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# Journal of Career Assessment

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Volume 10 Number 1 February 2002

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**The Journal of Career Assessment** publishes methodologically sound, empirically based studies focused on the process and techniques by which counselors and others gain understanding of the individual faced with the necessity of making informed career decisions. The term *career assessment*, as used in this journal, covers various techniques, tests, inventories, rating scales, interview schedules, surveys, and direct observational methods used in scientifically based practice and research to provide an improved understanding of career decision making. The focus is not just testing, but all those means developed and used to assess and evaluate individuals and environments in the field of career counseling.

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This journal is abstracted or indexed in **Abstract Journal of the Educational Resources Center, Current Contents: Social & Behavioral Sciences, Current Index to Journals in Education (CIJE), Psychological Abstracts, PsychINFO, PsychLIT, and Social Sciences Citation Index.**

**The Journal of Career Assessment** (ISSN 1069-0727) is published quarterly—February, May, August, and November—by Sage Publications, 2455 Teller Road, Thousand Oaks, CA 91320. Telephone: (800) 818-SAGE (7243) and (805) 499-9774; fax/order line: (805) 375-1700; e-mail: [order@sagepub.com](mailto:order@sagepub.com); <http://www.sagepub.com>. Copyright © 2002 by Sage Publications. All rights reserved. No portion of the contents may be reproduced in any form without written permission of the publisher.

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# The Utility of Career and Personality Assessment in Predicting Academic Progress

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We examined the ability of four career and personality assessment inventories to predict students' first-year college performance and persistence. Among our sample of 677 college freshmen who enrolled in a freshman orientation course, subscales from the Myers-Briggs Type Indicator, Strong Interest Inventory, and Social Skills Inventory uniquely predicted first-year college GPA, and subscales from these three instruments and the Career Factors Inventory uniquely contributed to the prediction of freshman-to-sophomore persistence, each after controlling for ACT/SAT scores. Our findings suggest that college counseling and career center staff may provide valuable retention-promotion efforts by helping to identify students at risk for poor academic performance or attrition on the basis of commonly used career and personality assessment inventories.

**Keywords:** Academic performance, college persistence, Myers-Briggs Type Indicator, Strong Interest Inventory, Social Skills Inventory, Career Factors Inventory

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**AUTHORS' NOTE:** Portions of this research were presented at the 106th Annual Convention of the American Psychological Association, August 1998, San Francisco, CA, and at the National Counseling Psychology Conference, March 2001, Houston, TX.

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 3-23  
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Although the first year of college is often viewed as an exciting time of new beginnings, the number and nature of transitions associated with navigating the first-year college experience also make it a period of heightened stress for students (Brooks & DuBois, 1995; Wintre & Sugar, 2000). Students are often adjusting to new living arrangements, forming new relationships, experimenting with new levels of autonomy, and being challenged academically and intellectually. Critical tasks associated with the first year of college include meeting academic performance demands and beginning to narrow possible fields of study if this has not already been done (Bean, 1985; Super, 1990; Tinto, 1975; Wortman & Napoli, 1996). Most students adjust to these demands quite successfully, but a sizeable minority struggles with these tasks. Approximately 25% of students at 4-year colleges and universities do not persist beyond their freshman year (U.S. Department of Education, 2000), and this figure increases to approximately 42% for community college students (Peterson, 1993). These high attrition rates have been identified as one of the most significant challenges facing institutions of higher education (Brawer, 1996; McGrath & Braunstein, 1997).

When the decision to leave college is voluntary and based on an assessment that a college degree is unnecessary to achieve one's career goals, it may be a positive vocational step for students. However, leaving college prior to the sophomore year is frequently attributed directly and indirectly to poor academic performance (Napoli & Wortman, 1998; Sandler, 2000), social isolation (Bean, 1980; Napoli & Wortman, 1998; Sandler, 2000; Tinto, 1975, 1993), and financial difficulties (Sandler, 2000). Thus, in many cases the decision to leave college is not entirely voluntary and may be associated with feelings of failure and disappointment. When students perform poorly in school or leave college before the sophomore year, vocational progress can be severely disrupted. In addition, there are economic disadvantages of leaving college prior to obtaining a degree (U.S. Department of the Census, 1996).

Because of the problems associated with first-year college attrition, college counseling and career center staff have been called on to help ease students' transition to their new environment. For example, psychologists working in university counseling centers may help with the early identification of students who are at risk for attrition (Wilson, Mason, & Ewing, 1997), thus providing a target group for freshman-level career and academic interventions. Although a body of literature based on models of student retention in higher education (e.g., Bean, 1980; Cabrera, Nora, & Castañeda, 1993; Tinto, 1993) might be consulted to guide the efforts of psychologists hoping to identify students who are drop-out prone, these models have limited utility for the *early* assessment of students at risk for poor performance and attrition because they emphasize person-environment fit indices that are difficult to assess until students have been on campus for some time. Thus, we suggest that the early identification of students who are attrition-prone or at risk for poor academic performance would be facilitated by the use of assessment instruments that focus on relatively stable aspects of the student.

Because of the potential for psychologists in higher education to assist with the early identification of students who may have difficulty succeeding during the first year of college, we wanted to identify instruments that counseling and career center staff could administer prior to college (e.g., during a summer orientation) or shortly after students' arrival on campus that would predict their persistence and performance. There is ample evidence that pre-college ability estimates (e.g., ACT and SAT scores, high school GPAs) are related to college performance and persistence (Bean, 1980, 1985; Blinne & Johnston, 1998; Kahn & Nauta, in press; Wolfe & Johnson, 1995). Thus, any useful predictors of first-year college performance and persistence must inform incrementally above and beyond academic ability indices. Our literature review suggested that four specific career/personality instruments might help identify students who are drop-out prone.

### **Career/Personality Instruments Hypothesized to Predict Academic Progress**

The Myers-Briggs Type Indicator (MBTI; Myers, McCaulley, Quenk, & Hammer, 1998), which is widely used in college counseling centers (Isaacson & Brown, 2000), provides personality indices that may be relevant to the prediction of performance and persistence. Myers et al. (1998) reported that a preference for Intuition, which involves perceiving patterns and relationships in information, is associated with higher scores on many standardized tests of academic aptitude and achievement than is a preference for focusing on details that can be perceived through the five senses (termed Sensing). Likewise, students whose enduring preferences are to be organized and responsive to deadlines (characteristic of Judging preferences) generally obtain higher grades than students who prefer flexibility and spontaneity (characteristic of Perceiving preferences). Kalsbeek (1987) reported that three of the four MBTI preferences were predictive of first-term college grade point averages (GPAs), even after controlling for SAT scores. The MBTI has also been shown to be a useful predictor of college graduation rates in one university (Schurr, Ruble, Palomba, Pickerill, & Moore, 1997), although this relationship was not as conclusive at a different university (Kalsbeek, 1987). Because of the apparent value of MBTI preferences in predicting academic progress, we explored the MBTI as a predictor of first-year college GPA and freshman-to-sophomore persistence.

A second instrument that may be relevant to freshman academic progress is the Strong Interest Inventory (SII; Harmon, Hansen, Borgen, & Hammer, 1994). In addition to the numerous measures of occupational interests provided by the SII, the SII contains Personal Style Scales that reflect preferences related to work and education (Harmon et al., 1994). These scales, which can be construed as measures of personality (Lindley & Borgen, 2000), may have particular relevance for college performance and persist-

ence. For example, the Learning Environment scale reflects comfort with an academic (vs. a practical or hands-on) environment, and theories of retention (e.g., Bean, 1980; Cabrera et al., 1993; Tinto, 1993) suggest that such a tendency would be predictive of academic integration, which in turn, should promote performance and persistence in college. We were unable to find any empirical investigations of the Personal Style Scales' relationships to college performance and persistence. Thus, examining these relationships was a purpose of this study.

Students' social skills may also be useful to assess early in college, as social skills are important in integrating oneself into a support network (Riggio & Zimmerman, 1991). The Social Skills Inventory (SSI; Riggio, 1989), a self-report measure of one's skills in verbal and nonverbal communication, may be another useful instrument for psychologists to administer early in the freshman year to help predict the extent to which one will adapt to the social demands of college life. Retention theories (Bean, 1980; Cabrera et al., 1993; Tinto, 1975, 1993) suggest that integration into the social community of a college is an important predictor of college performance and persistence, and much research has documented the positive impact of social support on adjustment to college (Abbey, Abramis, & Caplan, 1985; Brooks & DuBois, 1995; Cohen & Hoberman, 1983; Felsten & Wilcox, 1992), both for black and white students (Mallinckrodt, 1988; Taylor & Howard-Hamilton, 1995). In a meta-analysis of six studies investigating retention, Wortman and Napoli (1996) found that social integration significantly predicted college persistence. More importantly, Milem and Berger (1997) found that the extent to which students became involved socially with peers and faculty during their first 6 to 7 weeks of a semester was significantly related to their likelihood of persisting at their academic institution. Thus, the early identification of students who are at risk for having difficulty developing social relationships in college seems highly relevant, and we examined the SSI in this context.

Finally, a rather large body of literature supports a relationship between career goal identification and persistence (Peterson, 1993; Sprandel, 1986). College students with unclear or uncertain academic and career goals have been identified in several studies as a dropout-prone population (Beal & Noel, 1980; Daubman & Johnson, 1982; Titley & Titley, 1980). It is estimated that 20% to 50% of students entering college are undecided about academic and/or career goals (Lewallen, 1993), suggesting that the early identification of and intervention with this population may be especially promising. Several instruments, such as the Career Factors Inventory (CFI; Chartrand & Robbins, 1997), are available to help with the identification of students who may be undecided about a major or career. Specifically, the CFI measures antecedents of academic and career indecision, thus making it a potentially useful instrument to administer very early in one's college experience. However, Lewallen (1993) found that being undecided did not predict persistence after controlling for other variables known to be related to persistence, such as academic ability and performance. Thus, the utility of a

measure of career indecision in the prediction of academic performance and persistence needs to be clarified, and we examined whether the CFI could be useful in this respect.

### **Purpose of the Present Study**

In summary, the purpose of this study was to explore the utility of four easily administered career and personality instruments in predicting important outcomes associated with the first year of college—GPA and persistence into the sophomore year—after controlling for the already soundly established construct of academic ability. Specifically, we examined whether the MBTI, the Personal Style Scales of the SII, the SSI, and the CFI are useful predictors of these important academic outcomes. We hypothesized that subscales from these four instruments would contribute to the prediction of performance and persistence above and beyond the effects of academic ability.

## **METHOD**

### **Participants**

Six hundred seventy-seven entering freshmen (355 women, 322 men) at a large southeastern university who attended a freshman career-planning orientation course participated in this study. Among the students for whom we had ethnicity data, 86% were Caucasian, 11% were African American, 2% were of Asian descent, and the rest identified with another ethnic group. The average age of the sample was 18.16 years ( $SD = 1.03$  years).

Among the students who took the ACT ( $n = 637$ ), the mean score was 21.01 ( $SD = 3.57$ ). The 40 students who took the SAT received comparable scores ( $M = 1043.00$ ,  $SD = 146.41$ ). The mean first-year GPA among these students was 2.49, with a range from 0.00 to 4.00. Seventy-seven percent of the freshmen persisted into the sophomore year.

### **Measures**

#### ***MBTI***

The MBTI Form M (Myers et al., 1998) is a 93-item self-report instrument that measures psychological type based on preferences described in Jungian theory. From responses to 47 word pairs and 46 phrases, the respondent's preferences can be described along four dichotomies: Extraversion-Introversion (E-I), Sensing-Intuition (S-N), Thinking-Feeling (T-F), and

Judging-Perceiving (J-P). The E-I dichotomy (21 items) describes whether the respondent prefers to direct energy toward the outer world of people and objects (E) or toward the inner world of experiences and ideas (I). The S-N dichotomy (26 items) describes preferred processes of perceiving information, either through the five senses (S) or by perceiving patterns and interrelationships among information (N). The T-F dichotomy (24 items) describes the preferred process of drawing conclusions from perceived information, either by using objective and logical analysis (T) or by using personal and social values (F). Finally, the J-P dichotomy (22 items) describes preferred attitudes toward dealing with the outside world, either preferring decisiveness and closure (J) or preferring flexibility and spontaneity (P). Although continuous scores may be obtained for the MBTI-M, interpretation of these scores as the degree to which a trait is present is incorrect, and the dichotomy is recommended for the hand-scored form of the MBTI we used (Myers et al., 1998). These dichotomies were represented by four dummy-coded variables: E (coded 1) versus I (coded 0), S (coded 1) versus N (coded 0), T (coded 1) versus F (coded 0), and J (coded 1) versus P (coded 0). Test-retest reliability among college students, expressed as the percentages of agreement for the four dichotomies over a 4-week period, ranged from 84% (T-F) to 88% (J-P) (Myers et al., 1998). A wealth of validity data exists for the MBTI-M, including confirmatory factor analyses supporting the four-factor structure and expected relationships between MBTI-M scores and other self-report personality inventories (Myers et al., 1998).

## *SII*

The Personal Style Scales of the SII (Harmon et al., 1994) measure preferences for and styles of living and working. The 317-item SII requires respondents to indicate whether they “like” or “dislike” (or are “indifferent” to) a series of occupations, school subjects, activities, leisure activities, and types of people. Additional sections require the respondent to choose a preference between pairs of activities or stimuli and indicate which of a set of characteristics best describes her/him. The four Personal Style Scales are subsequently derived from these sections. The Work Style scale (51 items) distinguishes people who prefer to work with people from those who prefer to work with data, ideas, and things. The Learning Environment scale (49 items) differentiates people who prefer academic learning environments from those who prefer practical, hands-on learning environments. The Leadership Style scale (23 items) reflects one’s preferred style of leading, from directing others at one extreme to leading by example at the other. Finally, the Risk Taking/Adventure scale (9 items) discriminates between people who are willing to take risks and be spontaneous versus people who prefer to play it safe. Higher scores on the four scales indicate people who prefer to work with people, prefer an academic environment, prefer to lead

by directing others, and are willing to take risks, respectively. Harmon et al. (1994) reported that coefficients alpha for the Personal Style Scales range from .78 (Risk Taking/Adventure) to .91 (Work Style), and test-retest reliability (3-month interval) among college students ranges from .81 (Leadership Style) to .89 (Learning Environment). Validity of the Personal Styles Scales is supported by expected differences in educational level, occupation, and educational major (Harmon et al., 1994).

