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ABSTRACT

Witkin's field-dependence cognitive style theory predicts that females are more likely to have a social or field-dependent cognitive style, whereas males will more often have an analytical or field-independent cognitive style. Data from 144 secondary marketing education students (62 males, 82 females) from three secondary schools in northern Georgia confirmed this gender difference. These different styles include personality and information processing characteristics that may have conative origins. To explore this hypothesis, gender was used to analyze 20 conative (volitional) variables from the Educational Style Preference Inventory (ESPI). The ESPI measured orientation toward theoretical symbols (words and numbers), cultural determinants, and modes of inference. Twelve statistically significant but not large differences were found, suggesting that gender differences relate to conative or volitional behavior. Males were more field independent (analytical) although females had higher mean scores for theoretical symbols (abstractions). Females also had conative preferences that suggest a social orientation and sensitivity to the learning environment. This matches expectations from field-dependence theory. In general, the findings suggest that females, more than males, rely on enculturated values to interpret situations, desire peer input to organize experience and shape decisions, and want a variety of instructional modalities to derive meaning from an experience. Implications for teaching strategies and highly valued job skills, such as problem solving and interpersonal skills, are evident and provide the basis for future research. (Contains 27 references.) (Author/KC)

A Study of Gender Differences in Cognitive Style and Conative Volition

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Abstract

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Witkin's field-dependence cognitive style theory predicts that females are more likely to have a social or field-dependent cognitive style while males will more often have an analytical or field-independent cognitive style. Data analyzed in this study confirmed this gender difference for secondary marketing education students from three secondary schools in northern Georgia. These different styles include personality and information processing characteristics that may have conative origins. To explore this hypothesis, gender was used to analyze twenty conative (i.e. volitional) variables from the Educational Style Preference Inventory (ESPI). The ESPI measured orientation toward theoretical symbols (words and numbers), cultural determinants, and modes of inference.

Twelve statistical differences were found suggesting that gender differences relate to conative or volitional behavior. Interestingly, males were more field-independent (analytical) though females had higher mean scores for theoretical symbols (abstractions). Females also had conative preferences that suggest a social orientation and sensitivity to the learning environment. This matches expectations from field-dependence theory.

In general, the findings suggest that females, more than males, rely on enculturated values to interpret situations, desire peer input to organize experience and shape decisions, and want a variety of instructional modalities to derive meaning from an experience. Implications for teaching strategies and highly valued job skills, such as problem solving and interpersonal skills, are evident and provide the basis for future research.

Introduction

Research shows that females often have different information processing and personality styles than males (Witkin & Goodenough, 1981). Yet, "it is difficult both to identify the specific differences in the ways male and female students learn and to develop teaching strategies to accommodate the different gender-based learning strategies that have been identified" (Smithson, 1990, p. 8). Because valued job skill like higher-order thinking may be affected, the vocational implications of gender issues are clearly evident.

At present, research is needed to "find ways to examine and incorporate conative and affective phenomena within expanded cognitive processing models" (Snow, 1989; Snow & Farr, 1987, p. 7). Doing this may increase knowledge about cognitive orientations and skills. For example, it may be possible to better understand why "most women value connections with others while most males value autonomy" (Smithson, 1990, p. 8).

With this in mind, this study sought to learn if gender differences in cognitive styles, like field-dependence, could be more fully understood by determining if they include different conative patterns. No previous research like this had been reported in vocational literature. Yet, establishing ties may not be a direct process, much as Thomas and England (1989) indicate for advanced cognitive skills. Research in this area is relatively new (Snow, 1989).

Background

The field-dependent cognitive style theory is well established (Wapner, 1986). Its two cognitive patterns, located at the upper 27% and lower 27% on a range of scores, are called field-independent and field-dependent. Personality traits correlate to each style, as do career and academic interests (Witkin, 1978; Witkin & Goodenough, 1979; Witkin, Moore, Oltman, Goodenough, Friedman, Owen, & Raskin, 1977).

The two styles have stable and predictable attributes (Bertini, Pizzamiglio, & Wapner, 1986). Thus, field-independence is an analytical style that relates to internal frames of reference while field-dependence is a social style that correlates to external frames of reference. The frame of reference may include "automatic" features that have most relevance when tasks are new, lack inherent structure, and call on the learner to create meaning (Witkin, Moore, Goodenough, & Cox, 1977).

