Vlerick Leuven Gent Management School
Associated with Ghent University and with the Katholieke Universiteit Leuven

Vlerick Leuven Gent Working Paper Series 2003/09

LINKING COGNITIVE STYLES AND VALUES

HERMAN VAN DEN BROECK,
Herman.VanDenBroeck@vlerick.be
KARLIEN VANDERHEYDEN,
Karlien.VanDerHeyden@vlerick.be
EVA COOLS
Eva.Cools@vlerick.be

LINKING COGNITIVE STYLES AND VALUES

HERMAN VAN DEN BROECK,
Vlerick Leuven Gent Management School

KARLIEN VANDERHEYDEN,
Vlerick Leuven Gent Management School

EVA COOLS,
Vlerick Leuven Gent Management School

ABSTRACT

The purpose of this study was to examine the relationship between cognitive styles and values. Cognitive styles and values are both frequently studied domains, but the relationship between these concepts has been investigated rarely. Individuals increasingly become points of reference in the shaping of values and attitudes. Moreover, people are confronted with more alternatives. Hence, cognitive styles are becoming more important, since they are the vehicles for choosing relevant information and for building our value system. To study differences in cognitive styles the profoundly investigated analytic-holistic dimension was used. Examination of values was based on the theory of Schwarz (1992, 1994). 15,616 Belgian citizens filled out our self-developed questionnaire. The results revealed different value patterns for analytic and holistic thinkers, indicating that analytic people were more conservative, while holistic people were more open to change. Moreover, two types of analytic thinkers (knowing and planning style) were identified, each attaching importance to different values. As to the dimension of self-transcendence versus self-enhancement, a significant difference was found between the two types of analytic thinkers, as well as between analytic and holistic individuals.

Keywords: cognitive styles; values; individual differences

INTRODUCTION

Modern society is characterized by two trends, which display opposite qualities, namely individualization and globalization (Giddens, 1991; Halman & Petterson, 1995). Individualization is the process by which individuals increasingly become a reference point in the shaping of values and attitudes (Halman & Petterson, 1995). In premodern times, values were based upon, and legitimized by, tradition and religion. In contemporary society, however, values are an object of personal autonomy and characterized by an ethic of personal fulfillment. Nevertheless, modern society is not only individualized, but also differentiated. This means that the different life areas became "self-referential in terms of values" (Waters, 1994, p. 309). In contrast, premodern, traditional societies are described as integrated and non-differentiated. All life domains and their values were strongly connected, mainly by religion. As a consequence of the decreasing influence of religion, individuals are now freer to choose their needs. "Modernity confronts the individual with a diversity of choices and at the same time offers little help as to which options should be selected" (Giddens, 1991, p. 80).

The second trend of modern society is globalization. Individuals presently live in a 'global village' (Robertson, 1992, p. 8). Information about different cultures is disseminated rapidly throughout the world, thereby confronting individuals with more alternatives. Accordingly, the likelihood that people select similar values is reduced. In addition, people are also increasingly influenced by foreign events, resulting in value fragmentation (i.e., increased diversity of individual value systems).

Historically, information processing occurred in a predefined value system. In contemporary society, however, each individual has to perform selection of values and decision making. Therefore, cognitive styles are becoming increasingly important. Cognitive style is the vehicle for selection of relevant information and construction of a value system. Claxton, McIntyre, Clow, and Zemanek (1996) state that a cognitive style is an immediate and stable influence on human values and value systems, as it comprises individual differences in perception and processing of information, as well as decision making. Individual differences in cognitive style have been demonstrated to be an important influence on perception, learning, problem solving, and creativity (Kirton, 1989; Messick, 1976, 1984; Schmeck, 1988; Witkin & Goodenough, 1981). Furthermore, individuals have different mental processes and preferences, which affect their value system and choice of work and activities.

Although cognitive styles and values are both frequently studied domains, the relationship between these concepts is not thoroughly investigated. Therefore, the aim of our research is to study the influence cognitive style has on values.

Cognitive styles

A cognitive style can be defined as "a person's preferred way of gathering, processing, and evaluating information" (Hayes & Allinson, 1998, p. 850). Witkin, Moore, Goodenough, and Cox (1977) defined cognitive style as individual differences in the way people perceive, think, solve problems, learn, and relate to others. Messick (1984) defined cognitive styles as consistent individual differences in ways of organizing and processing information and experience. Taken together, a cognitive style refers to individual differences in the perception of environmental stimuli, and the organization and use of information. It influences how people look at their environment for information, how they organize and interpret this information, and how they use these interpretations for guiding their actions (Hayes & Allinson, 1998).

