Predicting Career Interests from Problem-Solving Style with High School Students

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Abstract

The goal of this study was to examine the relationship between problem-solving style as measured by *VIEW: An Assessment of Problem-solving Style* and career interests or preferences in high school students as measured by the *Kuder Career Search with Person Match*. Three-hundred forty-two eighth through eleventh grade junior and senior high school students from a suburban high school participated in this study. *VIEW* yields information about six individual problem-solving styles along three dimensions: Orientation to Change (Explorer vs. Developer), Manner of Processing (External vs. Internal), and Ways of Deciding (People-Oriented vs. Task-oriented). The Kuder Career Search with Person Match provides scores according to 16 career interest categories as well as Holland's RIASEC (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) model of categories of personality/career types. With respect to the Orientation to Change dimension, Explorers displayed a preference for the Kuder Arts/Communication (Artistic) Career Cluster. Externals displayed a preference for the Kuder Sales/Management (Enterprising) Career Cluster. With respect to the Ways of Deciding Dimension, those who had a People-Oriented decision-making style had a greater preference for the Kuder Arts/Communication (Artistic) Cluster and the Kuder Social/Personal Services (Social) Cluster while those who had a Task-Oriented decision-making style had a greater preference for the Kuder Outdoor/Mechanical (Realistic) Cluster and the Kuder Science/Technology (Investigative) Career.

Keywords: Career Interests; Problem Solving Style; VIEW; Kuder Search.

Introduction

Career development is a major field in counselling and guidance (Bailing & Stadt, 1973; Brown, Brooks, & Associates, 1990; Crites, 1978; Drummond & Ryan, 1995; Dudley & Tiedeman, 1977; Ginsberg, Ginsberg, Axelrad, & Herma, 1951; Kidd, 2006; Osipow, 1968; Parsons, 1909; Peterson, Krumboltz, & Garmon, 2005; Pietrofesa & Splete, 1975; Roe, 1956; Super, 1957). In this field, one of the key research directions in understanding how individuals develop interests in careers, choose careers, and succeed in careers has been to look at individuals' personality characteristics and interests (Ackerman & Heggestad, 1997; Betz, Borgan, & Harmon, 2006; Gasser, Larsen, & Bogan, 2004; Kieffer, Schinks, & Curtiss (2004); Nauta, 2007; Rogers, Creed, & Glendon, 2008; Small, 1953; Tokar, Fischer, & Subich, 1998). Individuals who are characterized by certain personality characteristics or interests appear to gravitate towards certain careers and do well, while other individuals with different characteristics or interests choose yet different careers.

Perhaps no one has pursued the personality/career relationship more than John Holland (Barrick, Mount, & Gupta, 2003; Gottfredson, Jones, & Holland, 1993; Holland, 1959, 1985, 1996, 1997; Patrick, Tuning, Grasha, Lucas, & Perry, 2005; Rayman & Atanasoff, 1999; Spokane, & Cruza-Guet, 2005). Holland's theory identifies and describes six personality/career types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC) (Holland, 1997; Weinrach & Strebalus, 1990). Individuals with a Realistic type prefer working with their hands and body, with tools, machines. They are more practical by nature and more physically and mechanically inclined.

They may prefer careers as carpenters, farmers, interior designers, physical therapists, police officers, film makers, automobile mechanics.

The Investigative type individuals have preferences for working with information and theory, being more intellectual and analytical. These types might be found more often in scientific and technical occupations, such as mathematician, psychologist, computer scientist, lawyer. The Artistic type is regarded as more creative, non-conforming, original. Poets, writers, musicians, painters, might be of this type. The Social types are the "helpers," so to speak. They would more likely be caretakers of some kind, social workers, counsellors, teachers, nutritionists, community organizers.

The Enterprising individuals are the "persuaders," found in careers involving selling in one form or another. They enjoy competition; they are status-seekers, leaders. Their careers might include publicist, politician, trainer, insurance broker, journalist, marketer. Finally, the Conventional type values attention to detail, order, and organization. The careers typical of this type include certified accountant, bookkeeper, financier, office manager, proofreader, computer programmer, clerk.

