correlations for Form G after nine months ($n = 559$) for E-I of .70, for S-N of .68, for T-F of .59, and for J-P of .63. A consistent factorial composition that loads into the four scales using exploratory factor analysis is reported by Myers et al. (1998) in four studies, and the same results are reported for six studies that used confirmatory factor analysis techniques. Myers et al. (1998) provide a critique of those studies that found different results. Myers et al. provide a wide variety of studies that support the convergent, divergent, criterion-related, and predictive validity of the MBTI Form G, as well as the other forms of the measure that are commercially available. A critique by Barbuto (1997) of the MBTI does question how well it operationalized Jung's types.

Sample

The total sample comprised data collected from 1,483 individuals from the United States. These data were collected as part of the Creative Problem Solving Group's applied research mission from participants in various programs. Some programs included an entire distribution of employees in particular divisions of organizations. Others included only selected participants from within larger groups of employees. The data were collected between January 1986 and November 1994. The age of the individuals ranged from 15 to 63, with an average age of 31.9 years. A total of 486 individuals were undergraduate students, 41 individuals were master's students, 634 worked for a manufacturer of household goods, 111 worked for a food manufacturer, 71 came from an IT consulting firm. The remaining 140 individuals came from six different organizations.

Procedures

With the exception of Tefft (1990), the majority of the studies summarized in Table 1 used small sample sizes. This study focused on providing a larger sample size upon which to explore the relationships between the measures.

Correlation coefficients were computed for comparison of all four dimensions of the MBTI with the total score and three subscales of the KAI. Unlike previous studies, reported in Table 1, correlations for men and women between the KAI and MBTI were also computed and presented.

None of the previous studies offer a conceptual approach to comparing the core constructs or a theoretical interpretation of the results. This study offered a preliminary conceptual prediction and explanation for the correlational results.

Results

The KAI mean score for the total group was 103 ($SD = 16.3$), seven points higher than the theoretical mean of 96 indicating a slight innovative preference for the sample. The MBTI mean scores for the total group were E (96.8, $SD = 25.9$, range 49-157), N (105.7, $SD = 27.1$, range 33-151), T (88.7, $SD = 24.9$, range 35-143), and J (98.4, $SD = 28.7$, range 45-161).

Table 2. Correlations (Pearson P) Between the Kirton Adaption–Innovation Inventory (KAI) and Myers-Briggs Type Indicator (MBTI) Functions

KAI	MBTI Functions			
	E–I	S–N	T–F	J–P
KAI-T	-.27**	.55**	-.08**	.44**
SO	-.32**	.48**	-.14**	.32**
E	-.13**	.32**	.08**	.42**
R	-.15**	.47**	-.09**	.33**

Note: N = 1,483, KAI-T = KAI total, SO = KAI Sufficiency of Originality subscale, E = KAI Efficiency subscale, R = KAI Rule Group Conformity subscale, E–I = extroversion–introversion, S–N = sensing–intuitive, T–F = thinking–feeling, J–P = judging–perceiving.
**p < .01.

The results of the correlation analysis between the KAI and MBTI are presented in Table 2.

Hypothesis 1 was supported. A stronger correlation between an innovative cognitive style and N (r = .55) was found. This was the highest magnitude among all the correlations, and it accounted for 30% of the variance. All three subscales of the KAI also had relatively strong correlations with an intuitive psychological type. The innovative SO correlation with N was .48, the innovative R correlation was .47, and the innovative E correlation was .32.

Hypothesis 2 was supported. A strong relationship between an innovative cognitive style and a perceiving psychological type (r = .44) was found. Of all the correlations of the KAI-T with the four dimensions of the

MBTI, this was the next highest in magnitude and accounted for 19% of the variance. All three subscales on the KAI also had moderate to strong correlations with a perceiving psychological type. The correlations with perceiving (P) of an innovative E was .42, innovative R was .33, and an innovative SO was .32.

Hypothesis 3 was also supported. We found lower magnitude correlations between the KAI and T–F (r = -.08) and E–I (r = -.27). This trend appeared to be consistent for all subscales of the KAI for T–F, indicating a lack of relationship between an innovative style and the perceiving preference.

The magnitude of the KAI subscales showed a different pattern for E–I. Very low magnitude correlations were found for the KAI E and R subscales, but a negative correlation of .32 was found for an innovative score and an introverted psychological type.

Table 3 shows the results of the correlation analysis between the KAI and MBTI for the sample, split on the basis of gender.

Except for slight differences in coefficients reported between the KAI E subscale and the S–N factor of the MBTI, and between the KAI SO subscale and T–F factor of the MBTI, no statistically significant difference in the strength of correlation between men and women was found. This supports Kirton’s (1999b) assertion that gender has only a very slight relationship to scores on the KAI. Kirton (1987) reported a correlation of KAI with gender difference of .195 at p < .001 for a sample of 402 subjects. It also supports Jung’s (1923) theory that “these types override the distinction of sex [gender]” (p. 413).

