An Examination of First-Year Students' Vocational Interest Patterns

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Career development and exploration is an essential task for all college students; after all, a large reason individuals pursue a college degree is to prepare to enter the world of work. The purpose of most first-year experience (FYE) courses is to help entering college students adjust to this new phase of their life and become successful pupils. Therefore, it is appropriate for FYE courses to incorporate a career development and exploration unit in the curriculum. Self-knowledge and occupational information related to career goals can assist first-year students to make the most out of their college experience.

The importance of attending to the career development of new college students is recognized by experts in the areas of student development and retention (Astin, 2001; Chickering & Reisser, 1993; Tinto, 1993). First-year college students are confronted with the task of navigating through some of the first steps of exploring careers, such as choosing a major, for example. Making a commitment to a field of study is a big step in a new student's life. Hildenbrand and Gore (2005) point out the significance of informing students early in their college careers that vocational development is an essential process that will continue over the course of their education and beyond. Additionally, according to Skipper (2002), FYE course instructors placed career development exercises in the top five most valuable activities addressed in their classrooms.

The concept of interests is essential to vocational psychology and is the foundation to understanding career development and related behavior. According to Savickas and Spokane (1999) vocational interests are unique in that few single constructs in all of psychology have governed specific subfields the way that interests have intrigued counseling psychologists studying in the realm of career development. The importance of vocational interests emerged in the early part of the twentieth century and interests were measured using many different techniques such as autobiographies and narratives, behavioral observations, and objective tests (Betsworth & Fouad, 1997; Crites, 1999; Savickas, 1999; Spokane & Decker, 1999; Walsh, 1999).

Hansen (1984) purports that early theorists (e.g. Strong, 1943; Super, 1949) defined the source of interests as follows: (a) environmental and/or social influences, (b) genetic predispositions, (c) personality traits, (d) representations of motivations, drives or needs, and (e) expressions of self-concept (p. 100). These pioneering ideas continue to shape how modern vocational psychologists conceptualize interests.

Vocational interests are directly linked to occupational choice; therefore, it is fitting that interest inventory assessment has a history of thorough study. Applied psychology bore the study of interests and creation of interest inventories in the early 1900s. Interest inventories can be used to help career counselors develop hypotheses and conceptualize clients, can afford an organizational framework for career exploration, can broaden or narrow client career options, and can assist clients in making connections between the big picture and their presenting concerns (Hansen, 2000).

A modest number of studies have addressed the exploration validity of interest inventories (Betsworth & Fouad, 1997). According to several authors, exploration validity is defined as the influence that vocational interest inventory assessments have over the actions individuals engage in to explore careers (Oliver & Spokane, 1988; Randahl, Hansen, & Haverkamp, 1993). It is added that exploration validity implies interest inventories are used before an actual career choice is made as tools to encourage career exploration (Blustein & Flum, 1999). Overall, the studies that have explicitly looked at exploration validity yield equivocal results. There is some support for interest inventories promoting career exploration (e.g. Toman & Savickas, 1997), yet there is also some evidence that suggests interest inventories do not evoke exploratory behavior (e.g. Hansen, Kozberg, & Goranson, 1994).

For over three decades computer assisted career guidance systems (CACGS) have aided the work of career counselors (Harris-Bowlsby, 1990). Computers provide excellent platforms for maintaining searchable career and educational databases, administering and scoring career assessment instruments, and linking assessment results to possible educational and occupational alternatives (Gore & Pickett, 2005). People are increasingly using computers to search for educational and career information, according to surveys (Boyce & Rainie, 2002; National Center for Educational Statistics, 2003). Lastly, meta-analytic evidence recording the effectiveness of CACGS is mounting (Oliver & Spokane, 1988; Spokane & Oliver, 1983; Whiston, Sexton, & Lasoff, 1998).

Historically, DISCOVER (ACT, 1988) has been one of the most widely used CACGS and overall research findings support its effectiveness in facilitating career development in college students (Garis & Niles, 1990). Interactive CACGS are equally as effective as other vehicles that provide inventory interpretation and allow for occupational

exploration (e.g., Hansen, 2000; Hansen, Neuman, Haverkamp, & Lubinski, 1997; Vansickle & Kapes, 1993). CACGS, such as DISCOVER, are most effective when paired with other career exploration activities. Research has demonstrated the utility of DISCOVER is greatly enhanced when incorporated into an FYE course career unit, as in the present study (Gore & Pickett, 2005).

The goal of this study was to examine career exploratory behavior in first-year college students. A career exploration unit of a first-year experience course, using the DISCOVER program, featured activities to assist students in learning about their interests, values and abilities as well as guiding their search for relevant occupational information. The present study assessed patterns in career exploratory behavior within the context of self-expressed interests.