The field-independent is revealed by an active discovery approach to learning, an individual orientation, analytical interests, and a task emphasis. The field-dependent style, on the other hand, may be evidenced by a chain-link reasoning process, a with-people orientation, social interests, and a social emphasis. Perhaps most critical, the field-independent uses an active reasoning pattern that includes cognitive structuring skill while the field-dependent "takes it as it is" and seems to be passive in the learning context. This difference is felt to be most critical

in new problem-solving situations where experience is lacking and structure is not evident.

Witkin (1978) attributed origins of field-dependence to early socialization and child raising practices. Piaget believed that advanced cognitive skills were not universal (Ginsburg and Opper, 1979) and Bruner (1990) reinforced the role of culture in developing cognitive abilities. Finally, Simpson and Marek (1984-85) reported that rural youths acquired certain cognitive abilities more slowly than urban youths. This suggests that cognitive skills, as indicators of social expectation, may be "automatic," thus revealing possible ties to conation.

Snow and Farr (1987) defined conation (conative) as ". . . A conscious tendency to act; a conscious striving . . . Impulse, desire, volition, purposive striving all emphasize the conative aspect" (p. 4). This includes "Moods and related emotional states" that "act as filters to produce selective attention and learning effects" (Snow & Farr, 1987, p. 6). In field-dependence, conation may trigger analytical or social interests, suggesting a situational aspect of learning.

Lazarus (1982) felt that studies of conation "lead inevitably to concern with personal meanings and to the factors that shape such meanings . . . to our own requirements" (p. 1020). Thus it may have implications for adaptive control, achievement motives, skilled performance, and persistence with problem solving and problem finding behavior (Snow, 1989). In combination with field-dependence, then, conation may "produce a richer and more integrated description of . . . personal knowledge growth" (Snow, 1989, p. 13).

Conation may define some of the content in the field-dependence frames of reference. The procedures and rules that guide processes that contribute to the creation of personal meaning may be involved. To test this idea, the learning style theory by Hill (1981) was adapted for use in this study. The original inventory had problems of validity and reliability (ACT, 1978; Clark & Sheriff, No Date). Fritz (1980; 1991) addressed them and developed the Educational Style Preference Inventory (ESPI), a modified version of Hill's instrument. Results from it, like those with conation and field-dependence, describe process traits and not competence with tasks.

The modified Hill inventory studies influences on meaning-making from theoretical symbols and qualitative codes, cultural determinants, and modes of inference. Hill (1981) believed that meaning-making was purposeful, involved social influence, and was filtered by channels of communication. He hypothesized that cultural codes mediate perceptions of symbols and their meaning. For some students, this meant narrow and/or few avenues of communication and understanding. In contrast, others were more diverse and adaptive routes to meaning-making. The diverse learning style maps that could be generated were intended to show that meaning-making was, as Lazarus (1982) suggested, a highly individual process.

Objectives

Based on implications for vocational development in the modern job context, this study sought to determine if gender differences in field-dependence led to distinctions in conative variables as defined by the ESPI. Specific research questions examined gender differences on the

1. Symbolic Orientation scales of the ESPI.
2. Sensory and Qualitative Cultural Code scales of the ESPI.
3. Cultural Determinant scales of the ESPI.
4. Mode of Inference scales of the ESPI

Research Methods

In addition to demographic information, data were collected with the Group Embedded Figures Test (GEFT) and the ESPI adapted by the investigator from the model developed by Hill (1981). The GEFT measures field-independence cognitive styles. It has satisfactory reliability (.89 on test-retest over a three year period) and validity (a correlation of .82 between the two major sub-sections) (Witkin, Oltman, Raskin, & Karp, 1971). The GEFT has three timed sections, one for practice and two others with 9 items each. Thus, a total of 18 simple figures are scored, each embedded in a complex design. Scores range from 0 to 18. Low scores (a field-dependent orientation) reflect difficulty in finding the simple figure. Higher scores (a field-independent orientation) reflect skill at locating simple figures.

Initial data analysis confirmed the gender difference in GEFT scores (see Table 1) predicted in field-dependence literature (Witkin, 1978; Witkin & Goodenough, 1981; Witkin, Moore, Goodenough, & Cox, 1977). This allowed for the subsequent analyses reported below.

Table 1

t Test: Gender X GEFT Score

	M	N	St. Dev.	*t*	d.f.	2-Tail Prob.
Females	5.8780	82	4.264	4.59	142	0.000*
Males	9.6129	62	5.493		*p>.001	

Twenty ESPI scales were grouped into (1) Symbolic Style -- four scales (visual linguistics, audio linguistics, visual quantitative, audio quantitative), (2) Sensory and Qualitative Cultural Codes -- nine scales (tactile, kinesthetic, transactional behavior, task commitment, temporal code, esthetics, synnoetics, histrionics, and kinesics), (3) Cultural Determinants -- three scales (Individual, peers, authority figures) and (4) Modes of Inference -- four scales (magnitude, difference, relationship and appraisal). Cronbach's alpha reliability averaged .7000 for the scales. Responses ranged from 1 ("Usually") to 5 ("Rarely"). There were four items for each scale.