### **SSI**

The SSI (Riggio, 1989) is a 90-item self-report measure of social intelligence or, more specifically, social communication skills. As conceptualized by the SSI, social communication can be verbal or nonverbal, and relevant skills involved in social communication are sending information to others (i.e., expressiveness), receiving information from others (i.e., sensitivity), and regulating the communication of interpersonal information (i.e., control). Accordingly, the SSI yields scores in three aspects of verbal communication and three aspects of nonverbal communication. The verbal communication scales include Social Expressiveness (one's verbal fluency when communicating information to others), Social Sensitivity (one's skill in interpreting the verbal communication provided by others), and Social Control (one's social self-presentation and role-playing skills). The nonverbal communication scales include Emotional Expressiveness (one's skill in communicating emotional messages and nonverbal information), Emotional Sensitivity (one's skill in accurately perceiving and interpreting the emotional cues of others), and Emotional Control (one's skill in conveying or suppressing particular emotional expressions). Items are rated on a 5-point Likert-type scale ranging from 1 (*not at all like me*) to 5 (*exactly like me*), with higher scores reflecting higher levels of social skills. Internal consistency of the SSI subscales ranges from .62 to .87, and test-retest reliability (2-week interval) for the subscales ranges from .81 to .96 (Riggio, 1989). Construct validity of the SSI has been supported by a principal-axis factor analysis supporting the existence of six factors corresponding to the six subscales. Moreover, Riggio (1989) reported positive correlations between the SSI and measures of self-monitoring, nonverbal expression, and 16-PF factors "happy go lucky-sober," "venturesome-shy," "outgoing-reserved," and "tender-minded-tough." A negative correlation was observed between the SSI and a measure of social anxiety, and the SSI was nonsignificantly correlated with measures of extraversion, neuroticism, and social desirability (Riggio, 1989).

### **CFI**

The CFI (Chartrand & Robbins, 1997; Chartrand, Robbins, Morrill, & Boggs, 1990) contains 21 items that measure four antecedents of education-

al or career indecision: Need for Career Information (6 items), Need for Self-Knowledge (4 items), Career Choice Anxiety (6 items), and Generalized Indecisiveness (5 items). Respondents rate each item on a 5-point Likert-type scale, with anchor labels differing depending on the item. The subscales are scored such that higher scores indicate a higher need for career information, a higher need for self-knowledge, greater career choice anxiety, and greater generalized indecisiveness. Coefficients alpha for the subscales range from .73 to .86, and test-retest reliability coefficients (2-week interval) range from .76 to .84 (Chartrand et al., 1990). Confirmatory factor analyses have supported the four-factor model (Chartrand et al., 1990). A discriminant analysis revealed that the CFI subscales accounted for 50% of the variance in predicting group membership as a "low decided" or "high decided" college student, with 85% of the cases correctly identified (Chartrand et al., 1990). The CFI subscales show positive relationships with measures of trait anxiety and negative relationships with measures of goal instability, vocational identity, and self-esteem (Chartrand et al., 1990), and negative relationships have also been observed between the CFI and measures of career decidedness and career development (Lewis & Savickas, 1995). Finally, the CFI has been related to selecting a major and student adjustment (Chartrand & Robbins, 1997).

#### *ACT/SAT Scores, GPA, and Persistence Status*

Students' ACT or SAT scores, first-year grade point averages (GPAs), and persistence status were accessed following the spring semester of the freshman year from official university records. Because some students took the ACT ( $n = 637$ ) and some took the SAT ( $n = 40$ ), these scores were transformed to  $z$  scores and thereafter used interchangeably. GPA was recorded on a 4-point scale, and retention status was coded such that 1 = *persisted* and 0 = *dropped out*.

#### **Procedure**

Entering freshmen in the fall semesters of 1997, 1998, and 1999 were invited to participate in this research. All participants were provided a full disclosure statement regarding the research and the intended use of the data. Administration of the instruments was done during a first-semester campus orientation course taken by many students. (This course was required by some majors and optional for others.) In their class, participating students were administered a battery of educational planning and career assessment instruments (consisting of the MBTI, SII, SSI, and CFI). After the instruments were scored and results recorded, a feedback session was provided by staff from the university counseling and testing center. At the end of the

spring semester of the freshman year, the students' university records were obtained to determine ACT/SAT scores, first-year GPA, and the enrollment status for the following year.

## RESULTS

Table 1 presents the means, standard deviations, and correlations among the measures. An examination of the means of the MBTI suggests that a high percentage of this sample endorsed Extraversion, Feeling, and Perceiving preferences; Sensing versus Intuition preferences were endorsed almost equally. The mean of the Learning Style scale of the SII was well below 50, suggesting that this sample leaned toward preferring a more practical (versus academic) learning environment. CFI scores also suggested that this sample reported needing more career information and self-knowledge than Chartrand et al.'s (1990) normative sample. Finally, SSI means were in the average range, suggesting that this sample had typical levels of social skills for college students.

The correlations between subscales within each instrument varied from near zero (as in the correlations between most MBTI subscales) to greater than .50 in magnitude (as in the correlations between some Personal Style Scales of the SII). With the exception of a strong correlation between the MBTI E/I preference and SSI Social Expressivity subscale, and a strong correlation between the Leadership Style scale of the SII and the SSI Social Expressivity subscale, all correlations between subscales of different instruments were moderate to low in magnitude, suggesting that, in general, these four instruments tap different constructs. None of the zero-order correlations between (a) the subscales of the MBTI, SII, SSI, and CFI and (b) first-year GPA and persistence were stronger than .20 in magnitude. As one would expect, GPA and persistence were strongly correlated,  $r = .49$ .

### Predicting First-Year GPA

We conducted a hierarchical regression analysis to predict GPA. This analysis examined the ability of the MBTI scales, Personal Styles Scales of the SII, SSI subscales, and CFI subscales to predict first-year college GPA. We entered ACT/SAT scores in the first step and scores from the 18 subscales from these instruments in the second step. Before conducting this regression analysis, tolerance was computed for each predictor. All tolerance values were above the .10 threshold (Pedhazur, 1997), suggesting that collinearity was not a problem in this analysis. In addition, the residual plot indicated a linear relationship and homoscedasticity, thus meeting two critical assumptions of regression.



12. SSI Social Expressivity	.61	-.07	-.04	.04	.27	.14	.46	.12	.47	.43	.12											
13. SSI Social Sensitivity	-.11	.06	-.14	.12	.22	-.05	.06	-.20	.21	.33	-.09	.04										
14. SSI Social Control	.25	-.08	.02	.04	.05	.19	.25	.10	.63	.29	.39	.46	-.06									
15. CFI Need for Career Information	.04	.09	.02	.03	.11	.03	.13	.00	.02	.10	-.05	.11	.08	.04								
16. CFI Need for Self-Knowledge	.01	.01	-.07	.04	.20	.11	.18	-.10	.02	.20	-.07	.04	.13	-.02	.57							
17. CFI Career Anxiety	-.11	.06	-.09	-.07	.17	-.11	.02	-.09	-.03	-.02	-.12	-.08	.27	-.13	.17	.11						
18. CFI Generalized Indecisiveness	-.21	.01	-.19	-.08	.14	-.20	-.17	-.17	-.09	-.08	-.13	-.20	.21	-.19	.02	.06	.49					
19. First-year GPA	-.05	.06	.07	.07	.11	.17	.12	-.08	.05	.07	-.10	-.02	.16	.02	.06	.07	-.02	-.04				
20. Persistence	.04	.05	.00	.04	.10	.08	.07	-.08	.07	.04	.05	.02	.08	.09	-.01	-.02	-.07	-.04	.49			
<i>M</i>	0.65	0.49	0.23	0.35	53.66	37.29	47.86	51.26	44.55	48.62	43.85	45.23	45.66	47.51	23.82	16.55	15.63	13.82	2.49	0.77		
<i>SD</i>	0.48	0.50	0.42	0.48	9.39	8.49	9.95	10.54	9.04	8.50	8.32	10.83	8.97	10.59	4.38	3.30	5.76	4.12	0.95	0.42		
<i>n</i>	674	674	674	674	520	520	520	520	586	586	586	586	586	586	674	673	676	676	677	672		

*Note.* MBTI = Myers-Briggs Type Indicator; E vs. I = Extraversion-Introversion, S vs. N = Sensing-Intuition, T vs. F = Thinking-Feeling, J vs. P = Judging-Perceiving; SII = Strong Interest Inventory; SSI = Social Skills Inventory; CFI = Career Factors Inventory.

**Table 2**  
**Predictors of First-Year GPAs From**  
**Second Step of Hierarchical Regression Analysis**

Predictor	<i>B</i>	<i>SE<sub>B</sub></i>	$\beta$
ACT/SAT scores	.28	.04	.30***
MBTI: Extraversion-Introversion	.07	.11	.04
MBTI: Sensing-Intuition	.16	.09	.09
MBTI: Thinking-Feeling	.22	.10	.10*
MBTI: Judging-Perceiving	.08	.09	.04
SII: Work Style	.01	.01	.13*
SII: Learning Environment	.01	.01	.11
SII: Leadership Style	.00	.01	-.04
SII: Risk Taking/Adventure	-.01	.00	-.07
SSI: Emotional Expressivity	.00	.01	-.04
SSI: Emotional Sensitivity	.00	.01	-.02
SSI: Emotional Control	-.01	.01	-.11*
SSI: Social Expressivity	-.01	.01	-.10
SSI: Social Sensitivity	.02	.01	.14**
SSI: Social Control	.01	.01	.13*
CFI: Need for Career Information	.01	.01	.03
CFI: Need for Self-Knowledge	.01	.02	.02
CFI: Career Choice Anxiety	-.01	.01	-.08
CFI: Generalized Indecisiveness	.00	.01	-.01

*Note.*  $n = 503$ . MBTI = Myers-Briggs Type Indicator; SII = Strong Interest Inventory; SSI = Social Skills Inventory; CFI = Career Factors Inventory.

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

As expected, ACT/SAT scores positively predicted first-year college GPA,  $F(1, 501) = 53.91$ ,  $p < .001$ , such that higher ACT/SAT scores were associated with higher first-year GPAs,  $\beta = .31$ . When entered in the second step, the battery of career/personality instruments predicted GPA above and beyond ACT/SAT scores,  $\Delta R^2 = .09$ ,  $F(18, 483) = 3.11$ ,  $p < .001$ . An examination of Table 2 revealed several significant relationships. With respect to the MBTI, a Thinking preference was associated with a significantly higher GPA than a Feeling preference,  $p < .05$ . The Work Style scale of the SII was also a significant predictor of GPA, such that students who prefer working with people attained higher first-year GPAs than students who prefer to work with data, ideas, and things,  $p < .05$ . Three subscales of the SSI were significant predictors of first-year GPA; lower scores on Emotional Control, higher scores on Social Sensitivity, and higher scores on Social Control were each associated with higher GPAs. None of the CFI subscales was a significant

**Table 3**  
**Predictors of Persistence From**  
**Second Model of Logistic Regression Analysis**

Predictor	B	SE <sub>B</sub>	Wald $\chi^2$	OR	95% CI	
					Lower Limit	Upper Limit
ACT/SAT scores	0.15	0.14	1.27	1.17	0.89	1.52
MBTI: Extraversion-Introversion	0.72	0.33	4.92*	2.06	1.09	3.90
MBTI: Sensing-Intuition	0.64	0.28	5.29*	1.90	1.10	3.28
MBTI: Thinking-Feeling	0.15	0.31	0.22	1.16	0.63	2.15
MBTI: Judging-Perceiving	-0.23	0.28	0.70	0.79	0.46	1.37
SII: Work Style	0.04	0.02	4.27*	1.04	1.00	1.08
SII: Learning Environment	0.05	0.02	5.08*	1.05	1.01	1.09
SII: Leadership Style	-0.01	0.02	0.25	0.99	0.95	1.03
SII: Risk Taking/Adventure	-0.02	0.01	2.06	0.98	0.96	1.01
SSI: Emotional Expressivity	-0.01	0.02	0.22	0.99	0.96	1.03
SSI: Emotional Sensitivity	-0.01	0.02	0.67	0.99	0.95	1.02
SSI: Emotional Control	0.02	0.02	1.11	1.02	0.99	1.05
SSI: Social Expressivity	-0.03	0.02	2.80	0.97	0.94	1.00
SSI: Social Sensitivity	0.05	0.02	9.44**	1.05	1.02	1.08
SSI: Social Control	0.03	0.02	2.60	1.03	0.99	1.06
CFI: Need for Career Information	0.01	0.03	0.05	1.01	0.94	1.08
CFI: Need for Self-Knowledge	-0.04	0.05	0.73	0.96	0.88	1.05
CFI: Career Choice Anxiety	-0.07	0.03	6.79**	0.94	0.89	0.98
CFI: Generalized Indecisiveness	0.02	0.04	0.30	1.02	0.95	1.10

Note.  $n = 499$ . B is the log of the odds ratio; OR = odds ratio; 95% CI = 95% confidence interval about the odds ratio; MBTI = Myers-Briggs Type Indicator; SII = Strong Interest Inventory; SSI = Social Skills Inventory; CFI = Career Factors Inventory.