Table 3. Men and Women Correlations (Pearson P) Between the Kirton Adaption–Innovation Inventory (KAI) and Myers-Briggs Type Indicator (MBTI) Functions

KAI	MBTI Functions							
	E–I		S–N		T–F		J–P	
	M	F	M	F	M	F	M	F
KAI-T	-.31**	-.28**	.57**	.52**	.01	-.10**	.47**	.42**
SO	-.36**	-.32**	.51**	.45**	-.05	-.18**	.36**	.29**
E	-.14**	-.15**	.37**	.25**	.10**	.12**	.42**	.43**
R	-.20**	-.15**	.49**	.46**	.00	-.10**	.38**	.30**

Note: Men, N = 824; women, N = 659. KAI-T = KAI total, SO = KAI Sufficiency of Originality subscale, E = KAI Efficiency subscale, R = KAI Rule Group Conformity subscale, E–I = extroversion–introversion, S–N = sensing–intuitive, T–F = thinking–feeling, J–P = judging–perceiving.
**p < .01, *p < .05.

Discussion and Conclusions

The results of this study indicated that there does seem to be some conceptual overlap between measures of psychological type and cognitive style, specifically between the MBTI and KAI, and that these relationships held even when separating the sample on the basis of gender. The MBTI S–N and J–P functions are measuring some of the same style constructs as the KAI. Within the S–N dimension, Jung’s intuitors are conceptually close to Kirton’s innovators, with a stronger relationship with SO and R, rather than E. This would indicate that intuitives are more likely to provide an abundance of possibilities as well as prefer to be unconstrained by rules and authority. Those with a stronger preference for perceiving (rather than judging) are also more likely to score with an innovative preference. The E subscale had the strongest of the subscale correlations, indicating that those with a stronger preference for perceiving are closer conceptually to those who prefer to limit the effect of structure on their thinking.

The results of this study also suggest that the MBTI measures additional constructs beyond that of the KAI. This conclusion is supported by the lack of substantial correlations between the E–I and T–F functions of the MBTI and the KAI–T.

The only surprising correlation uncovered by this study was the relatively strong relationship between the SO subscale of the KAI with the E–I dimension of the MBTI. This is not consistent with the conceptual foundations of these measures. The fact that there is a negative relationship between SO and E–I indicates that a preference for extraversion relates to Kirton’s SO subscale. Given the conceptual foundation described above, a relationship should have been found between the KAI and introversion, if one was found at all. Is the SO subscale more about the concept of originality, and is it really based on the concept of the creative loner? This question needs further exploration, particularly along the line of research conducted by Braun (1997).

From a conceptual perspective, there are numerous implications of these results. The first relates to the level of the general constructs themselves. Within the broad domain of individual differences, some styles can be subsumed under other higher-order factors (Vernon, 1973). Thus, various constructs of prefer-

ence, type, or style can be operating at very different levels of abstraction.

Cognitive style, as defined by Kirton (1994), appears to be more narrowly or precisely defined than psychological type, leading to correlations with only part of the larger construct of psychological type. Given the tight theoretical definition of the AI theory, it appears that it is approaching a similar construct to Jung’s (1923) notion of preferences surrounding perception. This leaves the other aspects contained in Jung’s conceptual space unaccounted for within AI theory. Because we see cognitive style as a concept on the borderline between personality and cognitive function, it will be necessary to continue a more theoretically driven program of research to better define the conceptual lines of demarcation. Further support for continuing this line of investigation is provided by Quenk and Hammer (1998):

Specifying that the MBTI is a personality inventory rather than some other kind of assessment tool discourages its misuse as a test of skills or abilities or as a simple measure of a particular construct, such as “cognitive styles.” Such possible misunderstanding is just one problematic result of detaching the instrument from its theoretical roots. (p. xvii)

The issue regarding varying levels of conceptual space being accounted for by varying constructs leads to the need for different approaches for future research and inquiry. As Vernon (1973) indicated:

some styles can be subsumed under the notion of second or higher-order factors. But we should not rule out the possibility of syndromes or dynamic Gestalts, which could be better studied by multivariate experimental designs, or by discriminant function, than by factor analysis. (p. 141)

Although this study utilized a larger sample than most previous research on the relationship between KAI and the MBTI, it was not a random sample. Future research should be conducted with random samples. This line of research should also be approached with more complex experimental and statistical designs.

There are also additional practical implications of the results of this study. Many creativity practitioners use measures of both psychological type and cognitive styles to help individuals, groups, and organizations understand and appreciate their differences. The MBTI and KAI are the two most well-researched and widely used approaches within the area of creativity research

and practice. Improved knowledge regarding how these constructs and measures relate can assist practitioners in their efforts to provide participants meaningful information and respond to their questions about measures with which they may already be familiar.

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