There are volumes of theory, research, and instrumentation beyond the scope of this study describing, explaining, and assessing personality characteristics. In addition, there also are multiple efforts to assess cognitive and information processing styles (Jonassen and Grabowski, 1993). However, in the area of creativity and problem solving, there have been only a few efforts to measure individual differences and relate them to occupational interests or preferences. Michael Kirton's Adaption-Innovation Inventory (KAI) (1994) has been one.

Adaptors prefer to work toward solutions that "fit" the constraints of the situation, using accepted rules and staying within provided or assumed structures. On the other hand, Innovators prefer to change or even ignore guidelines and given constraints, structures, or rules in favour of their own instincts and perceptions.

A new instrument that looks at creative problem-solving style is *VIEW: An Assessment of Problem-solving Style*. VIEW assesses one's style across three dimensions, Orientation to Change (OC), Manner of Processing (MP), and Ways of Deciding (WD. VIEW is based on a more recent approach to style definition and assessment which asks the question "How are you creative?" rather than "How creative are you?" (Isaksen, Dorval, & Treffinger, 2010; Treffinger, Isaksen, & Dorval, 2006; Treffinger, Selby, & Isaksen, 2007; Treffinger, Selby, Isaksen, & Crumel, 2007). This approach has been called the "level-style" distinction and appears to offer greater flexibility in understanding how an individual can or will best function in different problem contexts (Isaksen & Dorval, 1993).

Real-life problems are typically not clear in their definition. Effective methods to work on such problems may not be well known and also not obvious would be what constitutes the best solution. The overall environment or context surrounding the problem and problem solver can vary in many ways.

Thus, a focus on how a problem solver thinks, how he or she perceives, works on, and/or judges problems and their contexts offers a richer variety of hypotheses to test than considering only an individual's "amount" of knowledge or skill. Based on the personal characteristics that fit with each dimension of VIEW style, certain predictions can be made regarding people's career preferences.

For example, on the dimension of Orientation to Change, individuals may have preferences as Explorer or Developer. Explorers may prefer to work on problems where there are few guidelines, less structure, or influence by authorities. On the other hand, Developers are "enabled" by structure and authority. They may be more likely to persist and follow through on tasks, bend but not break rules, work within the "givens" of a problem. Explorers may be more likely to be flexible with activities, deadlines, and rules. Explorers may be more interested in "big-picture" ideas than details. Given these differences, one might hypothesize that Explorers might be more interested in or suited for careers where workers have greater

flexibility and autonomy, such as in Arts/Communication.

Individuals with styles of External or Internal Manner of Processing are likely to prefer more or less initial social interactivity or environmental "busy-ness," respectively. Externals may be energized by interactions with others, whereas Internals will need their own, quiet reflective time before engaging. With these preference differences, one might suggest that Externals would gravitate toward more Social/Personal service occupations.

On the third VIEW dimension, Ways of Deciding, individual styles are labelled People-Oriented or Task-Oriented. People-Oriented Deciders "set priorities based more on personal and caring judgments" whereas Task-Oriented Deciders prefer "well-reasoned conclusions and impersonal judgments." People-Oriented Deciders may try to avoid conflicts and maintain harmony in relationships but Task-Oriented Deciders may focus more on facts and logic even if decisions may have negative impacts on others. Based on these differences, one might hypothesize that People-Oriented Deciders would be found in more "people-oriented" careers, such as in Arts/Communication or in Social/Personal Services. Task-Oriented Deciders might be found in Science/Technical careers. The purpose of the present study was to investigate the relationship between VIEW problem-styles and career interests.

Methodology
Participants
A total of 342 junior/senior high school students from a small suburban school in Northern New Jersey participated in the study. Students from the eighth, ninth, tenth, and eleventh grades were included. The grade level breakdown included 27.8% 8th grade students, 23.7% 9th grade students, 25.4% 10th grade students and 23.1% 11th grade students. Students ranged in age from 12-18 years old with the average age being 14.79 years old. The percentage of females who participated in the study was 45.6% and the percentage of males who participated in the study was 54.4%. The sample was from a low-to middle-class socioeconomic background. The ethnic backgrounds included 13.7% Caucasian, 36.5% Asian, 36.5% Hispanic, 3.8% African American, and 9.5% other.