\* $p < .05$ . \*\* $p < .01$ .

predictor of first-year GPA. The four instruments, along with ACT/SAT scores, combined to explain 19% of the variance in first-year GPA,  $F(19, 483) = 6.00, p < .001$ . Nearly half of that variance (9%) was uniquely explained by the career/personality instruments.

### Predicting Persistence

We conducted a hierarchical logistic regression analysis to predict freshman-to-sophomore persistence. This analysis mirrored the analysis for GPA, but with this analysis the criterion was the log odds of persistence status (0 = *did*

*not persist*, 1 = *persisted*). The contribution of the block of career/personality instruments in the prediction of persistence was assessed by the change in the  $-2LL$  statistic, a statistic that is approximately distributed as a  $\chi^2$  (Menard, 1995). The relationship between an individual predictor (i.e., subscale) within a block and persistence is expressed as an odds ratio ( $e^b$ ), reflecting the probability of persisting divided by the probability of not persisting. An odds ratio of 1 is indicative of no relationship between the predictor and persistence, an odds ratio above 1 suggests a positive relationship, and an odds ratio below 1 suggests a negative relationship. The statistical significance of the odds ratio was assessed by the Wald approximation of the  $\chi^2$ .

In this analysis, ACT/SAT scores were not predictive of the odds of persisting into the sophomore year,  $\chi^2 = 2.62$ ,  $p > .10$ . However, adding the 18 subscales from the four career/personality instruments resulted in a significant improvement in the prediction of persistence,  $\chi^2 = 38.16$ ,  $p < .01$ . As illustrated in Table 3, several subscales were unique predictors of persistence. First, MBTI-Extraversion preferences and MBTI-Sensing preferences each were associated with greater odds of persisting than Introversion and Intuition preferences, respectively,  $ps < .05$ . Specifically, having a preference for Extraversion (versus Introversion) resulted in more than a 100% increase in the odds of persisting, and having a preference for Sensing (versus Intuition) resulted in 90% greater odds of persisting into the sophomore year, controlling for the other instruments and ACT/SAT scores. Second, the SII Work Style and Learning Environment scales were each predictive of the odds of persisting, with a preference for working with people (versus data, ideas, and things) and a preference for a more academic (versus practical) learning environment being associated with greater odds of persisting. One point increases in these scales were associated with a 4% and 5% increase in the odds of persisting, respectively. Third, the SSI Social Sensitivity subscale was positively associated with odds of persisting, such that one point increases on the subscale were associated with a 5% increase in the odds of persisting. Finally, the Career Choice Anxiety subscale of the CFI was a unique predictor of persistence, such that students with greater career choice anxiety were less likely to persist into the sophomore year than students with lower choice career anxiety.

## DISCUSSION

College persistence is a complex issue with clear implications for a student's vocational progress. Because college persistence requires students to reach a minimum standard of academic performance, most research has focused on the relationship between academic ability and student attrition (Wilson et al., 1997). With so much variance in persistence left unaccounted for by academic ability indices (e.g., Wolfe & Johnson, 1995), it is impor-

tant to investigate other potential predictors of premature departure from college, particularly those that may be used by career counselors given their potential role in providing academic/career interventions. Because career and personality instruments are frequently used when students seek counseling, and because many such instruments are easily administered in group settings (e.g., during a large freshman orientation), we sought to understand how four particular instruments might assist in identifying students who are attrition prone or at risk for poor academic performance. Students who are identified through these means early in the freshman year could then be targeted by counseling and career center staff for special interventions designed to increase their likelihood of remaining and succeeding in college through and after their first year.

After controlling for ACT/SAT scores, we found that five subscales from the battery of instruments we examined were predictive of first-year college grades. Consistent with retention theories that emphasize the importance of social integration in college (e.g., Tinto, 1975, 1993), most of the subscales that were predictive of first-year GPA all assessed some aspect of social relationships. We can speculate that a preference for working with people (vs. data, ideas, and things), as assessed by the Work Style scale of the SII, was predictive of first-year GPA because students who prefer to work with people may seek assistance from their instructors or from other students when they encounter difficulties with their work. They may also initiate collaborative study efforts that assist them in learning course material. Likewise, three of the six subscales of the SSI were significant predictors of academic performance. Students who are less likely to regulate nonverbal communication, are more sensitive to the verbal communication of others, and are better able to regulate verbal communication will probably be more likely to become integrated into the social fabric of the university. Again, their use of social systems may facilitate their learning and understanding of new material and their ability to cope with academic challenges. In addition to the social-orientated subscales, the MBTI Thinking (vs. Feeling) preference also predicted academic success; it is likely that the traditional critical thinking skills, which are often emphasized in first-year curriculum, involve objectivity over personal values, and Thinking types would prefer this approach to processing information than Feeling types.

Scales from the four instruments we examined also predicted freshman-to-sophomore persistence. In fact, this assessment battery was particularly important in the prediction of persistence because traditional indicators of academic success (i.e., ACT/SAT scores) were not predictive of the odds of persisting into the sophomore year among our sample. As with first-year GPA, the importance of social relationships seemed to be highlighted by several of the subscales that predicted eventual persistence. The Extraversion (vs. Introversion) preference from the MBTI was associated with greater odds of persisting, probably because the outward focus of such students likely helps them acclimate to the social and environmental demands of college life.

Both the Work Style and Learning Environment scales from the SII likely predicted persistence because, consistent with predictions made by retention theories (e.g., Tinto, 1975, 1993), students who are predisposed to become integrated within the university milieu, both academically and socially, will find the college experience to be a better fit than students without such predispositions. Students who prefer practical learning environments and who are less likely to prefer working or dealing with others may leave college because of a poor person-environment fit. Likewise, our finding that the SSI Social Sensitivity subscale was positively related to persistence suggests that students who are skilled in the interpretation of others' verbal communication may find the college environment to be a better fit and make use of social relationships in a more facilitative manner than those students with less social sensitivity. Moreover, because many freshmen may have difficulty adjusting to the varied lecture styles of their professors, students more skilled in the interpretation of verbal material would likely fare better than students with weaker social-sensitivity skills.

Two non-socially oriented scales were also predictive of persistence. We believe that the MBTI-Sensing (vs. Intuition) preference was associated with greater odds of persisting because successfully navigating the first year of college requires taking in many new facts and information, such as the specific skills necessary to help their academic performance, the resources available to aid their learning, and the norms associated with college life. Establishing conceptual relationships among this new information (more of an Intuitive activity) may not become necessary until a student becomes familiar with the sundry details of college life. Alternatively, as suggested by Schurr et al. (1997), students with a Sensing preference may be able to tolerate routine tasks that are necessary to succeed in college, such as note taking and memorizing information. Also, we found that the Career Choice Anxiety subscale of the CFI predicted persistence. It is likely that students who are highly anxious about making career decisions are reluctant to commit to an academic major or to enroll in additional classes until they are sure about their career goals, and such reluctance may limit the extent to which they feel committed to college in general.

### **Implications for Career Assessment and Interventions**

In summary, our findings suggest that scales from the MBTI, SII, SSI, and CFI may be useful supplements to traditional predictors of academic progress. Although many subscales did not uniquely predict performance or persistence, it would seem that a broad assessment of a student's characteristics would provide the greatest likelihood of understanding whether a student is at risk for poor performance or attrition. We offer specific recommendations for how counseling and career center staff may use such an assessment to identify at-risk students.

Many colleges and universities hold brief incoming student orientations prior to the beginning of classes to acquaint students with policies and procedures, to familiarize them with campus resources, and to provide early interactions with staff, faculty, and college peers (Pascarella, Terenzini, & Wolfle, 1986). Our findings suggest that college counseling center staff might play a role in such orientations by administering the MBTI, SII, SSI, and CFI in efforts to identify students who might benefit from academic performance and retention-enhancing interventions. Because the MBTI and SII are two of the most frequently administered instruments in college counseling centers (Isaacson & Brown, 2000), and because of the ease of administration of the SSI and CFI, students with characteristics predictive of lower GPAs and nonpersistence might be easily identified without expending many additional efforts and resources. Traditional models of retention have emphasized the importance of person–environment fit variables, which are difficult to assess until students have been on campus for some time. As a consequence, interventions stemming from the assessment and identification of students at risk for attrition on the basis of traditional constructs from retention theories are typically relegated to the role of remediation. By focusing on the early identification of students at risk for attrition on the basis of relatively stable characteristics (e.g., personality), preventative steps could be taken by counseling center staff as early as the first week of school.

Once students at risk for poor academic performance and nonpersistence have been identified, our findings provide some insight into career interventions that might ease students' transition to college and enhance the first-year experience. In general, it may be useful to provide workshops designed to help students understand the relative merits and limitations of various personality types and to develop strategies for compensating for limitations inherent with their preferred tendencies (e.g., Nelson et al., 1993). First, interventions designed to increase behavioral tendencies associated with Thinking (vs. Feeling) and Sensing (vs. Intuition) MBTI preferences may enhance academic progress during the first year. For example, students with predominantly Feeling preferences might be targeted for classes that enhance objective or impersonal critical thinking skills, and those with Intuitive preferences might receive interventions designed to help them understand the benefits of using factual data as opposed to operating from hunches when working on academic projects. Likewise, students with low scores on the SII's Learning Environment and Work Style scales might be encouraged to speak with their instructors about ways to increase the degree to which they see the applicability of what they learn in classes to real-world situations and to make use of social relationships that may facilitate their understanding and learning of course material.

In addition, given the value of the SSI subscales in predicting academic performance and persistence, it may be useful to provide counseling interventions that enhance social skill development. Group therapy may be an especially useful tool for doing so (Yalom, 1995). Many universities are using

alternative residence hall living arrangements for incoming students as a vehicle for fostering access to social support (e.g., Pascarella & Terenzini, 1981), and career center staff using the SSI may be able to provide valuable information regarding ideal living arrangements if the assessment is done before students arrive on campus. If such interventions are not sufficient to facilitate the academic performance of students who are lacking in social skills, it may be useful to supplement these alternative living arrangements with social skills training for students who have high emotional control, and low social sensitivity and social control tendencies.

### **Limitations and Suggestions for Future Research**

Our suggestions for these interventions are based on the assumption that the relationships between these four career/personality instruments and performance/persistence were causal, but we cannot confirm that assumption with these data. More complex methods would be necessary to test that assumption. For example, true experiments assessing the efficacy of our suggested interventions in improving performance and persistence would be necessary to support the presumed causal link. Relatedly, some of the significant relationships in our study represented small effects. Before implementing the interventions we have recommended to promote academic progress, it would be useful to verify their utility via experimental methods.

Second, although our sample did comprise three entering classes of students, all of the participants were sampled from the same university. Moreover, many students in this sample volunteered for the orientation course, suggesting that many recognized a need for guidance with respect to educational and career decisions. Indeed, our sample reported needing slightly more career information and self-knowledge than a normative sample of college students (Chartrand et al., 1990). It is unknown whether our results would generalize to other students at their university, students at other universities, or to students in community colleges. An important direction for future research would be to replicate this study with other groups of students from diverse colleges and universities.

Third, the persistence data were collected after the spring semester of the first year. It is possible that some students pre-enrolled for the fall semester of the sophomore year but did not actually attend in the fall due to changes in life circumstances or goals. To the extent that this occurred, the persistence rate observed in this research would have been overestimated. Moreover, because our research question was concerned with freshman-to-sophomore persistence, we do not know to what extent these assessment instruments have validity in predicting persistence beyond the sophomore year. For example, do these instruments predict actual graduation rates? Future research that examines this issue would be informative.

A final limitation is that we selected only some of the many possible career and personality inventories that may have relevance to a student's academic progress. It is likely that instruments that measure similar constructs as the MBTI, SII, SSI, and CFI would also be useful in the identification of students at risk for poor academic progress. Future research could extend this line of inquiry by utilizing alternative measures of career and personality variables to more fully understand the possible scope of early assessment in the enhancement of students' academic performance and persistence. By more explicitly identifying the links between career assessment and academic progress, psychologists and counseling center staff may further enhance the academic experiences of college students.

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# The Relation of Career Maturity to Personality Type and Social Adjustment

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Models of career maturity, first formulated at midcentury, have been criticized for not incorporating innovations in personality and developmental psychology. This isolation from general models of and debates about personal maturity has kept career maturity from receiving widespread acceptance in mainstream psychology. The present study investigated whether Super's model of career maturity could be linked to Gough's three-dimensional model of personality organization. To explore relations between the two structural models, 200 college students responded to Gough's California Psychological Inventory and Super's Career Development Inventory. Results showed that planful competence in career development related to greater realization of one's potential and a higher degree of social adjustment. Furthermore, the results indicated that more mature attitudes toward career planning and exploration related to an adjustment style characterized by extroversion in interpersonal relationships and by a positive orientation to social norms.

**Keywords:** Career maturity, career choice, career development, adaptability, social adjustment

Vocational psychologists have produced a significant body of research findings on personality and adjustment (Buboltz, Miller, & Williams, 1999), yet researchers in personality, social, and developmental psychology generally have not recognized this work. For example, vocational psychologists have well-developed models and measures of personality types (Holland, 1959)

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 24-41  
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and maturity (Super, 1954) that have important implications for understanding personality and development, but neither of these lines of inquiry have influenced prevailing thought in applied psychology. This caused Osipow (1993) to lament the fact that the work of vocational psychology is often overlooked in the mainstream of social affairs in general and in psychology in particular. With few exceptions, such as research on career self-efficacy (Bandura, 1997), related fields of psychology neither recognize nor use research findings from vocational psychology.