Cognitive style has been investigated in relationship to various concepts, such as personality (Gryskiewicz & Tullar, 1995), motivation (Martinsen, 1994), occupation (Allinson, Chell & Hayes, 2000), organizational climate (Kirton & McCarthy, 1988), creativity (Al-Sabaty & Davis, 1989), problem solving (Hammerschmidt, 1996), and conflict management (Percival, Smitheram & Kelly, 1992). Additionally, cognitive style has been studied from various points of view. Different authors have developed their own instruments of assessment, providing unique labels to the cognitive style under investigation. Accordingly, several authors have attempted to create order in this diverse field by integration of the different theories (Grigorenko & Sternberg, 1995; Hayes & Allinson, 1994; Rayner & Riding, 1997; Riding, 1997).

For example, Hayes and Allinson (1994) distinguish three approaches to the classification of cognitive style. The first approach implements a superordinate structure that provides categorization of style within an analytic-holistic dimension (e.g., Entwistle, 1981; Miller, 1987). Some theories using this approach link this dimension to differences in hemispheric functioning (e.g., Allinson & Hayes, 1996; Prevedi & Carli, 1987). The second approach relates cognitive style to processes. For example, in addition to using a vertical classification of styles (first approach), Miller (1987) also proposes a horizontal classification

according to the major cognitive processes of perception, memory, and thought. The third approach focuses on the difference between style and ability (e.g., Messick, 1984). Abilities are considered unipolar, while cognitive styles are considered to be bipolar. The level of ability is related to a possible degree of achievement in a particular area (e.g., intelligence). In contrast, cognitive styles range from one extreme to a contrasting extreme, with each pole of the dimension having different implications for cognitive functioning.

The current research is based upon the first approach to the classification of cognitive style. Several authors, who have implemented different labels of cognitive style to describe the same dimension (Brumby, 1982; Miller, 1987; Riding & Buckle, 1990), have used this approach. Nevertheless, two qualitatively different types of thinking are common among the studies. One type of cognitive style is described as analytic, deductive, rigorous, constrained, convergent, formal, and critical. On the other hand, terms commonly used to describe the second style are synthetic, inductive, expansive, unconstrained, divergent, informal, diffuse, and creative (Nickerson, Perkins & Smith, 1985). Table 1 displays the two poles of the dimension analytic-holistic according to a review of the literature.

Insert Table 1 About Here

Values

Defining values has attracted many different approaches. Schwartz and Bilsky (1987) described values as cognitive representations of the social, interpersonal, and biological demands placed upon each individual. Rokeach (1973) defined a value as "an enduring belief that a specific mode of conduct or end-state of existence is personally and socially preferable to an opposite or converse mode of conduct or end-state of existence" (p. 5). According to Hofstede (1980), "a value is a broad tendency to prefer certain states of affairs over others" (p. 19). Schwartz (1992) stated that values are desirable, transsituational goals, varying in importance, that serve as guiding principles in people's lives. Despite the abundance of definitions (Meglino & Ravlin, 1998), most authors agree that values are standards or criteria for choosing goals or guiding actions, and that they are relatively enduring and stable over time (Dose, 1997). Values are not single entities, but rather integrated within a system which

is “an enduring organization of beliefs concerning preferable modes of conduct or end-states of existence along a continuum of relative importance” (Rokeach, 1973, p. 5).

An individual’s values can explain a great deal regarding their interests and priorities, the choices they make and goals for which they strive. Values are central to an individual because they serve as mechanisms that guide their life within society.

Schwartz (Ros, Schwartz & Surkiss, 1999; Schwartz, 1992, 1994) proposes a theory on basic human values based upon two components. First, he distinguishes 10 values that are recognized by members of most societies. Second, he shows how these values are connected dynamically with each other by specifying which values are compatible and mutually supportive, and which values are conflicting and opposed. Schwartz (1992) thereby distinguishes the following values (Table 2).

Insert Table 2 About Here

Two dimensions underlie these values: self-transcendence versus self-enhancement, and openness to change versus conservatism. The first dimension represents the tension between acceptance of others as equals and concern for their welfare (universalism and benevolence) versus dominance over others and pursuit of success (power and achievement). The second dimension describes values that emphasize independent thought and action and readiness for change (self-direction and stimulation) in opposition to values of preserving traditional practices, protecting stability, and submissive self-restriction (security, conformity, and tradition). Schwartz (1994) found support for his model in 44 countries. Therefore, we used this theory to study the relationship between cognitive styles and values.