Sample: Participants were first-year college students enrolled in a 3-credit hour FYE course that included a structured career development and exploration unit (4 class periods). The sample, 170 participants, consisted of traditional age students attending a large public Midwestern university. The sample was moderately diverse with 71% of students identifying as European-American, 23% as African-American, 3% as Latina/o-American (2.5% Mexican-American), 2% as multiracial and 1% as Native-American. First-generation college students made up 57% of the sample. Fifty-two percent of participants were female. Mean age of participants was 18 years old, with a standard deviation of 1.8 years.

Revised Unisex Edition of the ACT Interest Inventory (UNIACT; Swaney, 1995): The UNIACT Interest Inventory is a 90-item interest inventory that uses a three-choice response format: Like, Indifferent, Dislike. Six 15-item scales correspond to the six Holland (1997) RIASEC types. The UNIACT Interest Inventory results are translated to ACT's World of Work Map (WWM). The WWM has six career clusters: social service (Social), administration and sales (Enterprising) business operations (Conventional) technical (Realistic), science and technology (Investigative), and arts (Artistic). Additionally, 60 out of the total number of items are evenly matched to relate to the Data/Ideas and Things/People Summary Scales. Each of the six career clusters represent various combinations of work tasks (data, ideas, people, things).

Three sets of norm groups exist for the UNIACT, Grade 12 (N=4,679) norms are used for the instrument on DISCOVER in the present study. Internal consistency reliability estimates for the UNIACT scales range from .83 - .93 in nationally representative samples of students. A three-week test-retest reliability coefficient for the six interest scales was reported as a median value of .82. The Data/Ideas and People/Things Summary Scale three-week test-retest reliability coefficients are .87 and .82 respectively (Swaney, 1995). Criterion-related validity for the UNIACT is .73, using Holland's (1997) six types as the criterion. Construct validity is evident as UNIACT scales accounted for 63% of the variance using Holland's hexagonal model as an indicator that the UNIACT scales are measuring the intended constructs (ACT, 2001).

Procedure: The four class period career development and exploration unit consisted of the following topics: introduction to the process of career exploration and occupational information, focus on interests related to career exploration, focus on values related to career exploration, focus on abilities related to career exploration, as well as integrating all three components and setting future goals. During these class periods, students engaged in interactive classroom discussions and activities, completed career assessment instruments (e.g. UNIACT), and had the opportunity to use the Internet version of DISCOVER to search information related to the world-of-work.

Each student received her/his own unique DISCOVER user ID and created a password that permitted use of the DISCOVER program at any time during the course of this study. Data extracted from the DISCOVER server's database include the amount of time (recorded in seconds) students spent exploring using the program, the number of different occupations that were investigated by students, the number of favorites that students marked and the number of hits (frequency) that each student visited distinct informational components, or part types, of the program. The eight part types of DISCOVER are: work tasks, related occupations, training, qualities, salary and outlook, likes/dislikes, info bites (summarized information), and more information (resources for additional information). Each of these exploration variables can be connected to specific UNIACT career cluster types. For example, it is possible to know that a student spent 500 seconds exploring technical careers; or that a student visited salary information ten times throughout the course of the study; or that a student sought varied information on fifteen different occupations.

Descriptive Information: Sample means and standard deviations for the exploratory behavior variables are presented in Table 1. Mean scores are provided for five variables representing the following DISCOVER activities: part type count (number of times part types accessed), part type time (amount of time, in seconds, spent exploring part types), occupations count (number of different occupations examined), favorites count (number of favorites marked), out of class time (amount of time, in seconds, spent using DISCOVER outside of class). Frequencies for the six interest types across the sample can be found in Table 2. The least frequent types were technical (Realistic) and business operations (Conventional), each at 10% of the sample; science and technology (Investigative) was the most frequent type, assigned to 29% of students.