One reason for this disregard is that although vocational psychologists derive their constructs from basic disciplines in psychology, they do not link their findings back to these disciplines. Career maturity is a case in point. In defining the construct of career maturity, researchers at midcentury relied heavily on the then current models and methods in personality and developmental psychology (Buehler, 1933; Lazarsfeld, 1931). For the next 40 years, career maturity researchers continued to ground their work in those models, neither linking their findings back to developmental psychology nor attending to innovations in developmental psychology (Vondracek, Lerner, & Schulenberg, 1983). Of course, the same can be said about research on vocational interests which also should be linked to mainstream psychology, yet this link is still missing 20 years after Holland (1976) criticized vocational psychology for being unable "to draw on the strength of personality and learning theory and vice versa" (p. 523). In the early 1990s, a leading personality researcher explicitly recommended that researchers concentrate on linking personality structure to career development and adjustment (Goldberg, 1993). Following his recommendation, in the last few years researchers on vocational interests have begun to do just that by linking the structure of vocational interests to the structure of personality, often comparing Holland's (1997) RIASEC hexagonal model of interests to personality styles, the "Big Five" model of personality (Costa & McCrae, 1992), and Wiggin's (1982) interpersonal circumplex (Borgen & Harmon, 1996; Broughton, Trapnell, & Boyes, 1991; Schneider, Ryan, Tracey, & Rounds, 1996; Tokar & Swanson, 1995; Tracey & Rounds, 1996). This embryonic work linking interest theory to personality theories has clarified the structure and meaning of interests for vocational psychology as well as contributed information about interests to personality psychology.

The success achieved by linking research on interests to personality prompted us to investigate whether a similar approach could succeed in linking models of career maturity to mainstream psychology, specifically personality psychology. We could find only one prior study that linked career maturity to a more general model of personality, a superb study by Heath (1976) that unfortunately never received the attention it deserved. Heath asserted that the construct of career maturity has yet to receive widespread acceptance in mainstream psychology because the construct continues to be "developed in isolation from more general models of and debates about maturity" (p. 1). To advance career maturity theory, the construct must be

seen as a specific example of more general developmental and personality principles. Accordingly, the present study investigated the relation of career maturity to personality, specifically to personality structure as has been done by interest researchers.

Before examining how career maturity relates to personality structure we had to decide which model of personality structure to use. There are two important families of structural models for personality, each with substantial lines of inquiry into the organization of personality. The two basic models differ in origin and goals. The circumplex model (exemplified by Wiggins, 1982) originated in the interpersonal psychiatry of Harry Stack Sullivan (Leary, 1957) and social psychology (Bales, 1950) whereas the dimensional model (exemplified by McCrae & Costa, 1987) originated in factor analyses of data from personality inventories. Circumplex models concentrate on interpersonal interaction as defined by two dimensions, typically labeled "love and dominance," "affiliation and status," or "sociability and conformity." Dimensional models, such as the "Big Five," include these two interpersonal dimensions, labeling them extroversion and agreeableness, and add one or more dimensions not intrinsically interpersonal but more affective, experiential, and motivational (Goldberg, 1993; McCrae & Costa, 1989). Consequently, dimensional models depict a more comprehensive account of personality organization whereas circumplex models depict a more thorough representation of social behavior. In choosing a model to use in research, dimensional models are better suited to cases in which there is clear simple structure (i.e., the variable cluster around the axes) whereas circumplex models are better suited to cases where variables are evenly distributed around the circumference of a two-dimensional plot.

In our research, we wanted to use an interpersonal model of personality organization because we view career maturity as behavioral responses to social expectations known as vocational developmental tasks and as a reflection of an individual's ability to function effectively in society. However, rather than a circumplex, we preferred a two-dimensional model of social behavior because career maturity is modeled by two dimensions, attitudes and competencies, which fit simple structure and because, in due course, the findings could be linked to research on the two-dimensions that structure Holland's hexagonal model of vocational interests. Thus, we selected Gough's (1990) two-dimensional model and measure of social behavior because of its conceptual elegance and precise operational definition. Moreover, Gough's complete model adds a third dimension, not of personality style but of social adjustment, that has particular relevance for career maturity research.

Gough's (1990) structural model of personality emerged from research on his California Psychological Inventory (CPI; Gough, 1996) which measures characteristics of everyday, interpersonal behavior such as responsibility, flexibility, and self-control. The CPI measures adaptive behavior and coping mechanisms in contrast to the MMPI which measures psychopathology and

defense mechanisms. Higher scale scores and overall profile elevation on the CPI indicate more effective interpersonal functioning.

More than 50 factor-analytic studies of the 18 original scales (now 20) consistently have identified two major latent themes that structure the manifest scales: interpersonal orientation and adherence to social norms. In 1970, Levin and Karni published the first smallest space analysis of the CPI which indicated a third orthogonal latent dimension indexed by three CPI scales: well-being, tolerance, and intellectual efficiency. Gough (1990) concluded that this third dimension reflected overall profile elevation and indicated level of realization of personality potential. Guided by the accumulated research on the CPI, Gough constructed three structural scales to represent the latent dimensions manifested in the CPI's 20 scales. This innovation in the CPI, added to its rich clinical literature and extensive empirical findings, makes it particularly useful for research that explores the basic structure of personality (Goldberg, 1993).

Gough (1990) called the three structural scales Vectors 1, 2, and 3. Vector 1 (V.1) denotes an interpersonal continuum from substantial social engagement (low scores) to social detachment (high scores) which Gough labeled externalization (outward focus) versus internalization (inward focus) in behavior. Vector 2 (V.2) denotes an orientation to social norms on a continuum from norm doubting and questioning to norm acceptance, upholding, and favoring. Thus, V.2 ranges from undercontrol to overcontrol in the regulation of behavior. In "Big Five" terms, V1. represents extroversion and V.2 represents agreeableness. Vector 3 (V.3) denotes level of realization, that is, the degree of effective functioning an individual has achieved. V.3 seems particularly relevant to career maturity in that it signifies the type of interpersonal behavior which facilitates achieving social goals in everyday life and adjusting comfortably to expectations set by society, including vocational development tasks.

### **Gough's Model of Personality**

Gough (1990) used the three vectors as axes in a geometric, cuboid model of personality. Gough's structural model uses cutoff scores on V.1 and V.2 to conjointly define four quadrants, with each quadrant containing about 25% of the general population (Gough, 1990, p. 43). The quadrants represent four ways of living, life styles, or types of people. Alphas are externally oriented and norm favoring (low V.1, high V.2). They are outgoing, readily accept social norms, and focus on constructive and appropriate social behavior. Betas are internally oriented and norm favoring (high on both V.1 and V.2). They are comfortable with norms yet more private than Alphas so they tend to display quietly reflective and conventional behaviors. Gammas are externally oriented and norm questioning (low V.1, low V.2). They enjoy being with people and value success and social rewards yet remain skeptical

about the legitimacy of authority. They can be innovative because they quickly notice flaws and creatively propose new ways of doing things. Deltas are internally oriented and norm questioning (high V.1, low V.2). They may be called artistic or intellectual because they tend to display reflective, imaginative, and creative behavior. Deltas often disagree with social conventions and traditional value systems, typically preferring to center their lives around their own private, internal world.

Cutoff scores divide V.3 into seven levels of effectiveness. So individuals are assigned to a quadrant and then, within that quadrant, placed at a level of realization that indicates how well they execute that way of life and realize their type's potentiality. Dividing each of four quadrants into seven levels produces a 28-cell taxonomy of personality functioning. For example, an Alpha at level 4 is an Alpha type functioning at an average level of competence. A Gamma at level 1 would be dissatisfied with current life and might be disruptive and counteractive in cultural context.

Gough's quadrants resemble Holland's (1997) RIASEC types in that both are personality typologies and both indicate adjustive orientations. The typologies differ in that the RIASEC hexagonal model has nothing like V.3, level of realization, which would indicate how effectively a RIASEC adjustive orientation is working for the individual. In other words, Holland's hexagonal model might indicate that two individuals display the same lifestyle, say ISA, yet does not indicate directly how adaptive the two individuals actually are in implementing the ISA vocational personality type in their social context. Of course by adding the secondary constructs of congruence, consistency, identity, and differentiation, Holland's theory does address adjustment, particularly success, satisfaction, and stability.

### **Super's Model of Career Maturity**

To operationally define career maturity, we used the model and measure of career development in adolescence and early adulthood that Super and his colleagues elaborated over a course of 4 decades (Super, 1955; Super, Savickas, & Super, 1996). According to the complete model, when decision-making competence is supported by an adequate fund of occupational information based on planful exploration, then individuals are ready, that is sufficiently mature, to make tentative career choices that are viable and suitable. The model defines two basic dimensions of maturity: attitudes toward and competencies for developing a career.

#### *Attitudes*

The attitudinal dimension consists of two variables: attitudes toward career planning and attitudes toward career exploration. Planning attitudes mediate

involvement in thinking about and preparing for the vocational future. Mature attitudes incline individuals to look ahead, take a planful approach, and actively involve themselves in career planning activities. Immature attitudes usually disincline individuals from looking ahead to their future in the world-of-work; therefore, they do not feel a need to acquaint themselves with or relate themselves to occupations. Attitudes toward career exploration address willingness to find and use good resources for career planning. Immature attitudes toward exploration usually mean that individuals are unconcerned with using good sources of data about the fields and levels of work.

### *Competencies*

The two variables in this cognitive dimension deal with decision-making competence and fund of occupational information. Low informational competence indicates that individuals need to learn about types of occupations, the mores of work, and vocational development tasks. They probably do not know much about the range of occupations available to them. In contrast, an adequate fund of information means good knowledge about types of occupations and ways to obtain and succeed in jobs. High competence means that individuals are sufficiently knowledgeable to apply occupational information to self and to begin crystallizing field and level preferences. Decision-making competence means the ability to apply decision-making principles and methods to solve problems involving educational and vocational choices. Low competence suggests that individuals do not know what to consider in making choices. This means those individuals are not ready to use the occupational information they have acquired for career planning. High competence means good knowledge of the principles and practices of decision making. Attitudes are thought to moderate the use of competencies which in turn condition outcomes such as decidedness and realism of choice.

### **Hypotheses**

The distinction between attitudinal and cognitive dimensions in career development structured several hypotheses about how career maturity relates to the dimensions and types in Gough's (1990) model of personal maturity. The dimensions in Gough's cuboid model actually denote two different qualities. The relational (V.1) and normative (V.2) dimensions address *styles of adjustment* whereas the realization dimension (V.3) measures *degree of adjustment*. This qualitative difference between style and degree of adjustment led to the hypothesis that career development relates differentially to the dimensions. We expected that career development attitudes would correlate stronger than the competencies to the dimensions V.1 and V.2.

Furthermore, we hypothesized about the direction of association between career development attitudes and the bipolar orientations in dimensions V.1 and V.2. Because externality fosters greater responsiveness to social expectations, we hypothesized that career attitudes correlate positively to the external orientation to interpersonal relations and negatively with the internal orientation. Because career development attitudes are a response to social expectations and involve development tasks, we hypothesized that they correlate positively to the norm-upholding orientation and negatively to norm-questioning orientation. Because career development competencies condition outcomes, we hypothesized that career competencies would correlate stronger to V.3 realization than to either V.1 or V.2. Because attitudes moderate the use of competencies, we also expected attitudes to correlate significantly to V.3. Because we expected V.3 to correlate to both attitudes and competencies, we predicted that career maturity would relate stronger to V.3 than to V.1 and V.2, which we anticipated would only correlate to attitudes.

These dimensional hypotheses conceptually subsume any typological hypotheses concerning the four types in that there are no interactive or non-linear relations among the dimensions. Nevertheless, in the spirit of Gough's (1990) typological model, we explicitly stated and tested one general and four specific typological hypotheses regarding how career maturity relates to the personality types. Based on the dimensional hypotheses, we further hypothesized that career maturity would be highest in the Alphas because they are external and norm accepting and lowest in the Deltas because they are internal and norm questioning. We also speculated by forming specific hypotheses regarding how the four types might develop different strengths in career development attitudes and competencies. For Alphas, we anticipated the best developed attitudes toward planning because of their externality and norm adherence. For Betas, we anticipated the most positive attitudes toward exploration because they are norm following in attending to vocational development tasks, yet because they are internal they wish to explore their options. For Deltas, despite the prediction that they would have the lowest career maturity, we anticipated the highest decision-making competence because their norm questioning and internality make them more likely to have substantial experience in making personal choices. For Gammas, we anticipated the greatest fund of information because their norm doubting and externality could combine to drive them to collect more and more facts.

In summary, this study examined three major hypotheses concerning the relation of career maturity to the dimension in Gough's (1990) typological model of personality.

1. Career maturity correlates stronger to degree of adjustment than to style of adjustment.
2. Career development attitudes correlate stronger than competencies to style of adjustment, whereas competencies correlate stronger than attitudes to degree of adjustment.

3. Career development attitudes correlate positively to degree of adjustment as well as to the prosocial styles of adjustment represented by the norm-upholding and external orientation.

## METHODS

### Participants

The participants for the study consisted of 200 college students at a large public university located in the southwestern U.S. In all, 98 men and 100 women participated in the study, and two gender-unspecified participants were excluded from the analyses. The participants were enrolled in undergraduate courses offered by the Department of Psychology. Students who volunteered to participate in the study earned extra credit in their particular psychology course. Human subjects guidelines were followed in recruiting students and conducting the study.

### Measures

The construct of personal maturity was operationally defined by the California Psychological Inventory (CPI; Gough, 1996) and the construct of career maturity was operationally defined by the Career Development Inventory–College and University Form (CDI; Super, Thompson, Lindeman, Jordaan, & Myers, 1981). Each participant responded to the complete CPI and the complete CDI.