Procedures

Data were collected from 144 secondary marketing education students in three northern Georgia high schools during the spring of 1991. There were 62 males and 82 females. They completed the GEFT first. It consisted of three timed sections, one for practice and two others for actual scoring. Next, they completed the ESPI. The GEFT was hand scored by the investigator. The total score from the two sections was recorded on the computer scan sheet used to record answers from the ESPI. Data were then tabulated and processed through The University of Georgia Educational Research Services Laboratory. Cronbach's alpha, t-tests, and descriptive statistics were used to analyze the data. It had been determined that there were no statistical differences in GEFT scores between the three schools or for years of enrollment in the programs.

Results

The results for question one are on Table 2. They show that, on four comparisons of symbolic orientation, there were three

Table 2
t-Test: Symbolic Orientation X Gender

	Male		Female			2-Tail
	M	St. Dev.	M	St. Dev.	t	Prob.
Read Words	2.479	0.811	2.116	0.898	1.22	0.013*
Hear Words	2.158	0.800	1.772	0.648	1.52	0.003*
Read Numbers	2.390	0.814	1.988	0.885	1.18	0.006*
Hear Numbers	2.600	0.777	2.525	0.856	1.21	0.587
					p>.025	

Table 3
t-Test: Sensory and Qualitative Codes X Gender

	Male		Female			2-Tail
	M	St. Dev.	M	St. Dev.	t	Prob.
Touch	2.557	0.949	2.765	1.000	1.11	0.211
Motor Skills	2.054	0.849	2.402	0.987	1.35	0.029
Concern for Positive Communication	2.237	0.928	1.567	0.569	2.66	0.000*
Task Commitment	1.967	0.702	1.611	0.670	1.10	0.003*
Punctuality	1.921	0.682	1.642	0.637	1.14	0.015*
Concern for Appearance of Work	2.742	0.906	2.374	0.926	1.04	0.018*
Know Limits	1.733	0.516	1.679	0.623	1.54	0.584
Role Expectations	3.122	1.912	2.496	0.883	1.88	0.001*
Non-Verbal Comm.	2.300	0.660	2.131	0.773	1.37	0.176
					*p>.025	

statistical differences. Female students, more so than males, "usually" relied on theoretical and abstract symbols, such as

visual and audio linguistics and audio quantitative, to develop personal meaning.

Table 3 shows results for the second question. Statistical differences were found on five of nine sensory and qualitative cultural codes. In sum, they suggest that female students, more than males, "usually" relied on cultural codes like concern for positive communication, task commitment, and punctuality to understand the meaning of a situation. To somewhat less degree, between "usually" and "sometimes," they relied more on aesthetics and histrionics than their male peers.

For question three, one statistical difference was found on cultural determinants (Table 4). It shows that females more "usually" relied on peers in decision making style than males.

Table 4
t-Test: Cultural Determinants X Gender

	Male		Female			2-Tail
	M	St. Dev.	M	St. Dev.	t	Prob.
On My Own	2.525	1.481	2.451	1.103	1.270	0.679
Peer Input	2.744	0.871	1.984	1.011	1.350	0.000*
Adult/Teacher Input	2.514	0.836	2.207	0.860	1.060	0.035
					*p>.025	

Finally, Table 5 shows gender differences in modes of inference on three of four scales - magnitude, difference, and relationships. Female students more "usually" developed meaning with these thinking styles than males.

In summary, gender differences were found on twelve of twenty conative constructs. In each situation, the female mean score indicated more reliance on the conative factor to derive meaning from an experience.

Table 5
t-Test: Modes of Inference X Gender

	Male		Female			2-Tail
	M	St. Dev.	M	St. Dev.	t	Prob.
Compare/Contrast	2.384	0.804	2.037	0.878	1.190	0.016*
Know Rules	2.142	0.837	1.759	0.678	1.520	0.005*
Related Examples	2.271	0.885	1.951	0.777	1.300	0.025*
Combination	2.617	0.799	2.340	0.817	1.050	0.046
					*p>.025	

Conclusions and Implications

It was initially determined that gender differences existed in field-dependence, though the range of possible scores (0 - 18) suggests that the GEFT mean for males was not extremely field-

independent (Table 1). For the entire sample, however, males were more field-independent than females. Yet, the actual distance between the two GEFT means did not approach maximization of extreme possibilities on the range.