Hypothesis Testing: The first hypothesis stated that the UNIACT Interest Inventory would exhibit exploratory validity. To test this, a series of multiple analyses of variance (MANOVA) was conducted and pointed toward similar findings. Only one will be described in detail. A MANOVA conducted with highest interest type as the independent

variable and number of occupations accessed as the dependent variable was significant using Wilks' criterion, $F(30, 638) = 3.76$, $p < .001$. Univariate tests indicated significant differences among interest types on the number of occupations accessed categorized by three of the career clusters: administration and sales (E), $F(5, 164) = 8.16$, $p < .001$; technical (R), $F(5, 164) = 3.54$, $p < .01$; and science and technology (I), $F(5, 164) = 5.30$, $p < .001$. Post-hoc comparisons among the six interest types were conducted using Tukey corrections. The number of administration and sales (E) occupations accessed was significantly higher for administration and sales (E) students than for the remaining five groups of students (which were not significantly different from one another). The number of technical (R) occupations accessed was significantly higher for technical (R) students than for arts (A), social service (S) and science and technology (I) students; the latter three were not significantly different from one another. Lastly, the number of science and technology (I) occupations accessed was significantly higher for science and technology (I) students than for social service (S), administration and sales (E) and arts (A) students; the latter three did not differ significantly from one another. Table 3 displays descriptive statistics, F values and η^2 values for the above MANOVA.

The second hypothesis stated that individuals with different career cluster types would attend to different material while engaging in career exploration. A MANOVA conducted with highest interest type as the independent variable and number of unique part types accessed as the dependent variable was not significant. Univariate tests indicated significant differences among interest types on the number of times the part type providing information on occupational training was accessed, $F(5, 164) = 2.42$, $p < .05$. Post-hoc comparisons among the six interest types were conducted using Tukey corrections. The number of times training information was accessed did not differ significantly among groups based on students' interest types. The results slightly support the second hypothesis that individuals with distinct interest types will engage in different career exploratory behavior. Table 4 displays descriptive statistics, F values and η^2 values for the above MANOVA.

Discussion: The purpose of this study was to examine in vivo career exploratory behavior of first-year college students within the context of self-expressed interests. The research hypotheses are discussed below, along with the limitations of the current study as well as directions for future research in this area.

It was hypothesized that students would explore vocational information in DISCOVER (ACT, 1988) consistent with their UNIACT (Swaney, 1995) results. The predicted hypothesis was partially supported. Administration and sales (E), technical (R), and science and technology (I) highest interest types did explore consistently with their UNIACT results. Social service (S) business operations (C) and arts (A) students did not explore consistently with their UNIACT interest inventory results. It is possible that students in these three groups were more open to occupational and major options outside of their highest interest type.

First, it is interesting to note that students with traditionally masculine Holland types explored more consistently with their UNIACT results. According to Gottfredson's (1981, 1996) theory of career development, she identifies Enterprising (administration and sales), Realistic (technical) and Investigative (science and technology) types as traditionally masculine. It is possible that students in the sample placed more value on traditionally masculine interest types; therefore, valued their results more if traditionally masculine career fields were suggested. This is consistent with research that suggests males and traditionally masculine life roles are regarded and treated as more valuable compared to females and traditionally feminine life roles (Unger & Crawford, 1996). Additionally, research testing Gottfredson's theory suggests that males are more rigid in upholding gender stereotypes (e.g. Hughes, Martinek & Fitzgerald, 1985; Leung & Harmon, 1990) and females are more flexible with respect to gender roles (Henderson, Hesketh & Tuffin, 1988). A study by Pickett and Swanson (2005) also supports the notion that females are more flexible with respect to gender roles; therefore, it is possible that both male and some female students valued their UNIACT results more if traditionally masculine interest types were suggested. If participants valued their results more they may have been more likely to explore consistently with them.

In connection, Gottfredson's theory also identifies Enterprising (administration and sales) and Investigative (science and technology) types as the most prestigious according to the social value and earning potential of careers in those categories. As mentioned above, if students valued those results more and felt they were more acceptable it may have led them to explore more consistently. It is also important to note that 57% of students in the sample identified as first-generation college students. It is possible that first-generation students see college differently than students who have a family history of college degrees. They may see a college degree as an opportunity to move out of their family's socioeconomic status (SES) and consequently select occupations high in prestige. Therefore, students with highest interest types in the two top prestigious career clusters may have valued their results more and in turn explored more consistently.

Another potential explanation for the differences in the consistency of exploratory behavior among the six types may be rooted in the UNIACT as an interest measure. It is possible that the UNIACT measures administration and sales (E), technical (R) and science and technology (I) more accurately than it measures social service (S), business operations (C) and arts (A) types for this particular sample. Additionally, the UNIACT (Swaney, 1995) incorporates self-estimates of ability. Brown, Lent and Gore (1994) state that both self-efficacy and self-estimates of ability are correlated concepts in

relation to Holland (1997) types, yet are distinct concepts. They go on to point out that self-efficacy beliefs were more closely correlated to vocational interests compared to self-estimates of ability. Betz (1999) purports that self-efficacy and self-estimates of ability are connected to exploration of interests. Perhaps this impacted the consistency with which students in this sample explored their UNIACT results as self-estimates of ability may not be as closely correlated to vocational interests and in turn influenced exploratory behavior patterns.