#### *California Psychological Inventory*

The CPI yields three structural scale scores, called vectors, representing interpersonal orientation (internality vs. externality), normative orientation (upholding vs. questioning), and level of realization of potential for effective functioning (realization). To place each participant into a quadrant, we used the cutoff scores recommended by Gough (1996, p. 35). The cutoff scores for V.1 and V.2 were higher for women because women scored higher in the norming sample. The cutoff scores for V.3 were the same for men and women because there were essentially no differences in the norming sample. V.1 was divided at 17.5 for men and at 19.5 for women. V.2 was divided at 21.5 for men and at 22.5 for women. The realization or social competence scale (V.3) consists of 58 CPI items. It was constructed to be orthogonal to the first two vectors yet have a maximum correlation with profile elevation for the CPI's 20 scale scores. Cutoff scores on V.3 divide the scale into seven levels of effectiveness (Gough, 1996, p. 35). Low scores or levels indicate

people who feel unfulfilled and whom others judge as low in social competence. Individuals at higher levels of V.3 display the ego-strength, inner resources, and personal integration needed to achieve a fulfilling life. In a norming sample of 1,000 women, V.3 correlated highly with CPI Tolerance (.87), Achievement via Independence (.86), Intellectual Efficiency (.83), Psychological Mindedness (.79), Well-being (.77), Capacity for Status (.72), Achievement via Conformity (.69), Responsibility (.67), Independence (.66), and Empathy (.65). Helson and Wink (1987) reported that V.3 correlated to extracurricular activities and academic interests in college, ego control and resourcefulness, coping, and expression of feelings in socialized ways. Extensive evidence of the reliability and validity for the three structural scales appears in chapter two of the CPI manual (Gough, 1996, pp. 17-56).

#### *Career Development Inventory—College and University Form*

The CDI, although published in 1981 and not revised since then, remains the pre-eminent operational definition of career development during adolescence and young adulthood. The CDI total score indicates career maturity or degree of career development. This score for career maturity is an aggregate of four scales that measure the attitudinal and the cognitive dimensions in Super's (1955) structural model of career development during adolescence and young adulthood. Two 20-item attitudinal scales measure dispositions toward career planning and exploration. The Career Planning Scale uses a 5-point Likert-type response scale, with scores ranging from 20 to 100. The Career Exploration Scale uses a 4-point Likert-type scale, with scores ranging from 40 to 80).

Two CDI cognitive scales measure knowledge about decision making and about the world of work. Each scale uses a multiple choice response format with four options. Thus, scores range from 0 to 20 on each scale. The CDI manual consists of two volumes and a supplement. The 27-page *User's Manual* (Thompson & Lindeman, 1981) presents the rationale, description of item content, administration instructions, scoring procedures, interpretation methods, and recommended uses. The 48-page *Technical Manual* (Thompson & Lindeman, 1984) presents the theory and research supporting the development of the CDI and detailed data on its psychometric characteristics. The 20-page *College and University Supplement* (Thompson & Lindeman, 1982) discusses psychometric characteristics of and normative data for that form. The manual appropriately cautions users about low test-retest reliability for the CDI scales (Career Planning, .79; Career Exploration, .73; Decision Making, .70; World of Work, .67) and encourages use of a CDI total score that increases reliability to .84.

The CDI possesses superior content validity because it explicitly operationalizes a model of career maturity that has been refined by 4 decades of programmatic research. Although the inventory's construct validity needs

**Table 1**  
**Distribution of Participants Among the**  
**California Psychological Inventory Types**

Level of Realization	Alpha <sup>a</sup>		Beta <sup>b</sup>		Gamma <sup>c</sup>		Delta <sup>d</sup>	
	M	F	M	F	M	F	M	F
1. M = 9      F = 6	4	3	1	1	1	2	3	0
2. M = 12     F = 10	5	4	1	1	4	4	2	1
3. M = 25     F = 18	9	5	4	2	9	7	3	4
4. M = 24     F = 35	7	5	3	5	11	13	3	12
5. M = 13     F = 21	5	7	2	3	3	7	3	4
6. M = 8      F = 6	2	1	4	1	1	3	1	1
7. M = 7      F = 4	4	1	1	0	1	2	1	1
Total	36	26	16	13	30	38	16	23

*Note.* N = 198 (98 men, 100 women).

a. *n* = 62.

b. *n* = 29.

c. *n* = 68.

d. *n* = 39.

more empirical support, its factor structure and relation to age, grade, and school curricula provide an adequate base. In regard to criterion-related validity, Thompson and Lindeman (1984) cited three concurrent validity studies that showed the CDI related as expected to ability, work salience, and other career development measures. Savickas and Hartung (1996), in reviewing CDI studies published from 1979 through 1995, concluded that the reliability and validity evidence for the CDI is substantial.

## RESULTS

Table 1 reports the number of males and females in each quadrant and the number of participants in each quadrant at each of the seven levels of realization. Although Gough (1996, p. 55) expected about 25% of the general population to fall in each quadrant, he reported that college-going rates for the four types differed significantly. Using data for 3,487 high school graduates from 16 cities, he reported a college-going rate of 42%. Among college attenders, he reported the following percentages: Alphas (36%), Betas (23%), Gammas (24%), and Deltas (17%). In the present study, we found similar percentages of Alphas (31.3%) and Deltas (19.7%) but more Gammas (34.3%) and fewer Betas (14.6%). Thus the participants in the present study included a higher proportion of norm-doubting externals and a lower proportion of norm-favoring internals. With regard to level of realization, as one

would expect, most participants (136/198 or 68%) scored in the middle three levels, with 30% or 59 participants falling in level 4. We found 40% (80/198) of participants scored below level 4 and 30% (59/198) of participants scored above level 4.

Table 2 reports the means and standard deviations for the total group and the four CPI types on the four CDI scales and the three CPI vectors. The mean scores for the three CPI vectors indicated that as a total group the participants were at level 4 on V.3 and could be typed as Gammas, although this could be debated because their V.1 and V.2 scores intersected very near the origin for the norming sample, as one might expect for a heterogeneous group of college students. Mean scores on V.3 for each of the four CPI types each fell in level 4.

To examine the hypothesis that career development dimensions relate differently to the three personality dimensions, we examined the correlations of career development attitudes and competencies to each personality vector. Table 3 shows the alpha coefficients for the four CDI scales along with the zero-order correlation coefficients between the three CPI vectors and the four CDI scales, across the total group. The CDI competence scales, as typically found (Savickas & Hartung, 1996), showed lower reliability than the attitude scales. While the internal consistency coefficients of the competence scales were adequate for the purposes of the present study, the reader should keep in mind that the correlations obtained between the competencies and personality variables were attenuated by content sampling error more than those obtained with the attitude scales.

As can be seen in Table 3, both V.1 and V.2 were unrelated to the two CDI cognitive scales. The zero-order correlations showed that V.1, externality, correlated significantly to both planning attitudes ( $r = -.20, p < .05$ ) and exploration attitudes ( $r = -.16, p < .05$ ). V.2, norm-favoring, had a similar pattern in correlating significantly to planning attitudes ( $r = .31, p < .01$ ) and exploration attitudes ( $r = .19, p < .05$ ). To examine redundancy in these zero-order correlations, we computed stepwise multiple regression analyses with the vectors as criteria and the four CDI scales as predictors. These analyses indicated that the four career development variables correlated .25 to V.1 and .33 to V.2. In both regression analyses, planning attitudes was the first and only significant step, correlating .20 to V.1 (externality) and .31 to V.2 (norm upholding). Clearly, planning attitudes explained most of the shared variance between the four career maturity variables and each of the two personality vectors.

V.3 (realization) had a different and more complex relation to the four CDI scales. Most important, V.3 correlated .37 ( $p < .01$ ) to decisional competence and .36 ( $p < .01$ ) to informational competence. With regard to the two CDI attitude scales, V.3 correlated .27 ( $p < .01$ ) to planning attitudes but was unrelated to exploration attitudes. A stepwise multiple regression showed that decision making ( $R = .37$ ) and occupational information ( $R = .41$ ) were the only two significant predictors of V.3 (entered as a block  $R = .44$ ). In com-

**Table 2**  
**Means and Standard Deviations for the Three CPI Vectors and the**  
**Four CDI Scales for Total Group and Four Personality Types**

Measure	CPI Personality Type									
	Total Group		Alphas		Betas		Gammas		Deltas	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<b>CPI</b>										
V.1	16.21	6.35	12.10	3.84	23.07	4.63	12.94	3.46	23.36	3.62
V.2	21.42	4.82	25.58	2.49	25.28	2.89	17.81	3.51	18.26	3.07
V.3	34.19	9.08	33.52	9.88	35.69	8.94	34.04	8.20	34.38	9.53
<b>CDI</b>										
Plan	72.45	14.84	77.77	11.65	75.35	13.20	70.29	13.88	65.00	18.11
Explore	51.08	10.09	54.62	10.23	51.88	10.14	49.20	9.71	47.51	8.79
Occ Info	14.84	3.04	14.47	3.12	16.12	2.03	14.93	3.03	14.31	3.38
Decide	12.11	3.44	11.94	3.85	13.35	2.26	12.04	3.33	11.54	3.56
Total	150.48	23.00	158.80	24.81	156.70	22.80	146.46	21.24	138.36	25.20

*Note.* *N* = 198. CPI = California Psychological Inventory; CDI = Career Development Inventory; Plan = Career Planning scale; Explore = Career Exploration scale; Occ Info = World of Work scale; Decide = Decision Making scale.

**Table 3**  
**Correlation Coefficients Between CPI Vectors and CDI Scales**

	CDI				CPI			Coefficient $\alpha$
	Plan	Explore	Decide	Occ Info	V.1	V.2	V.3	
Plan	1.00							.91
Explore	.39**	1.00						.84
Occ Info	.30**	-.02	1.00					.67
Decide	.33**	-.03	.59**	1.00				.71
V.1	-.20*	-.16*	.05	.03	1.00			
V.2	.31**	.19*	.08	.05	-.04	1.00		
V.3	.27**	.08	.36**	.37**	.07	-.05	1.00	

*Note.* CPI = California Psychological Inventory; CDI = Career Development Inventory; Plan = Career Planning scale; Explore = Career Exploration scale; Occ Info = World of Work scale; Decide = Decision Making scale.

\* $p < .05$ . \*\* $p < .01$ .

paring the three vectors, V.1 and V.2 related to planning attitudes and exploration attitudes, but not to competencies whereas V.3 related to both planning attitudes and competence.

Because we hypothesized that V.3 relates to both attitudes and competencies, we had predicted that career maturity would correlate higher to V.3 than it does to either V.1 or V.2. V.3 did have the highest zero-order correlation with career maturity ( $r = .31$ ,  $p < .001$ ) but just barely in that career maturity correlated .19 ( $p < .05$ ) to V.1 externality and .30 ( $p < .001$ ) to V.2 norm favoring. However, using a total score for career maturity does not actually test the hypothesis because it treats career development as unidimensional when in fact it has attitudinal and cognitive dimensions. Consequently, we computed multiple regressions entering the four CDI scores as a block to predict respectively, V.1, V.2, and V.3. The resulting multiple correlation for V.1 was .25, for V.2 it was .33, and for V.3 it was .44. The differences between the zero-order correlations for total score versus the multiple correlations using four scale scores confirms the expectation that the CDI scale scores do not add together in an unidimensional manner as well as supports the hypothesis that career maturity relates stronger to realization level than to the orientations.

The next set of analyses dealt with the hypotheses regarding the personality typology. When combining the dimensions V.1 and V.2 to form the cuboid model, we expected that career maturity would be highest in the Alphas because they are external and norm accepting and lowest in the Deltas because they are internal and norm questioning. The data confirmed this expectation. An analysis of variance (ANOVA) indicated a significant difference in the means scores between the four types on career maturity,  $F(3, 155) = 7.431$ ,  $p < .001$ . Scheffé post hoc analyses showed that compared to Deltas, Alpha ( $p < .001$ ) and Beta ( $p < .01$ ) types scored significantly higher

on career maturity. Alphas also scored significantly ( $p < .05$ ) higher than Gammas. The Alphas (CDI total mean = 158.80) showed the highest and the Deltas (CDI total mean = 138.36) showed the lowest career maturity. Although we had not made any predictions about the Betas (CDI total mean = 156.70) or Gammas (CDI total mean = 146.46), we were surprised to find that the Betas displayed a level of career maturity similar to the Alphas.

We used four ANOVAs to test the specific hypotheses regarding how the four types might show different strengths in career development attitudes and competencies. For Alphas, we anticipated the most mature attitudes toward planning because of their norm adherence and externality. The ANOVA indicated that mean scores on planning attitudes differed significantly,  $F(3, 155) = 7.85, p < .001$ , only between the Deltas (lowest) and the other three groups. For Betas we anticipated most positive attitudes toward exploration because they are norm following in attending to vocational development tasks, yet because they are internal they wish to explore their options. The only significant difference,  $F(3, 155) = 3.09, p = .03$ , on exploration attitudes occurred between Alphas and Deltas. For Deltas, despite the prediction that they would have the lowest career maturity, we anticipated the highest developed decision-making competence because their norm questioning and internality make them more likely to have substantial experience in making personal choices. This did not prove to be the case; in fact, they scored the lowest in decision-making competence, although none of the groups differed significantly on decision making. For Gammas, we anticipated the greatest fund of information because their norm doubting and externality could combine to drive them to collect more and more facts. The ANOVA indicated that Betas scored significantly higher,  $F(3, 155) = 3.29, p = .02$ , than the other three groups on information competence.

## DISCUSSION

Based on the data-analytic results relative to each hypothesis, we drew four major conclusions. First, we concluded that greater career maturity means, at least for the participants in this study, greater realization of one's potential. Individuals who displayed planful competence in developing their careers also displayed greater psychosocial competence in general. Mature attitudes toward planning the future along with decisional competence and a broad fund of information related positively to self-realization and ego integration. These results showed that fund of information added unique variance, beyond that explained by decisional competence, in predicting realization of potential. This is important relative to the suggestion by some researchers that the Career Development Inventory's two competence scales be collapsed into one scale.