Hypotheses

Based on the literature review of the analytic-holistic dimension (Table 1), we expect that analytic individuals tend to be more conservative and holistic people more open to change. Allinson and Hayes (1996) stated that “intuitivists [holistic style] tend to be relatively nonconformist, prefer an open-ended approach to problem solving, and rely on random methods of exploration” (p. 122). Kirton (1984) found that “adaptors [analytic style] are

characterized by precision, reliability, efficiency, discipline, and conformity. They are usually seen as safe, sound, and reliable. Innovators [holistic style], on the other hand, are seen as undisciplined with little respect for customs and group cohesion" (p. 139). Prevedi and Carli (1987) also noted that innovators are risk takers and sensation seekers. Guilford (1959) stated that convergent thinkers (analytic style) enjoy dealing with problems that require one conventional correct answer, whereas divergent thinkers (holistic style) like problem situations where they can produce several equally acceptable answers, with emphasis on variety, quantity, and originality. Therefore, the first hypothesis of this study is that individuals with an analytic style will be more conservative, whereas people with a holistic style will be more open to change.

Concerning the dimension of self-transcendence versus self-enhancement, we expect analytic individuals to be more self-transcendent, with holistic people scoring higher on self-enhancement. Kubes (1992) found a significant correlation between the Kirton Adaption Innovation Inventory (KAI) and the two control subscales described by Schutz. Kubes' study indicated that people on the innovative side (holistic style) had a higher need to control others and, at the same time, a lower need to be controlled. Myers and McCaulley (1985) stated that feelers (holistic style) disliked telling people unpleasant things, were sympathetic, and enjoyed pleasing others. Thinkers (analytic style) are described as firm and tough-minded, and expect fair treatment from others. Rogers (1959) noted that a creative person (closely related to the innovator) has a high need for social recognition. Thus, the second hypothesis of this study is that individuals with an analytic style will be more self-transcendent, whereas those with a holistic style will have higher self-enhancement.

METHOD

Sample

The sample comprised 15,616 Belgian citizens, of whom 61% were men, and 39% women. Participants' ages ranged from < 20 to > 55 years. Most subjects were aged either between 26 and 35 years (30%) or 36 and 45 years (29%). The majority (91%) of the respondents reported Dutch as their first language, with 9% speaking French as a first language. Participants reported a range of educational backgrounds and vocations. Most subjects worked full-time (90% full-time versus 10% part-time), with participants employed

in both the private (58%) and public sectors (42%). The questionnaire was published in a newspaper and was part of a large-scale research on work, life, and values. The respondents completed the questionnaire (a self-report inventory) voluntarily, and all data remained confidential.

Measurement

Development of the questionnaire measuring cognitive styles and values was based on an extensive literature review (e.g., Allinson and Hayes, 1996; Herrmann, 1994; Riding & Cheema, 1991; Schwartz, 1992, 1994). All questionnaire items were measured using five-point Likert scales (1 = strongly disagree, 3 = neutral, 5 = strongly agree). Higher scores indicate higher levels of each construct.

Development of items relating to cognitive style was based particularly on the theory of Herrmann (1994), allowing the construction of 18 items. The items were subjected to a principal component exploratory factor analysis. Items with factor loadings of 0.50 or less were eliminated (Becker & Bös, 1979). We initially tested a two-factor solution to evaluate the analytic-holistic categorization of styles. By restricting the analysis to two factors only, we found one factor representing the analytic side of the dimension (eight-item scale) and the other factor representing the holistic side (six-item scale). The reliability (Cronbach α) of the analytic and holistic factors were 0.76 and 0.80, respectively. The intercorrelation between the two factors was 0.28.

However, an unrestricted principal component exploratory factor analysis revealed three factors: one representing the holistic style and two further factors related to the analytic style. The first analytic factor focused on rational and analytic characteristics and was labeled ‘knowing style’ (three-item scale). The second analytic factor related to planning and organizational aspects and was labeled ‘planning style’ (five-item scale). The reliability (Cronbach α) of the first and second analytic factors was 0.71 and 0.74, respectively. The intercorrelation between those two factors was 0.35.

Based on the model of Schwartz (1992, 1994), we developed a questionnaire to measure values. The main reason not to use the existing Dutch version of the Schwartz Values Inventory is that the instrument is rather long to use in a survey. Stern, Dietz, and Guagnano (1998) also state that “administrating the full 56-item instrument is impractical for some investigators, such as survey researchers, because it takes an unacceptably large amount of the

space or time available for administrating a research instrument" (p. 986). Moreover, "no effort has yet been made to validate scores on measures of the 10 value types or the four value clusters" (Stern, Dietz, & Guagnano, 1998, p. 986). Like Stern, Dietz, and Guagnano (1998), we developed our own inventory of values based on the questionnaire of Schwartz. Principal component exploratory factor analysis identified four major clusters of variables: 'readiness to change' (α = 0.74; nine-item scale), 'conservatism' (α = 0.62; six-item scale), 'social commitment' (α = 0.77; 11-item scale), and 'individualism' (α = 0.82; 14-item scale). These scales correspond well with the four categories of values identified by Schwartz (i.e., openness to change, conservatism, self-transcendence, and self-enhancement). Further exploratory principal component factor analysis showed that three of the four scales consisted of multiple factors showing an eigenvalue greater than 1.