Instruments

VIEW: As Assessment of Problem-Solving Style
VIEW: An Assessment of Problem Solving Style is a 34-item, 7-point Likert scale self-report questionnaire that assesses three dimensions of problem-solving style (Selby, Treffinger, Isaksen, & Lauer, 2004). The first dimension is Orientation to Change. This scale describes the person's perceived preferences in two general styles for managing change and solving problems: the "Explorer" and the "Developer." The Orientation to Change dimension scores range from 18-126, with a hypothetical mean of 72.

The second scale is Manner of Processing, which describes the person's preference for working externally (i.e., with other people throughout the process) or internally (i.e., thinking and working alone before sharing ideas with others) when managing change and solving problems. These scores range from 8 to 56, with a hypothetical mean of 32. The third scale is Ways of Deciding, which describes the major emphasis the person gives to people (i.e., maintaining harmony and interpersonal relationships) or to tasks (i.e., emphasizing logical, rational, and appropriate choices) when making decisions during problem solving or when managing change. These scores also range from 8 to 56, with a hypothetical mean of 32.

Overall, more than 30,000 individuals ranging in age from 12 to 80 have taken *VIEW*. Reliabilities for each of the three scales are in the mid- to high .80s. Validity evidence is extensive, including exploratory and confirmatory factor analyses, correlations with other style and personality measures, and studies illustrating significant differences in choices, beliefs, and preferences by individuals of different *VIEW* styles (Selby, Treffinger, & Isaksen, 2007; Schraw, 2007).

The Kuder Career Search with Person Match

The *Kuder Career Search with Person Match* is an interest assessment that reports directly on the inventory-taker's similarity with groups of employed people in six-well known career clusters: Outdoor/Mechanical, Science/Technical, Arts/Communication, Social/Personal Services, Sales/Management, and Business Operations (Kuder & Zytowski, 1991). The assessment is applicable for individuals and in group settings, and is applicable for ages from middle school to adult.

The preference record portion is composed of 180 activities that students and adults probably have some familiarity with. Items are presented in the form of 60 forced-choice triads. Survey takers are required to mark all three items, selecting the most, next most, and least preferred, in effect, rank-ordering them. The Kuder Career Clusters form the central content of the summary report given to each taker. The use of career clusters rather than occupational titles is responsive to Holland's (1996) concept of how a set of activities can fit into a variety of occupations and is based on Holland's (1997) idea of the Big Six Factors (RIASEC). There are 16 Activity Preferences that are based on the sixteen USOE States' Career Clusters. These sixteen preferences can then be categorized or transformed into one of the six Kuder Career Clusters: Outdoor/Mechanical (Realistic), Science/Technical (Investigative), Arts/Communication (Artistic), Social/Personal Services (Social), Sales/Management (Enterprising), and Business Operations (Conventional). Reliability and validity information for the Kuder are extensive (Kuder, 1975, 1977; Kuder & Zytowski, 1991; Zytowski, 2001a, 2001b).

Procedure

The students participated during three of their English class sessions. Some of the students participated during the morning periods of the school day, while others participated during the afternoon periods of the school day. Any student that was absent during a testing day either made up the assessment during the following session or took it individually in the guidance department with the first author. Upon completion of both assessments achievement data (i.e., achievement test scores, standardized test scores, and grade point averages) and demographic data were collected.

Ethical Considerations

Since all of the participants in this study were going to be minors, permission for participation in the study was gained from the adolescents in addition to their parents. Also, permission was obtained from both the superintendent of the school district as well as the principal of the school prior to conducting the study. The study was also reviewed by Fordham University's Internal Review Board for human subjects research before data was collected.

Informed consent forms were used that clearly informed all participants of the nature and purpose of the study, and their right to withdraw from the study at any point without penalty. Additionally, confidentiality was ensured for all involved, including the staff, the parents, and the school district, as well as the adolescents.

Results

Descriptive Statistics

Descriptive statistics were computed for all variables, including means, standard deviations, ranges, standard errors, and intercorrelations among the Six Kuder Career Clusters and the dimensions of *VIEW: An Assessment of Problem-solving Style* (See Table 1). Students' average scores on each of the three dimensions of Orientation to Change, Manner of Processing, and Ways of Deciding were all consistent with the reported means in the VIEW's Technical Manual. Cronbach's Coefficient Alpha was computed and the results were the following: .77 for Orientation to Change (18 items), .72 for Manner of Processing (8 items), and .72 for Ways of Deciding (8 items).