Second, we concluded that the dimensions of career development relate differently to the dimensions of social adjustment. Attitudes related only to

style of adjustment, whereas planning attitudes and the two competencies related to degree of adjustment. Thus, it appears that the cognitive dimension of career development relates more to degree of social adjustment, or realization of potential. In contrast, career development attitudes seem to relate more to style of social adjustment. This distinction between attitudes and competencies coincides with the conception of career development as multidimensional. Furthermore, the finding that each of the four adjustment types were roughly similar in career development competence as well as level of realization supports Gough's contention that the four personality types in his cuboid model (1990) can each develop the competencies needed to realize their potential at work and in relationships.

Third, we concluded that career development attitudes associate with particular styles of adjusting to society, namely the norm upholding and external orientations. However, the orientation toward externality in social engagement does not seem as important in developing mature career development attitudes as whether or not an individual is oriented toward social norms and expectations. The norm-favoring style of adjustment seems particularly related to forming positive attitudes toward meeting social expectations presented as vocational development tasks. We drew this conclusion based on the correlations between the career development dimensions and the personality dimensions.

Fourth, we concluded that beyond the differences attributable to the normative dimension, there were few systematic differences in career maturity among the four personality types. Combining the normative and interpersonal dimensions produced a continuum of career maturity, from highest to lowest, among the four types structured first by the norm-upholding orientation and second by the external orientation: Alphas (upholding, external), Betas (upholding, internal), Gammas (questioning, external), and Deltas (questioning, internal). The fact that both Alphas and Betas favor norms probably explains why the Betas displayed a degree of career maturity very similar to Alphas, who were predicted to and did have the highest degree of career maturity. Despite their similarity on overall career maturity, there were differences in the career development profiles shown by external Alphas and internal Betas. Although similar in attitudes, the Betas displayed better developed competencies than Alphas. Betas scored an effect size of about .4 higher than Alphas on both decisional and information competence; moreover, Betas were significantly higher than the other three groups on informational competence. As expected the Deltas were the lowest on the continuum of career maturity. We had predicted that, of the four types, Deltas would be highest on decisional competence because of their norm-questioning internality. However, none of the groups showed significant differences on decisional competence. The fourth type, Gammas (norm questioning, external) fell midway between Deltas on the one hand and Alphas and Betas on the other hand. The difference between Gammas and Deltas, who are both norm-questioning, seems to be only in planfulness, with the external Gammas dis-

playing more mature attitudes toward planning. It appears that although Gammas may have their doubts, they go along with societal expectations.

We interpreted these four conclusions to mean that Super's (1955) model of career development in adolescence and young adulthood favors a norm-upholding style for fitting work into one's life. The planful competence that characterizes Super's model enables young people to realize their potential in organizations, institutions, and professions that provide guiding structures with obvious and orderly career paths. The norm-favoring orientation seems to manifest itself in planful competence that fosters a "readiness" or "head start" in getting on a career path and staying the course. Being more receptive to socialization, norm-upholding individuals may evolve career patterns characterized by congruence, continuity, and early establishment. These "stable" career patterns are idealized in career theory by normative and prescriptive language such as *fitting in*, *realistic choice*, *consistent preferences*, *planful attitudes*, *rational decision making*, *coherent aspirations*, and person-environment *congruence*. In contrast, norm-questioning types may enact career patterns characterized by multiple trials, discontinuity, and late stabilization. We must not let the language and constructs of career theory blind us to the fact that successful and satisfying careers can be developed through unconventional independence as well as through steady conformity. In fact, the deficiencies in guiding structures caused by dejobbing and disintegration of career paths in contemporary organizations actually require that career theory acknowledge and affirm independent and norm questioning approaches to fitting the work role into a life (Cote, 1997). The change in the landscape of occupations could prompt theory to elaborate a second broad model for developing a career. The first would still be the traditional normative model with its objectivist epistemology prescribing the meaning of *career maturity* and the second might be a singular model with a constructivist epistemology inscribing the meaning of *career adaptability* (Savickas, 1997).

The major theoretical implication of this interpretation is that career maturity relates more to timing of adjustment than to degree of adjustment. If career maturity, as it has been operationally defined since the 1950s, means earlier, rather than later, readiness to select and stay on a career path, then there is little reason to hypothesize that career maturity predicts eventual occupational adjustment. This would explain why it has been difficult to document a long-term connection between adolescent maturity and adult adjustment (Savickas, 1993). Accumulated evidence suggests that greater career maturity in adolescence does not foreshadow more occupational success and satisfaction in middle adulthood, as it might in early adulthood. A refined hypothesis would be that adolescent career maturity predicts earlier stabilization and longer continuity in career patterns not greater success and satisfaction in jobs.

The main implication of these results for practice is the simple advice to career counselors to consider the career maturity model, with its society-minded adherence to social norms, as *a* pathway, not the only pathway, to developing

a career. Given current models and measures of adolescent career development, a norm-questioning orientation to forming a vocational identity can easily be mistaken as immaturity or psychopathology. What may appear, from the vantage point of current career theory, to be "indecisiveness" or "unrealism" could actually reflect a norm-questioning and internal orientation to constructing an identity and developing a singular career. An approach to interpersonal relationships characterized by a sense of internally derived authority and autonomy may structure a self-authoring, not society-minded, orientation to career development. Further research is needed to explore the construct of a self-authoring orientation to career development and to determine if it should complement the society-minded orientation so prevalent in contemporary career theory and practice.

Although limited by involving a cross-sectional design, single operational definitions of the constructs, and only 200 participants from one university, the results of this study do augur well for continuing to merge career theory and research with contemporary models in mainstream developmental and personality psychology. We would like to see studies that follow up the small beginning we have made herein. We are particularly interested in studies that examine whether career indecision is greater in norm-questioning individuals, as career maturity was greater in norm-upholding individuals.

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# Multidimensional Properties of the LOT-R: Effects of Optimism and Pessimism on Career and Well-Being Related Variables in Adolescents

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The Life Orientation Test–Revised (LOT-R), measures of career maturity, career decision-making, career goals, and well-being were administered to 504 high school students. Exploratory and confirmatory factor analyses demonstrated bidimensionality rather than unidimensionality for the LOT-R, with the two factors of optimism and pessimism being largely unrelated. Those with high optimism reported high levels of career planning and exploration, were more confident about their career decisions, and had more career related goals. Those with high pessimism reported low levels of career and decision-making knowledge, were more career indecisive, and reported low levels of school achievement. For well-being, those with high levels of optimism reported high levels of self-esteem and low levels of psychological distress, whereas those with high levels of pessimism reported low levels of self-esteem and more psychological distress.

**Keywords:** Optimism, pessimism, career maturity, career decision making, self-esteem, career goals

Positive Psychology has received renewed interest by researchers over the past decade. Of particular focus has been the area of optimism, recognised as

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 42-61  
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a generalised tendency to expect positive outcomes or the belief that “good rather than bad things will happen in a person’s life” (Scheier & Carver, 1993, p. 26). Optimism performs a self-regulatory function in determining whether an individual will initiate or maintain working toward desired goals. Carver and Scheier (1981, 1982) have described this process within their Control Theory. This theory postulates that as long as individuals’ expectancies of eventual success are sufficiently favourable, they are likely to remain engaged in efforts to reach desired goals despite adversities that may arise. However, when individuals’ doubts become too severe, they are more likely to give up on their goals in the face of adversity. These alternative facets represent optimism and pessimism, respectively. The differences in individuals’ expectancies are assumed to correspond with variations in their affect. For example, when individuals attain sufficient movement toward their desired goals, their affect is positive. Yet, when movement is sufficiently impeded, individuals experience negative affect.

The most commonly utilised measure of optimism is the Life Orientation Test (LOT) developed by Scheier and Carver (1985). This scale contains eight items, four negatively and four positively phrased, which determines an individual’s level of optimism. Recently, Scheier, Carver, and Bridges (1994) modified the LOT as they found that two of the original positively phrased items were measuring an individual’s method of coping rather than generalised expectancies. For the LOT-Revised (LOT-R) the two coping items were removed, an additional positively phrased item was included, and one negatively worded item was not included in the scoring. To date, research investigating optimism has mainly utilised the original LOT incorporating the two coping items.

Over the past decade much confusion and controversy has arisen regarding the dimensionality of the LOT. Scheier and Carver (1985) have preferred the unidimensional view, that is, optimism and pessimism form polar opposites. This suggests that an individual can be either optimistic or pessimistic but cannot be both. It is their opinion that the two separate dimensions that do emerge in some studies probably reflect differences in item wording rather than content. Some research, however, indicates that this view may be inaccurate and that optimism can be better conceptualised as two partially independent dimensions on which an individual can score positively or negatively.

Numerous studies have provided evidence for a conceptualisation of optimism and pessimism as separate constructs (Chang, Maydeu-Olivares, & D’Zurilla, 1997; Lai, 1994; Mroczek, Spiro, Aldwin, Ozer, & Bosse, 1993). Specifically, Marshall, Wortman, Kusulas, Hervig, and Vickers (1992) conducted exploratory and confirmatory factor analyses on the LOT and revealed that a two-factor model was superior when explaining optimism. They also found that optimism was predominantly related to extraversion and positive affect, whereas pessimism was principally associated with neuroticism and negative affect. The authors concluded that important information may be lost without separate measures for both optimism and pessimism. In a

more recent study, Robinson-Whelen, Kim, MacCallum, and Kiecolt-Glaser (1997) examined whether optimism or pessimism was a more important predictor of health and well-being among adults experiencing severe, chronic stressors than those who were not. Using factor analysis, they found, similar to Marshall et al. (1992), optimism and pessimism to be separate, largely independent constructs. Further, they found that pessimism, but not optimism, was able to predict health and well-being, confirming that the two dimensions related to external variables in a different manner.

Further support for the bidimensionality of the LOT is associated with the low degree of relationship found between the two dimensions. For adult samples, Plomin et al. (1992) found that optimism and pessimism were uncorrelated. Mroczek et al. (1993) reported a moderate correlation ( $-.28$ ). Dember, Martin, Hummer, Howe, and Melton (1989) reported an average correlation of  $-.55$  across two samples. Marshall, Wortman, Kuslas, Hervig, and Vickers (1992) reported correlations of  $-.54$  and  $-.47$  in two young male samples. Both latter studies considered these correlations insufficient to warrant viewing optimism and pessimism as a single construct. Myers and Steed (1999) found optimism and pessimism to be moderately correlated ( $.50$ ) in a sample of university students, and drew a similar conclusion. These low to moderate relationships argue that the constructs are relatively independent, and important information could be lost if not measured separately.

Researchers have identified that there is a greater degree of independence of the constructs in older adult samples than in younger samples. The studies that have found moderate correlations of  $.40$  or greater have generally utilised younger populations (Dember et al., 1989; Marshall et al., 1992; Myers & Steed, 1999). A cognitive developmental view has been proposed to account for these findings. This perspective suggests that younger thinkers often "approach problems more dualistically and accept a more black versus white view of reality than older adults" (Labouvie-Vieff, 1992, cited in Robinson-Whelen et al., 1997, p. 1351).

In relation to the dimensionality of the LOT-Revised, Mehrabian and Ljunggren (1997) used both exploratory and confirmatory factor analysis techniques that yielded one factor. They found a correlation of  $-.56$  ( $-.82$  when corrected for attenuation) between the two dimensions, and concluded that this provided evidence for unidimensionality. Lai and Wong (1998) also used confirmatory factor analysis with a Hong Kong Chinese sample and found that their adapted version of the LOT-R (C-RLOT) was best represented by a one-factor model. On the other hand, Burke, Joyner, Czech, and Wilson (2000) contrasted the LOT-R with the Optimism/Pessimism Scale (OPS; Dember et al. 1989), and demonstrated that the two scales were not measuring similar constructs and found only a modest correlation between LOT-R optimism and LOT-R pessimism ( $-.30$ ), concluding that the two dimensions were relatively independent.

Adding support to the bidimensionality view of the LOT is the way that optimism and pessimism relate differently to external variables. Myers and Steed (1999) found that individuals who used repressive coping strategies (i.e., avoiding negative affect rather than seeking positive affect) scored higher than controls on pessimism, but had overlapping scores on optimism. Marshall et al. (1992) found pessimism to be correlated predominantly with neuroticism and negative affect. Robinson-Whelen et al. (1997) contrasted a sample of stressed home caregivers with non-caregiving residents and found that negative affectivity, anxiety, and depression correlated more highly with optimism among the stressed adults. Further, these authors found that pessimism, but not optimism, was a better predictor of psychological and physical health outcomes a year later.

Dispositional optimism has a future orientation in that it concerns an individual's generalised expectations. Research to date has primarily focused on its association with outcomes for psychological and physical health issues, such as breast cancer (Carver et al., 1993), gay men at risk for AIDS (Taylor et al., 1992), academic adjustment at university (Aspinwall & Taylor, 1992), coping (Carver, Scheier, & Weintraub, 1989; Harju, & Bolen, 1998; Myers & Steed, 1999; Scheier & Carver, 1992), stress (Chang, 1998), and postpartum depression (Carver & Gaines, 1987). Studies to date have also largely focused on university and adult samples. There has been little research that has tested the dimensionality of the LOT with younger groups, nor has there been research that has examined the correlates of optimism and pessimism with external variables for this age group.