Readiness to change had no subscales. However, the scale of conservatism could be divided into two factors, namely 'religiousness' (α = 0.75; two-item scale, e.g., 'I believe in God') and 'conformity' (α = 0.63; four-item scale, e.g., 'obedience is an important value to pass on to others'), with these scales showing an intercorrelation of 0.18.

The social commitment scale was divided into three factors, namely 'leftist' (α = 0.60; four-item scale, e.g., 'everybody is entitled to a benefit'), 'social consciousness' (α = 0.76; four-item scale, e.g., 'I am touched by the refugees' situation'), and 'environmental consciousness' (α = 0.71; three-item scale, e.g., 'my behavior reflects my concern for the environment'). Intercorrelations between leftist and social consciousness, social consciousness and environmental consciousness, and environmental consciousness and leftist were 0.35, 0.49, and 0.14, respectively.

The scale of individualism could also be divided into three factors, namely 'power' (α = 0.76; six-item scale, e.g., 'I want to be the best'), 'materialism' (α = 0.68; four-item scale, e.g., 'money is important in order to be happy'), and 'chameleon behavior' (α = 0.62; four-item scale, e.g., 'I adapt my values to those of my superiors to reach my goals'). Intercorrelations between power and materialism, materialism and chameleon behavior, and chameleon behavior and power were 0.47, 0.43, and 0.42, respectively.

RESULTS

Table 3 presents the Pearson correlation coefficient between cognitive style and the four value scales.

Insert Table 3 About Here

Table 3 shows a very strong correlation between the holistic style and readiness to change ($r = 0.32$, $p < 0.01$). The correlation between the analytic style and readiness to change was also significant, although weaker ($r = 0.14$, $p < 0.01$). To test the difference between the correlations obtained on the same sample and with one variable in common, we used a t test as formulated by Dubois (1965). The finding that individuals with a holistic style have a significantly higher correlation with readiness to change than those with an analytic style was confirmed ($t = 19.72$, $p < 0.01$).

The value of conservatism showed a significant positive correlation with an analytic style ($r = 0.19$, $p < 0.01$). In contrast, an holistic style was negatively correlated with conservatism ($r = -0.05$, $p < 0.01$).

The two other scales, social commitment ($r = 0.08$, $p < 0.01$ for analytic style; $r = 0.14$, $p < 0.01$ for holistic style) and individualism ($r = 0.14$, $p < 0.01$ for analytic style; $r = 0.15$, $p < 0.01$ for holistic style), were both positively correlated with each of the two cognitive styles.

However, when dividing the analytic style into the knowing and planning style, different results were revealed for all factors except readiness to change. Conservatism displayed a much stronger positive correlation with the planning style ($r = 0.22$, $p < 0.01$) than with the knowing style ($r = 0.07$, $p < 0.01$). This difference was statistically significant ($t = 16.78$, $p < 0.01$).

Differences between the knowing and the planning style were also identified on the scales of social commitment and individualism. There was a strong positive correlation between social commitment and the knowing style ($r = 0.13$, $p < 0.01$), which was similar to the correlation with the holistic style. The correlation with the planning style was much weaker ($r = 0.02$, $p < 0.01$). A contrasting relationship between these styles and individualism was revealed. A strong correlation between individualism and the planning style (similar to

the correlation with the holistic style) was demonstrated ($r = 0.16$, $p < 0.01$), whilst correlation with the knowing style was much weaker ($r = 0.05$, $p < 0.01$).

Table 4 presents the Pearson correlation coefficients between cognitive style and the value subscales.

Insert Table 4 About Here

Examination of the conservatism subscales (i.e., conformist and religious) reveals the strongest correlation with the planning style (conformist: $r = 0.24$, $p < 0.01$; religious: $r = 0.08$, $p < 0.01$). The correlation with the knowing style was much weaker (conformist: $r = 0.08$, $p < 0.01$; religious: $r = 0.02$, n.s.). Both subscales were negatively correlated with the holistic style (conformist: $r = -0.04$, $p < 0.01$; religious: $r = -0.04$, $p < 0.01$).