Table 1: Descriptive statistics for all variables.

Variable	N	Range	Min	Max	M	SD	SE
Grade Point Average	247	3.83	.59	4.42	3.10	.77	.05
Age	342	6	12	18	14.79	1.31	.07
Orientation to Change	342	85	28	113	73.93	13.36	.72
Manner of Processing	342	47	8	55	30.82	8.09	.44
Ways of Deciding	342	43	10	53	31.93	7.51	.41
Outdoor/Mechanical	342	98	1	99	43.67	26.95	1.46
Science/Technical	342	98	1	99	53.56	28.77	1.56
Arts/Communication	342	98	1	99	52.39	28.80	1.56
Social/Personal Services	342	98	1	99	44.32	27.98	1.51
Sales Management	342	98	1	99	56.46	28.61	1.55
Business Operations	342	96	1	97	43.79	8.05	1.52

According to the Kuder Technical Manual Version 1.2, females tend to score higher on the art and human services categories while males tend to score higher on the mechanical categories. In addition, those who are younger in age tend to score higher on the art and science categories while those who are older score higher on the sales category. The trends found within the participants' scores seemed to be consistent with those reported in the technical manual. Students' average scores on each of the Six Kuder Career Clusters were also consistent with the reported means in the *Kuder Career Search with Person Match Technical Manual*.

Pearson correlations were computed between each of the three dimensions measured by *VIEW: An Assessment of Problem-solving Style* and the Six Kuder Career Clusters. Results of the correlations can be seen in Table 2. The correlation coefficients suggested the following:

1. With respect to Orientation to Change (OC), a significant relationship was found between the participants' score on Orientation to Change and the Kuder Sales/Management (Enterprising) Career Cluster;
2. Explorers displayed a greater preference for the Sales/Management career cluster than the Developers;
3. With respect to Manner of Processing (MP), a significant relationship was found between the participants' score on Manner of Processing and the Kuder Sales/Management (Enterprising) career cluster; and
4. Externals displayed a greater preference for the Sales/Management career cluster than the Internals.

Table 2: Correlations and Intercorrelations between VIEW and the Six Kuder Career Clusters.

Variable	1	2	3	4	5	6	7	8	9
Orientation to Change	-	.067	.079	-.002	.029	-.078	.084	-.172**	.069
Manner of Processing	-	-	.072	.021	.046	.029	.073	-.198**	026
Ways of Deciding	-	-	-	.183**	.243**	-.304**	-.245**	.120*	-.148**
Outdoor/Mechanical	-	-	-	-	.634**	-.599**	-.619**	-.048	-.395**
Science/Technical	-	-	-	-	-	-.585**	-.644**	-.193**	-.384**
Arts/Communication	-	-	-	-	-	-	.534**	-.157**	.108*
Social/Personal Services	-	-	-	-	-	-	-	-.492**	.192**
Sales/Management	-	-	-	-	-	-	-	-	-.081
Business Operations	-	-	-	-	-	-	-	-	-

* $p < .05$; ** $p < .01$; *** $p <.001$

With respect to Ways of Deciding (WD), significant relationships were found between the participants' score on Ways of Deciding and the Kuder Career Clusters. Task-oriented decision-making participants displayed a greater preference for the Kuder Outdoor/Mechanical (Realistic) Career Cluster, the Science/Technology (Investigative) Career Cluster, and the Sales/Management (Enterprising) Career Cluster. The Person-oriented decision-making participants displayed a greater

preference for the Kuder Arts/Communication (Artistic) Career Cluster, the Social/Personal Services (Social) Career Cluster, and the Kuder Business Operations (Conventional) Career Cluster.

Style Preferences and Vocational Interests

To examine style differences and career preferences, participants were grouped according to the hypothetical means in the distribution for each of the three dimensions. For the Orientation to Change variable, the participants' scores were coded as a 1.00 if they fell below the score of 72 and as a 2.00 if they were equal to or above the score of 72. Those who were scored as a 1.00 were placed into the Explorer group, and those who were scored as a 2.00 were placed into the Developer group. The descriptive statistics for the coded Orientation to Change and the Six Kuder Career Clusters can be found in Table 3.

Table 3: Descriptive statistics for orientation to change dimension coded and the six Kuder Career Clusters.