Subsequent data analyzes, then, identified statistical differences on 12 of 20 conative variables based on gender. This suggested differences in meaning-making between males and females that involve theoretical symbols and qualitative cultural codes, cultural determinants, and modes of inference. These variations were hypothesized to relate to the different frames of reference associated with the two field-dependent cognitive styles. Witkin (1978) felt that distinctions like these could be culturally derived.

Thus, while GEFT data indicated that males had a higher analytical orientation, females had higher reliance on theoretical symbols, like reading and hearing words and reading numbers. As sources of meaning, they represent external information sources and could suggest more attention to the learning environment to create meaning. If this includes the "automatic" information processing features of field-dependence, females may accept knowledge "as it is" while males use mediational processes like structuring, which operates independent of known facts. This difference may be most critical in new problem-solving situations where experience is lacking and structure is not evident. Witkin and Goodenough (1981) suggest these characteristics may be most critical in an initial learning experience.

Beyond theoretical symbols, the influence of qualitative cultural codes to cognitive style has been suggested (Bruner, 1990; Ginsburg & Opper, 1979; Witkin, 1978). This study seemed to confirm aspects of this, specifically the greater sensitivity of the field-dependent cognitive style to external behavioral regulators. Concern for positive communication, meeting role expectations, the appearance of work, task commitment, and punctuality imply sensitivity to cultural codes. Hill (1981) hypothesized that cultural codes mediate perceptions of symbols and their meaning.

Female reliance on peers as a cultural determinant can be explained by Witkin's theory. Given the normal peer-orientation of the high school years, and that females tend to "value connections with others" (Smithson, 1990, p. 8), this preference, as reliance on an external frame of reference, would be expected in conditions where uncertainty is high and the need for structure leads to the need for external support (Witkin, Moore, Goodenough, & Cox, 1977). In these conditions, field-dependence theory hypothesizes that the "automatic" nature of cognitive style will reveal itself (Witkin & Goodenough, 1981).

Finally, modes of inference represent ways that information is organized and presented so that meaning is developed by use of mental processes. Females had a higher preference for wanting information in the form of rules, comparison/contrast, and multiple examples, possibly to meet cognitive needs. Field-dependence theory implies that multiple communication formats may provide

structure and a means through which knowledge is linked. Witkin suggested that field-dependence was a passive learning style while field-independence produced a more active and experimental reasoning pattern (Witkin, Moore, Goodenough, & Cox, 1977).

In sum, the data suggested differences in the frames of reference associated with field-dependence. This included symbolic orientation, cultural codes, modes of inference, and peers as a cultural determinant. The differences in emphasis on the conative factors seemed to involve sensory stimulation and regulatory knowledge. The field-dependent female group seems more attune to external information sources while the field-independent male group may be more inner directed. This suggestion does not imply, however, that reliance on the external environment means that those with a field-dependent style are unable to solve problems. It means that different processes are used to reason about events.

The focus of conation, cognitive style, and educational style are on processes of learning and knowing and are not direct reflections of competence with tasks. Thus, the field-independent learner may construct meaning independent of external structure, while, in new task settings, the field-dependent may rely on them to organize experience. Yet, because the GEFT mean for males was not highly field-independent, the data suggests that, for both males and females, particularly in new task settings, there may be a need for teacher-made cognitive structure.

The statistical differences on the twelve ESPI conative scales, like for field-dependence data, indicated that differences in classroom performance are may be less evident in everyday life than in the data. Differences in mean scores on the scales were not large, averaging less than half a point on the qualitative codes and about one-third for thinking style. Thus, in connection with Lazarus (1982) his concern for meaning making, the data suggests a need to study learning as an individual activity.

Importantly, there are many students, both male and female, in marketing and other vocational programs that have a field-dependent orientation. If cognitive styles stabilize during early adolescence (Witkin & Goodenough, 1981), frames of reference and conative patterns may also reflect a degree of stability. Their flexibility and adaptive potential must be considered in terms of the requirements in learning experiences.

In conclusion, this study seemed to advance the call by Snow to "incorporate conative and affective phenomena within expanded cognitive processing models" (Snow & Farr, 1987, p. 7). Yet, the status of research like this means that these findings should be viewed as tentative (Snow, 1989; Snow & Farr, 1987; Thomas & Englund, 1989).

Recommendations

Based on these findings, then, these recommendations are offered:

1. Examine the interaction of field-dependence and cognitive demands in ill-structured work situations.
2. Identify specific cognitive restructuring skills that field-dependent learners need for complex tasks in job settings.

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