Significant associations were also revealed between cognitive style and social commitment. Both the holistic and knowing style were positively correlated with the leftist subscale (holistic style, $r = 0.09$, $p < 0.01$; knowing style, $r = 0.06$, $p < 0.01$); the planning style on the other hand was negatively correlated with the leftist subscale ($r = -0.10$, $p < 0.01$). Positive correlations were also revealed between social consciousness and the three cognitive styles; the association with the planning style was the weakest (knowing, $r = 0.14$, $p < 0.01$; holist, $r = 0.12$, $p < 0.01$ $r = 0.06$, planning, $p < 0.01$). Additionally, the final subscale of the social commitment scale, environmental consciousness, was positively correlated with each of the three cognitive styles (knowing, $r = 0.10$, $p < 0.01$; planning, $r = 0.11$, $p < 0.01$; holist, $r = 0.09$, $p < 0.01$).

Individualism is composed of three value subscales. The power subscale showed the strongest positive correlation with the holistic style ($r = 0.28$, $p < 0.01$). The correlations between power, and both the knowing and planning style, were very similar (knowing, $r = 0.17$, $p < 0.01$; planning, $r = 0.16$, $p < 0.01$). The two remaining subscales of materialism and chameleon behavior showed the strongest positive correlation with the planning style (materialism, $r = 0.14$, $p < 0.01$; chameleon behavior, $r = 0.06$, $p < 0.01$). The knowing style was negatively correlated with the two value scales (materialism, $r = -0.03$, $p < 0.01$; chameleon behavior, $r = -0.09$, $p < 0.01$). The holistic style was positively correlated with

materialism ($r = 0.03$, $p < 0.01$) and negatively correlated with chameleon behavior ($r = -0.03$, $p < 0.01$).

DISCUSSION

The results of the current study confirm our first hypothesis. Analytic individuals are more conservative, whereas holistic people are more open to change (readiness to change). New ideas, possibilities, and variety excite holistic individuals, whilst analytic people (knowing and planning style) prefer the status quo. People with a knowing style do not search for creative solutions, but rather remain within known boundaries. People with a planning style focus on what has previously succeeded, and have difficulties coping with change.

According to Prevedi and Carli (1987), adaptors (analytic people) prefer to cope with problems by improving a known solution, while innovators (holistic individuals) prefer to cope with problems by developing new answers. Adaptors respect existing rules and hierarchies. Further, they like completing tasks and have a high need for order and method. In contrast, innovators enjoy risk taking. They are not interested in existing structures and paradigms, preferring the main theme of a problem rather than the details.

Foxall and Hackett (1994) and Buttner, Gryskiewicz, and Hidore (1999) state that both adaptors and innovators are creative, albeit in a different way. Adaptors search for a relatively small number of solutions to a problem. They prefer a conventional approach to improve efficiency. Innovators, on the other hand, prefer radical change and like to challenge a traditional framework of rules.

Our second hypothesis is only partly confirmed. We expected analytic people to be more self-transcendent, and holistic people more oriented towards self-enhancement. However, with regard to self-transcendence (social commitment: leftist, social consciousness, environmental consciousness), analytic and holistic people are not significantly different. Nevertheless, when examining the three cognitive styles, a difference between the knowing and the planning style (both analytic thinkers) is demonstrated. People with a planning style have a lower correlation with both the leftist and social consciousness scales than either the people with a knowing style or the holistic thinkers (Figure 1). Individuals with a planning style dislike ambiguity, and consequently attempt to eliminate the sensual, feeling, and intuitive modes of thought. They are often perceived by others as small-minded, insensitive, and anti-social (Herrmann, 1994). Hudson (1966) describes convergers (i.e., analytic people)

as more emotionally inhibited than divergers. Convergers prefer to structure their experiences at all levels and try to keep different aspects of their lives compartmentalized. Our results confirm Hudson's description, demonstrating that planning people are less socially conscious. However, the distinction we make between the planning and the knowing style makes it possible to identify some differences within the category of convergent (analytic) thinkers.

Concerning self-enhancement (individualism), holistic people are clearly more power-oriented. This result confirms the finding of Kirton (1976). He characterizes innovators as people who are less sensitive to others and who have a high need for social recognition. Individuals with a more innovative cognitive style prefer to work with less imposed structure. As a consequence, they have a higher need to control others, whereas they have a lower need to be controlled. However, planning individuals (but not people with a knowing style) show higher materialism and chameleon behavior than the holistic thinkers. Planning people seek certainty, including financial and materialistic security. Their avoidance of ambiguous or uncertain situations can explain their higher materialism. Planning individuals also fear a loss of control. In order to maintain predictability and control (over situations and people) they are prepared to modify their own behavior (Herrmann, 1994). They are willing to both ignore a principle for financial gain, and adjust their values to conform to those of more powerful people. Analytic thinkers (adaptors) also tend to have lower self-esteem and self-confidence than innovators (Gryskiewicz, 1982). This may also explain why they are more prepared to adapt their behavior and values.