Variable	Orientation to Change	*N*	*M*	*SD*	*SE*
1. Outdoor/Mechanical	Explorer	138	41.79	28.05	2.34
	Developer	204	44.94	26.17	1.83
2. Science/Technical	Explorer	138	51.31	27.95	2.38
	Developer	204	55.07	29.29	2.05
3. Arts/Communication	Explorer	138	57.04	27.57	2.35
	Developer	204	49.24	29.26	2.05
4. Social/Personal Services	Explorer	138	43.78	26.56	2.26
	Developer	204	44.68	28.96	2.03
5. Sales/Management	Explorer	138	59.38	27.96	2.38
	Developer	204	54.49	28.93	2.03
6. Business Operations	Explorer	138	44.73	27.69	2.36
	Developer	204	43.15	28.34	1.98

For the Manner of Processing variable, the participants' scores were coded in a similar manner according to whether they fell in relation to the hypothetical mean of the distribution. The participants' scores were coded as a 1.00 if they fell below the score of 32 and as a 2.00 if they were equal to or above the score of 32. Those who were scored as a 1.00 were placed into the External group, and those who were scored as a 2.00 were placed into the Internal group. The descriptive statistics for this dimension can be found in Table 4.

Table 4: Descriptive statistics for manner of processing dimension coded and the six Kuder Career Clusters.

Variable	Manner of Processing	*N*	*M*	*SD*	*SE*
1. Outdoor/Mechanical	External	184	42.73	26.18	1.93
	Internal	158	44.76	27.85	2.22
2. Science/Technical	External	184	52.29	27.58	2.03
	Internal	158	55.03	30.12	2.34
3. Arts/Communication	External	184	52.26	27.93	2.06
	Internal	158	52.54	29.88	2.38
4. Social/Personal Services	External	184	43.53	27.86	2.05
	Internal	158	45.23	28.18	2.24
7. Sales/Management	External	184	60.33	27.53	2.03
	Internal	158	51.96	29.26	2.33
8. Business Operations	External	184	42.90	27.81	2.05
	Internal	158	44.83	28.39	2.26

Lastly, for the Ways of Deciding variable, the same process was completed in relation to where the participants' scores fell in relation to the hypothetical mean of the distribution. The participants' scores were coded as a 1.00 if they fell below the score of 32 and as a 2.00 if they were equal to or above the score of 32. Those who were scored as a 1.00 were placed into the Person-

oriented decision-making group, while those who were scored as a 2.00 were placed into the Task-oriented decision-making group. The descriptive statistics for this dimension can be found in Table 5.

Table 5: Descriptive statistics for ways of deciding dimension coded and the six Kuder Career Clusters.

Variable	Ways of Deciding	N	M	SD	SE
1. Outdoor/Mechanical	Person	166	39.94	26.53	2.06
	Task	176	47.19	26.93	2.03
2. Science/Technical	Person	166	49.11	29.28	2.27
	Task	176	57.75	27.72	2.09
3. Arts/Communication	Person	166	58.87	28.46	2.21
	Task	176	46.27	27.85	2.10
4. Social/Personal Services	Person	166	49.34	27.72	2.15
	Task	176	39.57	27.46	2.07
5. Sales/Management	Person	166	53.22	29.23	2.27
	Task	176	59.52	27.74	2.10
6. Business Operations	Person	166	46.83	27.38	2.13
	Task	176	40.93	28.45	2.14

Multivariate Analyses of Variance

Multivariate analyses of variance were computed with the Six Kuder Career Clusters as dependent variables and the three VIEW-coded groups, respectively, as the independent variables. To test Hypotheses 1 and 2, the Orientation to Change dimension was evaluated. The results indicated that a significant difference was found between the coded Orientation to Change dimension groups on the Six Kuder Career Clusters, $F(6, 335) = 2.35$; Wilk's lambda = 2.35, $p < .05$, partial eta squared = .04. To test hypotheses 3 and 4, the Manner of Processing dimension was evaluated.

The results indicated that no statistically-significant differences were found between the coded Manner of Processing dimension groups on the Six Kuder Career Clusters. Figure 3. The results indicated that a significant difference was found between the coded Ways of Deciding dimension groups on the Six Kuder Career Clusters, $F(6, 335) = 3.71$; Wilk's lambda = 3.71, $p < .001$, partial eta squared = .06.