One area with a strong future focus is career decision making, where choices are made that strongly influence life directions and outcomes. Career issues are particularly salient for adolescent populations where young people need to be informed, skilled, and confident to set future goals and make career-related decisions. Important to this life transition from education to work are young peoples levels of career maturity, their career related decision-making abilities, and the clarity of their future occupational goals. Career maturity refers, broadly, to the individual's readiness to make informed, age-appropriate career decisions and cope with career development tasks (Savickas, 1989). Definitions include the individual's ability to make appropriate career choices, including awareness of what is required to make a career decision and the degree to which one's choices are both realistic and consistent over time (Levinson, Ohler, Caswell, & Kiewra, 1998). Crites's (1971) model of career maturity proposed that it consists of an affective dimension and a cognitive dimension. The cognitive dimension is composed of decision-making skills, and the affective dimension includes attitudes toward the career decision making process. Only one investigation was identified that related specifically to career issues. Geers (2000) examined expectations regarding academic, health, and external and future class grade outcomes in relation to optimism and pessimism (assessed by the LOT and

OPS). Optimism and pessimism correlated differentially with these variables. Academic, health, and external outcomes were associated with optimism, while future class grade was related to pessimism.

Based on the research reviewed thus far, the dimensionality of the LOT remains unclear, and there have been very few studies that have examined the factor structure of the revised LOT-R. Neither scale has been tested on adolescent samples, nor has the construct of optimism been examined in relation to career planning, where a future orientation is the primary focus. The present study will test the factor structure of the LOT-R on a sample of school-based adolescents, and examine the correlates of pessimism with well-utilised well-being variables and to newly examined variables of career maturity. Given previous research on the LOT it is expected that a two-factor model will better fit the data for the LOT-R, and that these two factors will only be moderately correlated. As with previous research it is also expected that these separate factors will correlate differently with measures of well-being. Lastly, given the future focus of career-related variables and their likely sensitivity to life orientation, it is also expected that the separate factors will correlate differently with these variables.

## METHOD

### Participants

Participants were 504 high school students attending Grades 8 through 12 at one Australian high school in southeastern Queensland. The school was suburban based in a medium sized city, and was established as middle level socioeconomic based on its location. There were no significant ethnic groupings, which reflected the broad cultural nature of the Australian population. Participants were drawn from a larger database (see Patton & Creed, 2001) and represented all students in these grades who fully completed the survey form. Fifty-two percent of participants were female, ranging in age from 12.48 to 18.51 years ( $M = 14.96$  years,  $SD = 1.52$  years). There were 155 students from Grade 8, 61 from Grade 9, 125 from Grade 10, 88 from Grade 11, and 75 from Grade 12. On a self-report measure of School Achievement, 10.8% indicated they typically achieved less than a Satisfactory Achievement (SA) level at school, 11.3% indicated they typically achieved SA, 19.7% achieved between SA-High Achievement (HA), 23.4% achieved HA, 19.5% achieved between HA-Very High Achievement (VHA), and 15.4% achieved VHA.

## Instruments

### *Optimism*

The Life Orientation Test–Revised (LOT-R; Scheier, Carver, & Bridges, 1994) is a 10-item scale, with 4 filler items and 6 scale items. LOT-R Total scores are calculated by summing the three positively worded and three negatively worded items (these are reverse coded). Respondents are asked to indicate their level of agreement with each of the items on a 4-point scale, ranging from *strongly agree* to *strongly disagree*. This gives a possible score range of 6 to 24, with higher scores indicating more optimism. Scheier, Carver, and Bridges report an internal reliability coefficient of .78 for an undergraduate sample. The corresponding internal reliability coefficient for the sample in the present study was .60. LOT-R Optimism (total of the three positively worded items) and LOT-R Pessimism (total of three negatively worded items) were also calculated. Internal reliability coefficients for these subscales were .62 (Optimism) and .78 (Pessimism).

### *Career Maturity*

The Australian version of the Career Development Inventory (CDI-A; Lokan, 1984) has 72 items and is designed for students in Grades 8 through 12. It measures several aspects of career development, including career planning orientation, awareness and use of resources, knowledge of the career development process, knowledge of the world of work, and knowledge and use of decision making principles. Four subscales and two composite scales were examined in this study. The four subscales were Career Planning (CP; 20 items), Career Exploration (CE; 16 items), World of Work Information (WW; 24 items), and Career Decision Making (DM; 12 items). The two composite scales were Career Development Attitude (CDA; CP and CE combined) and Career Development Knowledge (CDK; WW and DM combined). Adequate reliability and validity data are reported in the manual (Lokan), and represent similar psychometric properties to those reported for the American inventory (Pinkney & Bozik, 1994). Internal reliability coefficients calculated in the present study were .91 (CP), .77 (CE), .85 (WW), .74 (DM), .91 (CDA), and .89 (CDK).

### *Career Decision Making*

The Career Decision Scale (CDS; Osipow, 1987) consists of two subscales, the CDS-Indecision scale (16 items) that provides a measure of career indecision, and the CDS-Certainty scale (2 items) that indicates the degree

of certainty that the respondent feels in having made a career decision. Participants are asked to respond by indicating on a 4-point scale whether the item was *not at all like me* to *exactly like me*. Higher scores on CDS-Indecision indicate greater indecision; higher scores on CDS-Certainty indicate greater certainty. Internal consistency coefficients have been consistently reported in the .80 range (Hartman, Fuqua, & Hartman, 1983). Internal reliability coefficients calculated in the present study were .90 for CDS-Indecision and .78 for CDS-Certainty. Concurrent validity (Hartman & Hartman, 1982), construct validity (Hartman et al., 1983) and predictive validity (Hartman, Fuqua, Blum, & Hartman, 1985) have all been adequately demonstrated.

### *Career Goal Setting*

A 6-item scale (Mu, 1998) was used to measure the level of career-related goal setting (CGS). The six items were "I have a clear set of goals for my future; I know what I want to do in terms of an occupation or career; I believe my occupational/career goals are realistic; I believe I will be able to achieve my occupational/career goals; I am clear about the steps I need to take to achieve my occupational/career goals; I am taking the steps necessary to achieve my occupational/career goals." Respondents were asked to indicate their agreement with each item on a 5-point scale with end points of *strongly agree* to *strongly disagree*. This gave a possible score range of 6 to 30, with higher scores representing more career related goal setting. Mu (1998) reported an internal reliability of .92 with his sample of high school students. The internal reliability coefficient in the present study was .90.

### *Self-Esteem*

The 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965) was used to provide a measure of global evaluation of self-worth. The RSE is the most widely used instrument for the measure of this construct (Blascovich & Tomaka, 1991). Participants are asked to respond by rating how strongly they agree with each statement on a 4-point scale, using anchors of *strongly agree* to *strongly disagree*. The total score has a possible range of 10 to 40, with higher scores indicating higher self-esteem. The internal reliability coefficient for this sample was .85.

### *Psychological Well-Being*

The 12-item version of the General Health Questionnaire (GHQ; Goldberg, 1972) was used to measure psychological distress. The 12-item

version has been widely used and recommended for use as a screening device with young people (e.g., Winefield, Goldney, Winefield, & Tiggemann, 1989). Respondents are asked to report on how they felt recently on a range of variables, including cognitive processing, self-esteem, anxiety, and depression (e.g., "Have you recently been able to concentrate on whatever you're doing?"). Responses were scored on a 4-point scale from 0 to 3 using anchors such as *better than usual*, *same as usual*, *less than usual*, *much more than usual*. Scores were totalled to produce global ratings with a score range of 0 to 36. Higher scores indicated more psychological distress. The internal reliability coefficient for this sample was .87.

## Procedure

Survey forms containing the six scales (LOT-R, CDI-A, CDS, CGS, RSE, GHQ-12) and asking questions about age, gender, and school achievement were administered to all students in Grades 8 through 12 in the secondary school that participated in the study. The classroom teachers who had been provided with instructions regarding the administration protocol administered the survey forms.

The total sample utilised in the study was 504 student participants. In order to test the hypothesised dimensionality of the LOT-R, this sample was randomly split into two groups. These groups were then compared to determine if any bias resulted from the process of the split. One resultant group was then subjected to an exploratory factor analysis (principal-axis factor analysis with varimax rotation), and the second group was subjected to two confirmatory factor analyses (Arbuckle & Wothke, 1995) to test for a single or two-factor model for the LOT-R. A series of cross-sectional analyses was then conducted to determine whether the LOT-R measures responded differently to a range of outside (demographic, career, and well-being related) variables.

## RESULTS

### Original Sample and Random Split

The original sample of 504 was randomly split into two subgroups of 253 and 251 study participants, respectively. Chi-square and independent sample *t* tests found no differences between the two groups on any of the demographic (age, gender), career, or well-being related variables, indicating no manipulation bias. Summary data for the original sample and the two randomly split subgroups are reported in Table 1.

**Table 1**  
**Mean and Standard Deviation Scores for the Total Sample and the Two**  
**Groups, and *t* Values for Tests of Differences Between the Two Groups**

	Total Sample			Group 1			Group 2			<i>t</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
<b>LOT-R</b>										
LOT-R (Total)	504	16.47	2.88	253	16.43	2.77	251	16.51	2.98	-0.29
LOT-R (Pessimism)	504	7.47	2.14	253	7.55	2.13	251	7.38	2.14	0.88
LOT-R (Optimism)	504	8.94	1.81	253	8.98	1.78	251	8.89	1.85	0.57
<b>Career variables</b>										
CDI-A (CDA)	500	98.79	18.79	252	100.10	17.94	248	97.47	19.57	1.56
CDI-A (CDK)	504	20.98	7.61	253	20.82	7.35	251	21.14	7.89	-0.47
CDI-A (CP)	501	60.86	13.21	243	61.78	12.52	248	59.92	13.84	1.58
CDI-A (CE)	503	38.01	7.67	252	38.31	7.46	251	37.71	7.89	0.88
CDI-A (WW)	504	14.97	5.28	253	14.86	5.12	251	15.09	5.43	-0.50

CDIA (DM)	504	6.00	3.00	253	5.96	2.88	251	6.04	3.13	-0.31
CDS (CER)	502	5.56	1.67	253	5.68	1.57	249	5.44	1.76	1.60
CDS (IND)	494	33.95	10.31	251	34.03	10.41	243	33.86	10.24	0.18
CGS	498	23.04	5.61	250	23.26	5.17	248	22.81	6.02	0.90
School Achievement	462	6.65	1.78	228	6.66	1.80	234	6.65	1.77	0.08
<b>Well-being variables</b>										
Self-Esteem	496	29.88	5.77	249	29.92	5.77	247	29.85	5.78	0.13
GHQ-12	500	11.62	6.40	250	11.56	6.49	250	11.67	6.33	-0.19
<b>Demographic variable</b>										
Age	504	14.96	1.52	253	14.96	1.57	251	14.96	1.47	-0.00

*Note.* Sample sizes differ as not all participants completed all scales. Lot-R = Life Orientation Test–Revised; Lot-R (Total) = total of 6-item LOT-R scale with higher scores representing higher levels of optimism; LOT-R (Pessimism) = total of 3-item Pessimism subscale of LOT-R with higher scores representing more pessimism; LOT-R (Optimism) = total of 3-item Optimism subscale of LOT-R with higher scores representing more optimism; CDI-A (CDA) = Career Development Attitude composite scale of the Career Development Inventory–Australia; CDI-A (CDK) = Career Development Knowledge composite scale of the CDI-A; CDI-A (CP) = Career Planning subscale of the CDI-A; CDI-A (CE) = Career Exploration subscale of the CDI-A; CDI-A (WW) = World of Work subscale of the CDI-A; CDI-A (DM) = Decision Making subscale of the CDI-A; CDS (CER) = Certainty subscale of the Career Decision Scale; CDS (IND) = Indecision subscale of the CDS; GS = 6-item Career Goal Setting scale; GHQ-12 = 12-item General Health Questionnaire.

**Table 2**  
**Principal Axis Factor Estimates of the**  
**Orthogonal (Varimax) Factor Loadings for the LOT-R**

Item	Factor 1	Factor 2
I rarely count on good things happening to me	<u>.81</u>	.04
I hardly ever expect things to go my way	<u>.74</u>	-.01
If something can go wrong for me, it will	<u>.63</u>	-.05
Overall, I expect more good things to happen to me than bad	.09	<u>.66</u>
I am always optimistic about my future	.05	<u>.61</u>
In uncertain times I usually expect the best	-.14	<u>.45</u>

*Note.*  $n = 253$ . LOT-R = Life Orientation Test-Revised. Underlined values indicate highest factor loadings.

### Exploratory Factor Analysis of the LOT-R

To estimate the factor structure of the LOT-R, an exploratory factor analysis using principal axis factoring with an orthogonal (varimax) rotation was conducted on Group 1. This analysis identified two factors accounting for 62.10% of the variance. This solution was factorially simple and interpretable, with three items loading on Factor 1 (eigenvalue = 2.08, variance explained = 34.66%; eigenvalues and percentage variance derived from initial principal axis factoring) and three items loading on Factor 2 (eigenvalue = 1.65, variance explained 27.44%). The items loading on Factor 1 were the three items considered to represent Pessimism; loading on Factor 2 were the three items considered to represent Optimism. These results support categorization of the LOT-R into two separate factors tapping Pessimism and Optimism. Factor loadings after rotation are reported in Table 2.

### Confirmatory Factor Analysis of the LOT-R

Confirmatory factor analysis (CFA) based on the 251 participants from Group 2 was conducted using Amos Version 4.0 (Arbuckle & Wothke, 1995). In a CFA, an a priori structure is posited and the adequacy of how well the data fit this structure is tested. The purpose here was to evaluate the two competing interpretations reported for the factor structure of dispositional optimism (as measured by the LOT-R), that is, (Model 1) that the LOT-R is a unidimensional measure (e.g., Scheier & Carver, 1992), and (Model 2; which is consistent with the exploratory factor analysis results in the present study), that the LOT-R has a two-factor structure. For Model 1, the six LOT-R items were allowed to load freely on a single latent factor representing Optimism. For Model 2, the three optimism items were allowed to load

freely on a latent factor representing Optimism, and the three pessimism items were allowed to load freely on a latent factor representing Pessimism. The correlation between the two latent factors in Model 2 was freely estimated. Variances for all latent factors were fixed at unity to identify the models. Chi-square values and subjective indices of fit for the two analyses are reported in Table 3.