Insert Figure 1 About Here

IMPLICATIONS FOR PRACTICE AND RESEARCH

Individuals with different cognitive styles who attach varying importance to particular values may have a pejorative view of each other. The practical relevance of our research is demonstration of the importance of such cognitive differences. Kirton and McCarthy (1988) already stated that cognitive styles are "increasingly being seen as another critical intervening variable in work performance" (p. 175) and they conclude that "the identification of a

cognitive climate within organizations has useful implications for the practitioner who is attempting to build effective teams" (p. 182). Talbot (1989) also states that "differences in the way people think significantly affect one-on-one and team interactions in the workplace. Being able to identify, qualify, and understand each employee's unique thinking patterns provide an excellent opportunity to enhance individual and team performance and productivity" (p. 35). Sadler-Smith and Badger (1998) investigate human resource implications of cognitive style and conclude from their review that "human resource practitioners have a crucial role to play in the fostering of individual versatility and the facilitation of innovation through the effective management of differences in individual style" (p. 263). In other words, knowing cognitive styles implicates that people can be placed in jobs they like to do and in which they are successful. It can explain why people with the same abilities, knowledge, and skills perform different in the organization. It will also improve respect for diversity. Given the usefulness of the cognitive style concept for the organization, it is rather strange that it has been a relatively neglected concept within the area of industrial and organizational psychology (Hayes & Allinson, 1994). Further research on cognitive styles within organizations can anticipate on its practical relevance for organizational and individual behavior.

This study attempted to provide a framework for the examination of the relationship between cognitive styles and values. The data demonstrate that people with different cognitive styles support different values. Moreover, we identified two subscales within one of the cognitive styles. Knowing and planning individuals, both analytic thinkers, seem to have some different characteristics. However, further research is necessary to better understand these differences. In this sense, this study can be seen as a pilot study. Further validation and cross-validation of the cognitive style questionnaire is necessary, as well as research on the different cognitive styles in general, and the possible relationship with other variables in particular. Since this study was a part of a large-scale study on work, life, and values, separate research on cognitive styles in organizations is needed. Moreover, respondents completed the questionnaire voluntary. Our sample may not be representative for people within organizations, which implicates there can be some kind of response bias. Future research can take advantage of these limitations.

REFERENCES

Allinson, C. W., Chell, E., & Hayes, J. (2000). Intuition and entrepreneurial behavior. European Journal of Work and Organizational Psychology, 9, 31-43.

Allinson, C. W. & Hayes, J. (1996). The Cognitive Style Index: A measure of intuition-analysis for organizational research. Journal of Management Studies, 33, 119-135.

Al-Sabaty, I. & Davis, G. A. (1989). Relationship between creativity and right, left and integrated thinking styles. Creativity Research Journal, 2, 111-117.

Becker, P. & Bös, K. (1979). The concept of homogeneity: A comparison of two ways to select homogeneous item clusters. International Journal of Sport Psychology, 10, 101-111.

Brumby, M. N. (1982). Consistent differences in cognitive styles shown for qualitative biological problem-solving. British Journal of Educational Psychology, 52, 244-257.

Buttner, E. H., Gryskiewicz, N., & Hidore, S. C. (1999). The relationship between styles of creativity and managerial skill assessment. British Journal of Management, 10, 228-238.

Carne, J. C. & Kirton, M. J. (1982). Styles of creativity: Test score correlations between the Kirton Adaption-Innovation Inventory and the Myers-Briggs Type Indicator. Psychological Reports, 50, 31-36.

Claxton, R. P., McIntyre, R. P., Clow, K. E. & Zemanek, Jr. J. E. (1996). Cognitive style as a potential antecedent to values. Journal of Social Behavior and Personality, 11, 355-373.

Dubois, P.H. (1965). An introduction to psychological statistics. New York: Harper & Row.

Dose, J. J. (1997). Work values: An integrative framework and illustrative application to organizational socialization. Journal of Occupational and Organizational Psychology, 70, 219-240.

Entwistle, N. J. (1981). Styles of learning and teaching. Chichester: Wiley.

Foxall, G. R. & Hackett, P. M. W. (1994). Styles of managerial creativity: A comparison of adaption-innovation in the United Kingdom, Australia and the United States. British Journal of Management, 5, 85-100.

Giddens, A. (1991). Modernity and self-identity. Stanford: Stanford University Press.

Grigorenko, E. L. & Sternberg, R. J. (1995). Thinking Styles. In D. H. Saklofske & M. Zeidner (Eds.), International handbook of personality and intelligence (pp. 205-229). New York: Plenum Press.

Gryskiewicz, N. (1982). The Kirton Adaption-Innovation Inventory in Creative Leadership Development. Paper presented at the Occupational Psychology Conference of the British Psychological Society, Sussex University.

Gryskiewicz, N. D. & Tullar, W. (1995). The relationship between personality type and creativity styles among managers. Journal of Psychological Type, 32, 30-35.