Univariate Analyses

To further analyze the effects found within the multivariate analyses of variance, multiple univariate analyses were conducted. Table 6 shows differences between the Explorers and the Developers on the Six Kuder Career Clusters. Results of the univariate analyses indicated that a statistically significant difference was found with the Kuder Arts/Communication (Artistic) Career Cluster, $F(1, 342) = 6.12$, $p < .01$.

Table 7 shows differences between the Externals and the Internals on the Six Kuder Career Clusters. Results of the univariate analyses indicated that a statistically significant difference was found with the Kuder Sales/Management (Enterprising) Career Cluster, $F(1, 342) = 7.41$, $p < .01$.

Table 8 shows differences between the Person-oriented decision-makers and the Task-oriented decision-makers on the Six Kuder Career Clusters. Differences were found with the Kuder Outdoor/Mechanical (Realistic) Career Cluster, $F(1, 342) = 6.28$, $p < .01$, with the Kuder Science/Technology (Investigative) Career Cluster, $F(1, 342) = 7.86$, $p < .01$, with the Kuder Arts/Communication (Artistic) Career Cluster, $F(1, 342) = 17.10$, $p < .001$, with the Kuder Social/Personal Services (Social) Career Cluster, $F(1, 342) = 10.71$, $p < .001$, with the Kuder Sales/Management (Enterprising) Career Cluster, $F(1, 342) = 4.18$, $p < .05$, and with the Kuder Business Operations (Conventional) Career Cluster, $F(1, 342) = 3.81$, $p < .05$. These significant differences are consistent with the correlational analyses above.

Table 6: Univariate analyses for the orientation to change dimension coded with the six Kuder Career Clusters.

Variable	SS	df	MS	F	Partial	Eta	Squared
					Power		
Outdoor/Mechanical	817.46	1	817.46	1.13	.00		.19
Science/Technology	1164.95	1	1164.95	1.41	.00		.22
Arts/Communication	5003.00	1	5003.00	6.12*	.02		.69
Social/Personal Services	65.77	1	65.77	.08	.00		.06
Sales/Management	1971.45	1	1971.45	2.42	.01		.08
Business Operations	205.47	1	205.47	.261	.00		.08

*$p < .05$; ** $p < .01$; *** $p < .001$

Table 7: Univariate analyses for the manner of processing dimension coded with the six Kuder Career Clusters.

Variable	SS	df	MS	F	Partial Eta Squared	Power
Outdoor/Mechanical	348.85	1	348.85	.48	.00	.11
Science/Technology	639.87	1	639.87	.77	.00	.14
Arts/Communication	6.77	1	6.77	.01	.00	.05
Social/Personal Services	244.29	1	244.29	.31	.00	.09
Sales/Management	5954.53	1	5954.53	7.41**	.02	.78
Business Operations	317.42	1	317.42	.40	.00	.10

*$p < .05$; ** $p < .01$; *** $p < .00$

Table 8: Univariate analyses for the ways of deciding dimension coded with the six Kuder Career Clusters.

Variable	SS	df	MS	F	Partial Eta Squared	Power
Outdoor/Mechanical	4487.45	1	4487.45	6.28**	.02	.71
Science/Technology	6379.40	1	6379.40	7.86**	.02	.80
Arts/Communication	13551.0 1	1	13551.01	17.10***	.05	.99
Social/Personal Services	8153.43	1	8153.43	10.71***	.03	.90
Sales/Management	3390.42	1	3390.42	4.18*	.01	.53
Business Operations	2972.87	1	2972.87	3.81*	.01	.50

*$p < .05$; ** $p < .01$; *** $p < .00$

Supplemental Analyses

Supplemental analyses were computed to determine if factors such as gender, age, academic achievement, ethnicity, and grade level were to be considered. With respect to academic achievement (grade point average and standardized test scores) there was a correlation between academic achievement for the eleventh graders (High School Proficiency Assessment Math) and the Manner of Processing Dimension, $r = .382$, n = 79, $p < .01$, as well as with the Ways of Deciding Dimension, $r = .225$, n = 79, $p < .05$. It was found that the eleventh grade students with an Internal and a Task-oriented decision-making style scored higher on the High School Proficiency Mathematics standardized test. There was a correlation between academic achievement for the eighth, ninth, and tenth grade students (New Jersey Assessment of Skills and Knowledge Language Arts) and the Manner of Processing Dimension, $r = .177$, n = 232, $p < .01$. Those students with an Internal style scored higher on the New Jersey Assessment of Skills and Knowledge Language Arts standardized test.