Secondly, it was hypothesized that individuals with different career cluster types would engage in distinct vocational exploratory behavior with respect to the kind of information they sought out about occupations and majors (i.e. the eight part types of DISCOVER: work tasks, related occupations, training, qualities, salary and outlook, likes/dislikes, info bites (summarized information), and more information (resources for additional information). The current study slightly supported this supposition as students differed significantly on the number of times training information was accessed. Social service (S), technical (R) and arts (A) students seemed to be less likely to attend to job training information compared to their administration and sales (E), business operations (C) and science and technology (I) counterparts. Additionally, administration and sales (E) students appeared to spend more time looking at salary and outlook information compared to all other high interest types; however, these results were not statistically significant.

In general this can be interpreted as a positive finding, as results suggest that students are attending to similar occupational information regardless of their specific interest type. It echoes the findings of Brown and Ryan Krane (2000) that maintain group career interventions are equally as effective as individual career interventions. The current study's results imply that career interventions do not need to be tailored to clients based on their interest type; therefore, in interventions with large groups of students technical (R) types are participating comparably and attending to similar kinds of information as social service (S) types, for example. This is important as it is essential for all types to gain comprehensive information about occupations in order to make an informed decision (Gati, Krausz & Osipow, 1996).

However, some information may be more (or less) interesting to students with certain interest types. For example, being salary-minded may be an advantage to administration and sales (E) students, as it fits with what is needed to succeed in business. A focus on budgets and profits may be what attracted students to that interest type. Additionally, perhaps social service (S), technical (R) and arts (A) types spent less time examining job training information because it was not a detailed part of some of those occupations. For example, perhaps job training information was not as complex or extensive for social service (S), technical (R) and arts (A) occupations. Or possibly students felt skills needed for those jobs were not easily taught, for instance: caring for and wanting to help others, having mechanical abilities or artistic aptitude.

Study Limitations: The inability to administer the UNIACT before students could explore on DISCOVER was a limitation. Students met with their career unit facilitator and received their user ID at the beginning of the first class period; at the end of the first class period they were assigned to complete the UNIACT. This may have contributed to some of the inconsistency in exploratory behavior and UNIACT scores, it is possible that students explored significantly before taking the interest inventory. A related limitation was the inability due to enormity of the task to check and see if each student took the UNIACT more than once. This also may have influenced exploratory patterns.

Directions for Future Research: Future work in this area would benefit from learning more about college students' career development by conducting more research examining in vivo career exploration. As discovered from the current study, examining actual exploratory behavior may lead to unexpected, yet very valuable, results. Studying in vivo exploratory behavior gives researchers an accurate picture of the information students are actually investigating. This will enable researchers, clinicians and instructors to more effectively serve individuals in making informed, satisfying vocational choices.

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Table 1
Descriptive Information – Exploratory Behavior Variables

	N	***M***	***SD***	**Range**
Part Type Count	179	46.22	49.07	1 – 336
Part Type Time (in seconds)	179	1731.04	1241.58	168 – 7268
Occupations Count	179	14.03	14.47	1 – 105
Favorites Count	75	2.96	1.76	1 – 8
Out of Class Time (in seconds)	130	2402.88	2828.69	65 – 19830

Table 2
Interest Type Frequencies

	N	**Percent**
Social Service (S)	22	12.9%
Administration & Sales (E)	26	15.3%
Business Operations (C)	17	10.0%
Technical (R)	17	10.0%
Science & Technology (I)	50	29.4%
Arts (A)	38	22.4%
Total	170	100.0%

Table 3
Summary of Multivariate Analysis of Variance for Occupations Count by Interest Type