Guilford, J. P. (1959). Personality. New York: McGraw-Hill.

Halman, L. & Petterson, T. (1995). Individualization and value fragmentation. In R. De Moor (Ed.), Values in Western societies (pp. 297-316). Tilburg: Tilburg University Press.

Hammerschmidt, P. K. (1996). The Kirton Adaption-Innovation and group problem solving success rates. Journal of Creative Behavior, 30, 61-74.

Hayes, J. & Allinson, C. W. (1994). Cognitive style and its relevance for management practice. British Journal of Management, 5, 53-71.

Hayes, J. & Allinson, C. W. (1998). Cognitive style and the theory and practice of individual and collective learning in organizations. Human Relations, 51, 847-871.

Herrmann, N. (1994). The creative brain (5th printing ed.). Lake Lure, NC: Brain Books.

Hofstede, G. (1980). Culture's consequences: International differences in work-related values. Beverly Hills, CA: Sage Publications.

Hudson, L. (1966). Contrary imaginations. Harmondsworth: Penguin.

Kirton, M. (1976). Adaptors and innovators: A description and measure. Journal of Applied Psychology, 61, 622-629.

Kirton, M. J. (1984). Adaptors and innovators - Why new initiatives get blocked. Long Range Planning, 17, 137-143.

Kirton, M. J. (Ed.). (1989). Adaptors and innovators: Styles of creativity and problem-solving. London: Routledge.

Kirton, M. J. & McCarthy, R. M. (1988). Cognitive climate and organizations. Journal of Occupational Psychology, 61, 175-184.

Kubes, M. (1992). Cognitive style and interpersonal behaviour: The Kirton Adaption-Innovation and Schutz's FIRO-B inventories. Journal of Human Behaviour, 29, 33-38.

Martinsen, O. (1994). The effect of individual differences in cognitive style and motives in solving insight problems. Scandinavian Journal of Educational Research, 38, 83-95.

Meglino, B.M. & Ravlin, E.C. (1998). Individual values in organizations: Concepts, controversies, and research. Journal of Management, 24, 3, 351-389.

Messick, S. (1976). Individuality in learning: Implications of cognitive styles and creativity for human development. London: Jossey-Bass.

Messick, S. (1984). The nature of cognitive styles: Problems and promises in educational practice. Educational Psychologist, 19, 59-74.

Miller, A. (1987). Cognitive styles: An integrated model. Educational Psychology, 7, 251-268.

Myers, I. B. & McCaulley, M. H. (1985). Manual: A guide to the development and use of the Myers-Briggs Type Indicator. Palo Alto: Consulting Psychologists Press.

Nickerson, R., Perkins, D., & Smith, E. (1985). The teaching of thinking. Sheffield: Training Agency.

Percival, T. Q., Smitheram, V., & Kelly, M. (1992). Myers-Briggs Type Indicator and conflict-handling intention: An interactive approach. Journal of Psychological Type, 23, 10-16.

Prevedi, G. P. & Carli, M. (1987). Adaption-Innovation typology and right-left hemispheric preferences. Personality and Individual Differences, 8, 681-686.

Rayner, S. & Riding, R. J. (1997). Towards a categorization of cognitive styles and learning styles. Educational Psychology, 17, 5-27.

Riding, R. & Cheema, I. (1991). Cognitive styles - An overview and integration. Educational Psychology, 11, 193-215.

Riding, R. J. (1997). On the nature of cognitive style. Educational Psychology, 17, 29-49.

Riding, R. J. & Buckle, C. F. (1990). Learning style and training performance. Sheffield: Training Agency.

Robertson, R. (1992). Globalization. Social theory and global culture. London: Sage.

Rogers, C. R. (1959). Towards a theory of creativity. In H.H. Anderson (Ed.), Creativity and its cultivation. New York: Harper.

Rokeach, M. (1973). The nature of human values. New York: The Free Press.

Ros, M., Schwartz, S. H., & Surkiss, S. (1999). Basic individual values, work values and the meaning of work. Applied Psychology: An International Review, 48, 49-71.
Sadler-Smith, E. & Badger, B. (1998). Cognitive style, learning and innovation. Technology Analysis & Strategic Management, 10, 2, 247-265.

Schmeck, R. R. (Ed.). (1988). Strategies and styles of learning. New York: Plenum Books.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and tests in 20 countries. In M. Zanna (Ed.), Advances in experimental social psychology (Vol. 25, pp. 1-65). Orlando, FL: Academic Press.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? Journal of Social Issues, 50, 19-45.

Schwartz, S. H. & Bilsky, W. (1987). Toward a psychological structure of human values. Journal of Personality and Social Psychology, 53, 550-562.