With respect to students' grade-point average, the following relationships were found to be statistically significant: grade-point average with High School Proficiency Assessment Mathematics, $r = .629$, n = 78, $p < .01$; grade-point average with High School Proficiency Assessment Language Arts, $r = .384$, n = 78, $p < .01$; grade-point average with New Jersey Assessment of Skills and Knowledge Mathematics, $r = .523$, n = 144, $p < .01$; grade-point average with New Jersey Assessment of Skills and Knowledge Language Arts, $r = .414$, n = 144, $p < .01$; and grade-point average with the Orientation to Change dimension, $r = .194$, n = 247, $p < .01$. These relationships can be interpreted as those students with higher grade-point averages (academic achievement) scored

higher on the standardized tests in both the language arts and the mathematics sections. In addition, those students with a Developer preference had higher grade- point averages.

With respect to gender differences, there was a statistically significant relationship between gender and grade-point average, $r = -.218$, n = 247, $p < .01$; females had higher grade- point averages than the males. A statistically significant relationship was found between grade- point average and age, $r = -.143$, n = 247, $p <.05$ and between grade-point average and grade level, $r = -.126$, n = 247, $p < .05$; as the students increase in age and grade level, there grade- point averages decreased. Lastly, a statistically significant relationship was found between gender and the Ways of Deciding dimension, $r = .189$, n = 342, $p <.01$. Males displayed a greater preference for the Task-oriented decision-making style while females displayed a greater preference for the Person-oriented decision-making style. There was a statistically significant difference in the Ways of Deciding dimension for gender (M= 30.38, females; M= 33.23, males), $t (340) = -3.557$, $p <.001$.

With respect to ethnicity differences, no statistically-significant differences were found. The descriptive statistics for comparison of the ethnicity groups for the three dimensions of *VIEW* can be found in Table 9. With respect to age and grade level differences, no statistically-significant correlations were found between age or grade level and the Six Kuder Career Categories and the three *VIEW* dimensions. After conducting a one-way analysis of variance on all Kuder Career Categories, the only statistically-significant difference was found with the Science and Technology Kuder Career Category, $F (3, 338) = 2.625$, $p < .05$. However, *post hoc* means comparisons showed no significant differences among the groups. Statistical power was only 64% for this difference. With respect to *VIEW* and age or grade differences, no statistically-significant differences were found.

Table 9: Descriptive statistics for comparison of ethnicity groups for three dimensions of VIEW.

Variable	N	M	SD	SE
Orientation to Change				
Asian	125	75.06	13.05	1.17
African American	13	68.08	15.78	4.38
Caucasian	47	72.38	13.80	2.01
Hispanic	125	74.01	12.93	1.16
Other	32	73.88	14.53	2.57
Manner of Processing				
Asian	125	32.06	7.97	.71
African American	13	31.15	8.14	2.26
Caucasian	47	29.96	8.21	1.20
Hispanic	125	29.90	8.20	.73
Other	32	30.69	7.81	1.38
Ways of Deciding				
Asian	125	32.13	7.81	.70
African American	13	30.15	4.90	1.36
Caucasian	47	33.53	8.13	1.19
Hispanic	125	31.65	7.02	.63
Other	32	30.63	8.05	1.42

Discussion

As described above, there is a substantial body of research on the connection between personality type and career interest. Certain personality characteristics or "types" have been correlated with early interest in and later choice, success, and/or well-being in certain careers. Various measures of personality and cognitive characteristics and styles have demonstrated these relationships. The implications of the results of all of these studies have been used to help individuals gain an awareness of their potential interests in and suitability for specific careers in vocational development and school-guidance programs.

With respect to the connection between one's problem-solving style, as measured by *VIEW: An Assessment of Problem-solving Style,* and one's career interest, as measured by the *Kuder Career Search with Person Match*, a number of significant relationships appear.

In the present study, Explorers had a greater preference for the Arts/Communication (Artistic) Career Cluster when compared to the Developers. This was predicted above, given the characteristics described as typical of Explorers during problem solving. But no statistically-significant differences were found for the other five Kuder Career Clusters.