	M	*SD*	*F*	η^2
Social Service (S) Occupations Count			0.96	.03
Social Service (S)	3.23	2.71		
Administration & Sales (E)	2.88	3.49		
Business Operations (C)	3.29	2.64		
Technical (R)	2.12	2.96		
Science & Technology (I)	2.12	3.13		
Arts (A)	2.08	2.66		
Total	2.49	2.97		
Administration & Sales (E) Occupations Count			8.16***	.20
Social Service (S)	1.36	1.84		
Administration & Sales (E)	5.92	7.32		
Business Operations (C)	2.35	3.76		
Technical (R)	2.35	2.15		
Science & Technology (I)	0.90	1.67		
Arts (A)	1.37	1.70		
Total	2.12	3.80		
Business Operations (C) Occupations Count			2.01	.06
Social Service (S)	0.18	0.39		
Administration & Sales (E)	1.12	2.04		
Business Operations (C)	1.18	2.21		
Technical (R)	1.18	2.70		
Science & Technology (I)	0.34	0.77		
Arts (A)	0.47	1.56		
Total	0.64	1.63		
Technical (R) Occupations Count			3.54**	.10
Social Service (S)	0.68	1.13		
Administration & Sales (E)	1.81	6.09		
Business Operations (C)	1.82	2.43		
Technical (R)	4.06	4.70		
Science & Technology (I)	1.14	1.21		
Arts (A)	0.66	0.99		
Total	1.43	3.15		
Science & Technology (I) Occupations Count			5.30***	.14
Social Service (S)	1.18	1.22		
Administration & Sales (E)	1.62	3.73		
Business Operations (C)	2.47	2.87		
Technical (R)	1.88	2.12		
Science & Technology (I)	4.54	4.22		
Arts (A)	1.68	3.24		
Total	2.55	3.56		
Arts (A) Occupations Count			0.99	.03
Social Service (S)	3.91	6.07		
Administration & Sales (E)	4.31	7.55		
Business Operations (C)	3.29	3.33		
Technical (R)	2.59	2.45		
Science & Technology (I)	5.54	5.65		
Arts (A)	4.92	5.53		
Total	4.48	5.61		

Note: $N = 170$.
Overall using Wilks' Criterion, $F(30, 638) = 3.76$, $p < .001$, $\eta^2 = .12$.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 4
Summary of Multivariate Analysis of Variance for Exploration by Part Type Count

	M	*SD*	*F*	η^2
Part Type Count – Work Tasks			1.08	.03
Social Service (S)	14.05	11.15		
Administration & Sales (E)	22.50	29.27		
Business Operations (C)	19.65	15.46		
Technical (R)	17.94	9.95		
Science & Technology (I)	19.54	14.10		
Arts (A)	14.58	12.70		
Total	18.02	16.61		
Part Type Count – Related Occupations			1.23	.04
Social Service (S)	4.09	4.49		
Administration & Sales (E)	5.81	5.64		
Business Operations (C)	7.00	8.71		
Technical (R)	4.24	4.42		
Science & Technology (I)	6.22	7.38		
Arts (A)	3.76	5.06		
Total	5.21	6.25		
Part Type Count - Training			2.42*	.07
Social Service (S)	3.23	4.09		
Administration & Sales (E)	6.73	7.47		
Business Operations (C)	7.53	8.22		
Technical (R)	3.71	4.27		
Science & Technology (I)	6.46	7.78		
Arts (A)	3.29	4.07		
Total	5.21	6.52		
Part Type Count - Qualities			1.80	.05
Social Service (S)	2.64	3.14		
Administration & Sales (E)	4.96	5.85		
Business Operations (C)	5.12	7.76		
Technical (R)	2.76	3.68		
Science & Technology (I)	4.92	6.59		
Arts (A)	2.26	3.53		
Total	3.84	5.49		
Part Type Count – Salary & Outlook			1.66	.05
Social Service (S)	5.59	10.06		
Administration & Sales (E)	15.50	26.00		
Business Operations (C)	10.06	12.69		
Technical (R)	9.06	9.94		
Science & Technology (I)	10.26	11.57		
Arts (A)	5.89	12.52		
Total	9.34	14.86		
Part Type Time – Likes/Dislikes			1.26	.04
Social Service (S)	2.23	3.62		
Administration & Sales (E)	3.15	8.56		
Business Operations (C)	1.82	3.03		
Technical (R)	1.71	1.57		
Science & Technology (I)	3.84	5.80		
Arts (A)	1.47	2.51		
Total	2.58	5.07		

Table 4 continued

Summary of Multivariate Analysis of Variance for Exploration by Part Type Count

	M	***SD***	***F***	η^2
Part Type Time – Info Bites			1.22	.04
Social Service (S)	1.32	2.64		
Administration & Sales (E)	1.12	1.66		
Business Operations (C)	0.59	0.71		
Technical (R)	0.88	1.50		
Science & Technology (I)	1.36	2.17		
Arts (A)	0.55	1.06		
Total	1.01	1.81		
Part Type Time – More Information			0.89	.03
Social Service (S)	0.91	1.27		
Administration & Sales (E)	0.85	1.38		
Business Operations (C)	0.47	0.72		
Technical (R)	0.47	0.72		
Science & Technology (I)	0.76	1.24		
Arts (A)	0.45	1.01		
Total	0.66	1.13		

Note: $N = 170$.

Overall using Wilks' Criterion, $F(40, 687) = 0.95$, $p > .05$, $\eta^2 = .05$.

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.