Stern, P.C., Dietz, T., & Guagnano, G.A. (1998). A brief inventory of values. Educational and Psychological Measurement, 58, 6, 984-1001.

Talbot, R.P. (1989). Valuing differences in thinking styles to improve individual and team performance. National Productivity Review, 9, 1, 35-50.

Waters, M. (1994). Modern sociological theory. London: Sage.

Witkin, H. A. & Goodenough, D. R. (1981). Cognitive style: Essence and origins. New York: International Universities Press.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 1-64.

TABLE 1

Description of the analytic-holistic dimension

Analytic style	Holistic style
Convergence[6]	Divergence [6]
Sequential, structured[1,4,6]	More random, less orderly[1,4]
Facts, details[1,2,5]	Possibilities, meanings, ideas[5]
More interested in parts than in the whole[6]	More interested in the whole than in the component parts[6]
Logical[4], reflective[1,6]	Intuitive[4], impulsive[6], active[1]
Conservative[2], conventional, conformist[3]	Openness to experience[1], taking risks[2], subversive[3]
Planned, organized, systematic[1,2,5]	Flexible, spontaneous, open-ended[1,2,5]
Utility[5]	Novelty[3,5]
Objective, impersonal[2,5]	Subjective, (inter)personal, expressive[2,5]
Rational, intellectual[2,5]	Emotional, sensitive[2,5]
Verbal[1,2,6]	Visual[1,2,6]
Precision, methodical[5]	Inventive, creative[5]
Routine[1,3,5]	Variety[5]

Note. 1 = (Allinson & Hayes, 1996); 2 = (Herrmann, 1994); 3 = (Kirton, 1984); 4 = (Miller, 1987); 5 = (Myers & McCaulley, 1985); 6 = (Riding & Cheema, 1991).

TABLE 2

Values according to Schwart (1992)

Power: social status and prestige, control and dominance over others

Achievement: personal success through demonstrating competence according to social standards

Hedonism: pleasure and enjoying life

Stimulation: excitement, novelty, and challenge in life

Self-direction: independent thought, seeking, creating, experimenting, and exploring

Universalism: equality, tolerance and justice for all, and respect for nature

Benevolence: welfare for all, forgiveness, honesty, loyalty, and responsibility

Tradition: respect for traditional culture

Conformity: obedience, politeness, and respect for the elderly and parents

Security: safety, security, and stability in a stable society

---

TABLE 3

Pearson product-moment correlations between cognitive style and the four value categories

	1.	2.	3.	4.	5.	6.	7.	8.
1. Holistic style	1.00							
2. Analytic style	0.28**	1.00						
. Knowing style	0.37**	0.74**	1.00					
4. Planning style	0.13**	0.89**	0.35**	1.00				
5. Readiness to change	0.32**	0.14**	0.14**	0.10**	1.00			
6. Conservatism	-0.05**	0.19**	0.07**	0.22**	0.24**	1.00		
7. Social commitment	0.14**	0.08**	0.13**	0.02**	0.04**	-0.04**	1.00	
8. Individualism	0.15**	0.14**	0.05**	0.16**	0.16**	0.06**	-0.27**	1.00

**Correlation is significant at the 0.01 level (two-tailed).

TABLE 4

Pearson product-moment correlations between cognitive style and the value subscales

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Knowing style	1.00											
2. Planning style	0.35**	1.00										
3. Holistic style	0.37**	0.13**	1.00									
4. Readiness to change	0.14**	0.10**	0.32**	1.00								
5. Conformist	0.08**	0.24**	-0.04**	0.28**	1.00							
6. Religious	0.02	0.08**	-0.04**	0.08**	0.18**	1.00						
7. Leftist	0.06**	-0.10**	0.09**	-0.04**	-0.19**	-0.13**	1.00					
8. Social consciousness	0.14**	0.06**	0.12**	0.09**	0.04**	0.07**	0.35**	1.00				
9. Environm. consciousness	0.10**	0.11**	0.09**	0.03**	0.07**	0.05**	0.14**	0.49**	1.00			
10. Power	0.17**	0.16**	0.28**	0.20**	0.08**	0.01	-0.21**	-0.12**	-0.08**	1.00		
11. Materialism	-0.03**	0.14**	0.03**	0.09**	0.12**	-0.03**	-0.22**	-0.13**	-0.02*	0.47**	1.00	
12. Chameleon behavior	-0.09**	0.06**	-0.03**	0.05**	0.07**	-0.06**	-0.25**	-0.26**	-0.12**	0.42**	0.43**	1.00

*Correlation is significant at the 0.05 level (two-tailed); **Correlation is significant at the 0.01 level (two-tailed).

FIGURE 1

Differences between knowing and planning individuals (Pearson r correlations)