With respect to the Manner of Processing dimension, Externals had a greater preference for the Kuder Sales/Management (Enterprising) Career Cluster when compared to the Internals. The Social cluster did not reveal a difference. However, given that Externals "take energy" from interaction with others, it may not be surprising that Externals preferred the Enterprising (Sales/Management) cluster, where individuals of that Holland type enjoy competitive environments and are described as "persuaders," leaders, sellers.

With respect to the Ways of Deciding dimension, it was found that the Person-oriented decision-makers had a greater preference for the Kuder Arts/Communication (Artistic). Career Cluster and the Kuder Social/Personal (Social) Career Cluster when compared to the Task oriented decision-makers, and it was found that the Task-oriented decision-makers had a greater preference for the Kuder Science/Technology (Investigative) Career Cluster. These results are consistent with the original predictions.

The Task-Oriented Deciders also had higher scores on the Kuder Outdoor/Mechanical (Realistic) Career Cluster and the Kuder Sales/Management (Enterprising) Career Cluster when compared to the People-Oriented decision-makers. The People-Oriented decision-makers had a greater preference for the Kuder Business Operations (Conventional) Career Cluster when compared to the Task-oriented decision-makers. Task-Oriented Deciders preferred more "doer-oriented" and "persuader-oriented" careers while People-Oriented Deciders appears to prefer the more "organizer oriented" careers.

Cautionary Factors

However, these last two comparisons, while statistically significant, achieved power levels barely above 50%. All other significant comparisons across all three VIEW dimensions achieved power levels of .69 - .99. Another cautionary factor is the coding method used in the analyses. While dividing styles by the hypothetical means of each dimension adheres to VIEW theory, it does allow for individuals with only small or moderate preferences to be grouped with individuals with stronger and more extreme scores towards the ends of each scale. Clearly, individuals with scores very near the hypothetical means may be considered as having little or no preference for a vocational category. Or, alternatively, one may hypothesize that individuals with small or only moderate preferences might change their preferences with increasing age, knowledge, or experience.

The correlations reflect similar results. With Orientation to Change, a small but significant negative correlation with the Sales/Management cluster suggests that Explorers have preferences in this category. A similar, small and negative correlation between Manner of Processing and Sales/Management suggests that Externals have preferences there. The Ways of Deciding dimension was significantly related to all career clusters. While People-Oriented Deciders appeared to prefer the Arts, Social/Personal Services, and Business Operations clusters, the Task-Oriented Deciders preferred the Outdoor/Mechanical, Science/Technology, and Sales/Management clusters.

An additional comment is warranted with respect to the Ways of Deciding relationships to Kuder and Holland scores. With this one VIEW dimension, it is worth noting that all six career cluster scores showed significant differences. Perhaps the VIEW and the Holland theories support

each result. On the other hand, perhaps the "clean sweep," so to speak, is also a function of the VIEW dimension, itself. Ways of Deciding is a measure of "deciding," after all, and answering the Kuder requires individuals to prioritize among several choices on each and every item. Any way you think about it, the individual is making decisions. That effort, itself, may be a reason that style differences were reflected in all six clusters. This hypothesis is deserving of additional research.

Supplementary Findings and Further Research Needed

The supplemental findings concerning gender, age, ethnic background, and academic achievement do not appear to invalidate the relationships between problem-solving style and vocational interests, but they do warrant future attention as research on style and career interests continues. Each of these demographic and achievement factors has a long history in educational research and the more we learn about their influence the better able we will be to plan and deliver effective instructional experiences to all learners. Overall, VIEW data from its current database of over 30,000 continue to not show gender differences, but there is insufficient data on differences, if any, among racial or ethnic groups. While some data in school settings suggest achievement is positively correlated with Developer, Internal, and Task-Oriented styles, certainly more research is needed to fully examine the effects of style and context, including different types of problem tasks and different types of achievement.

Conclusion

Several of the original predictions of VIEW styles and Holland's six career types were supported by the present data. In the case of Ways of Deciding, additional differences were also observed that appear consistent with VIEW theory. In conclusion, it may be proposed that problem-solving style and career interests are related and that increasing knowledge of each can be helpful to those involved in career development.

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