Firstly, the results of the CFA analyses indicated that Model 2, the two-factor model, fit the data considerably better than Model 1, the one-factor model. Secondly, the chi-square results and all of the subjective indices indicated that Model 2 was a good fit to the data, while the fit for Model 1 was less than acceptable. In the two-factor model the correlation between the latent Pessimism and latent Optimism factors was .16, indicating little shared variance between the two variables. The evidence here with this adolescent sample is that the LOT-R reflects two largely uncorrelated latent factors that can be labelled Pessimism and Optimism.

### Relationship With Career-Related Variables

To test how the LOT-R measures of Optimism and Pessimism related to external variables, bivariate correlations were calculated between the LOT-R Optimism, LOT-R Pessimism, LOT-R Total, and the career, well-being, and demographic variables. Despite the LOT-R loading on the two factors of Optimism and Pessimism in this study, the LOT-R has been examined in other studies as a unidimensional construct. To allow for a contrast between the use of the factor scores (of Optimism and Pessimism) and the total score of the LOT-R, the LOT-R Total was also included in this correlational analysis (see Table 4).

For career maturity, small to moderate significant associations were found between the LOT-R Total and all CDI-A measures (CDA, CDK, CP, CE, WW, DM). The separate factor scores of LOT-R Optimism and LOT-R Pessimism, however, present a different picture. Career Development Attitude (CDI-A CDA) was moderately positively correlated with LOT-R Optimism, such that higher levels of optimism were associated with more career planning and exploration, while there was no association between LOT-R Pessimism and Career Development Attitude. On the other hand, there was no association between LOT-R Optimism and Career Development Knowledge (CDI-A CDK), while LOT-R Pessimism was moderately negatively correlated with Career Development Knowledge, such that higher levels of pessimism were associated with lower levels of knowledge about the world of work and decision-making strategies. This career maturity double dissociation is reflected in the subscales of the CDI-A (CP, CE, WW, and DM).

For career decision making, there was a small positive correlation between LOT-R Total and decision-making certainty (CDS-CER). This masked a

**Table 3**  
**Chi-Square and Goodness-of-Fit Indices for Models of LOT-R**

Model	<i>df</i>	$\chi^2$	GFI	AGFI	IFI	NFI	TLI	CFI	RMSEA	PCLOSE
1-Factor	9	115.29**	.86	.67	.69	.67	.48	.69	.22	.00
2-Factor	8	11.47	.99	.96	.99	.97	.98	.99	.04	.55

*Note.*  $n = 251$ . LOT-R = Life Orientation Test–Revised; GFI = Goodness-of-Fit; AGFI = Adjusted Goodness of Fit; IFI = Incremental Fit Index (Hair, Anderson, Tatham, & Black, 1995); NFI = Normed Fit Index (Bentler & Bonnet, 1980); TLI = Tucker-Lewis Index (Tucker & Lewis, 1973); CFI = Comparative Fit Index (Bentler, 1990); RMSEA = Root Mean Square Error of Approximation; PCLOSE = Probability of Close Fit (Browne & Cudeck, 1993).

\*\* $p < .001$ .

**Table 4**  
**Pearson Product–Moment Correlations Between LOT-R Total,  
 LOT-R Optimism, LOT-R Pessimism, and Career,  
 Well-Being, and Demographic Variables**

External variable	LOT-R		
	Total	Optimism	Pessimism
<b>Career variables</b>			
CDI-A (CDA)	.20**	.24**	-.07
CDI-A (CDK)	.17**	-.02	-.25**
CDI-A (CP)	.20**	.26**	-.05
CDI-A (CE)	.15*	.15*	-.08
CDI-A (WW)	.14*	-.02	-.21**
CDI-A (DM)	.19**	-.02	-.27**
CDS (CER)	.14*	.26**	.03
CDS (IND)	-.24**	.01	.33**
CGS	.12*	.24**	.04
School Achievement	.20**	.06	-.22**
<b>Well-being variables</b>			
Self-Esteem	.55**	.34**	-.45**
GHQ-12	-.38**	-.37**	.19**
<b>Demographic variable</b>			
Age	-.01	.01	.02

*Note.* Sample sizes differ as not all participants completed all scales. Lot-R = Life Orientation Test–Revised; Lot-R (Total) = total of 6-item LOT-R scale with higher scores representing higher levels of optimism; LOT-R (Pessimism) = total of 3-item Pessimism subscale of LOT-R with higher scores representing more pessimism; LOT-R (Optimism) = total of 3-item Optimism subscale of LOT-R with higher scores representing more optimism; CDI-A (CDA) = Career Development Attitude composite scale of the Career Development Inventory–Australia; CDI-A (CDK) = Career Development Knowledge composite scale of the CDI-A; CDI-A (CP) = Career Planning subscale of the CDI-A; CDI-A (CE) = Career Exploration subscale of the CDI-A; CDI-A (WW) = World of Work subscale of the CDI-A; CDI-A (DM) = Decision Making subscale of the CDI-A; CDS (CER) = Certainty subscale of the Career Decision Scale; CDS (IND) = Indecision subscale of the CDS; GS = 6-item Career Goal Setting scale; GHQ-12 = 12-item General Health Questionnaire.

\* $p < .01$ . \*\* $p < .001$ .

moderate positive correlation with LOT-R Optimism, such that higher levels of optimism were associated with more career decision-making certainty, and no correlation with LOT-R Pessimism. Similarly, there was a moderate negative correlation between LOT-R Total and career indecision, which masked a moderate positive correlation with LOT-R Pessimism, and no correlation with LOT-R Optimism. Similarly, a modest positive association between LOT-R Total and career goal setting masked a moderate positive correlation

with LOT-R Optimism and no correlation with LOT-R Pessimism. Lastly, for school achievement, a moderate correlation with LOT-R Total reflected a moderate negative association with LOT-R Pessimism, and no association with LOT-R Optimism. In summary, for the career-related variables, those with high levels of optimism (LOT-R Optimism) reported high levels of career planning and exploration, were more decided about their career decisions, and had more career-related goals. Those with high levels of pessimism (LOT-R Pessimism) reported low levels of career and decision-making knowledge, were more career indecisive, and reported low levels of school achievement.

For the well-being variables, more intuitive results are reported. Those with higher levels of optimism (LOT-R Optimism) reported higher levels of self-esteem and lower levels of psychological distress. Those with higher levels of pessimism (LOT-R Pessimism) reported lower levels of self-esteem and more psychological distress. Lastly, no associations were identified between optimism or pessimism and age.

## DISCUSSION

The results of the current study support the hypothesis that optimism and pessimism, as measured by the LOT-R, are separate, largely unrelated constructs as proposed by previous researchers who tested this hypothesis on adult samples (e.g., Chang et al., 1997; Marshall et al., 1992; Robinson-Whelen et al., 1997). The current results contribute to the present literature by demonstrating the bidimensionality of the LOT-R with an adolescent sample. Support for bidimensionality comes also from the weak correlation (.16) found between the constructs in the present study. This low relationship suggests there is very little shared variance between the two factors.

Previous research has found that there is a greater degree of independence between the constructs of optimism and pessimism in older adult samples (e.g., -.28; Mroczek et al., 1993) than younger adult samples (e.g., -.47 to -.54; Marshall et al., 1992). A cognitive developmental view has been presented to account for this finding, proposing that younger adults have a more black and white view of reality and approach problems more dualistically than older adults. The current study utilizing an adolescent sample does not support this proposition or the developmental explanation for it. Robinson-Whelen et al. (1997) found that during times of chronic stress individuals tended to view the future dualistically, considering both positive and negative aspects. This implies that the immediate situation experienced by the individual rather than the developmental stage they are at might be the important feature associated with optimism and pessimism. There was no reason to suppose that the students in the present study were experiencing great stress or situations that might have impacted on optimism/pessimism

in this way. It is possible that this was the explanation for the low correlation between optimism and pessimism and needs to be explored in future research.

Further support for the bidimensionality nature of optimism comes from the way optimism and pessimism related to the external variables examined. Based on the future focus of optimism/pessimism in regard to expectations, this study examined the relationship between optimism and career-related variables (career maturity, decision-making, and goals) which also have a future orientation and are a pertinent issue at this stage of adolescent development. It was predicted that the optimism and pessimism constructs would relate differently to the external career variables. It was shown that those with high levels of optimism demonstrated higher levels of career planning and exploration, were more decided about their career decisions, and had more career-related goals. Conversely, those with higher levels of pessimism were depicted with lower levels of career and decision-making knowledge, were more career indecisive, and reported lower levels of school achievement. When examining these associations it was clear that the total LOT-R scores masked meaningful correlations between the career-related variables and the separate optimism and pessimism constructs. These findings emphasise the importance of investigating optimism and pessimism independently, as utilising the total score of the LOT-R does not present a clear picture of the relationships that are occurring between external variables and optimism/pessimism. These findings also indicate that optimism and pessimism may have a key role to play in adolescent career development and orientation. If positive expectations of the future for adolescents can be fostered then they will be more likely to demonstrate higher levels of career planning and exploration, be more confident about their career decisions, and have more career-related goals. Thus, when developing interventions or programs that focus on career orientation in adolescents, an important component will be to include methods to increase the participants' levels of optimism.

The validity of the career-related findings is enhanced as the results for the associations between optimism and pessimism and well-being (the stable self-esteem variable and the state-like psychological distress variable) are consistent with previous studies (Aspinwall & Taylor, 1992; Scheier & Carver, 1992). Those with higher levels of optimism reported higher levels of self-esteem and lower levels of psychological distress. Those with higher levels of pessimism reported lower levels of self-esteem and more psychological distress.

Researchers are beginning to recognise the importance of investigating the positive and negative facets of optimism, affect, and cognition. The empirical evidence has revealed that positive and negative affect or cognitions, and likewise optimism, are not polar opposites as originally thought. The literature has demonstrated that individuals are capable of experiencing positive and negative facets of affect and cognition at the same time in varying degrees (Ito & Cacciopo, 1998). Accumulating evidence is also demonstrating that individuals can experience optimism and pessimism simultane-

ously in varying degrees (Burke et al., 2000; Chang et al., 1997; Marshall et al., 1992). The present study supports the conceptualisation of optimism and pessimism as separate constructs. The implication inherent in this finding is the importance of investigating optimism and pessimism independently when conducting further research in this area. Obtaining a single score for optimism is no longer appropriate, and it is recommended that two scores be obtained, one for optimism and one for pessimism.

Based on the present findings, a number of areas require further examination. Research needs to examine the developmental paths of dispositional optimism and dispositional pessimism in general and specifically in relation to the development of career maturity variables for young people. Related to this, the importance of optimism/pessimism in determining an individual's career-related activities and career path influences need to be examined. For example, how does optimism impact study behaviour or obtaining work experience, and what are the mediating factors playing a role here? It is likely that optimism and pessimism research will prove a productive avenue to facilitate a better understanding of the career development of adolescents.

### Limitations

There are a number of limitations that need to be considered for the current study. First, the external validity of the findings is restricted to the population utilised. Second, there are concerns about common method variance as self-report measures were the only form of assessment. In future, it would be useful to utilise a multi-modal approach (such as observation and interviews in conjunction with self-report measures). Third, correlational analyses were applied to understand the relationships between the various constructs. Future research would benefit by testing causal models on data collected over more than one occasion. Finally, the internal reliability of the total LOT-R Optimism subscale was quite low. The psychometric properties of the LOT-R should be examined further with adolescents to confirm the scale's applicability with this population.

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# The Structural Validity of Holland's R-I-A-S-E-C Model of Vocational Personality Types for Young Black South African Men and Women

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This study examined the validity of Holland's circular order model of vocational personality types for young black South African men and women. The validity of the model was investigated for four groups, namely men and women from the Eastern Cape Province, and men and women from the North West Province. The randomization test of hypothesized order relations and the accompanying correspondence index suggested that the data of all four groups fit the circular order model poorly. The results of multidimensional scaling analyses also suggested poor fit. These results indicate that the circular order model may not be valid for black South African youths. Reasons for the unsatisfactory fit between the model and the observed data are discussed.

**Keywords:** Vocational interests, cross-cultural, hexagonal model, vocational personality types, structure of vocational interest, circular order model

John L. Holland's (1973, 1985, 1997) structural model of vocational personality types has generated a substantive body of empirical research and academic debates (Borgen, 1991; Tinsley, 1992, 2000). The model has also led to the development of interest inventories, such as the Vocational Preference Inventory (Holland, 1985) and the Self-Directed Search (SDS; Holland,

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**AUTHOR'S NOTE:** We thank Terence J. G. Tracey for his assistance in interpreting the randomization test results.

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 62-77  
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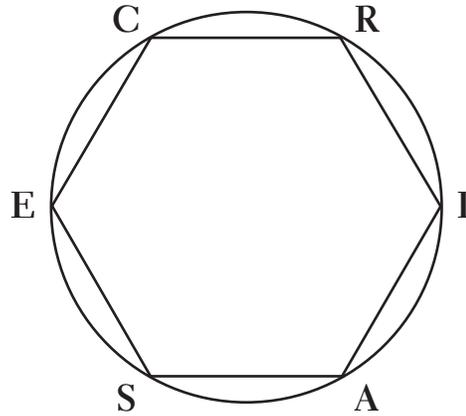


Figure 1. Holland's circular order model. R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional.

Fritzche, & Powell, 1994), that are widely used for career counseling purposes. Holland (1973, 1985, 1997) postulates the existence of six vocational personality or interest types: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). This model can be spatially represented as a circular R-I-A-S-E-C ordering of the six types (see Figure 1). The circular ordering leads to a number of predictions about the relationships between the types. Specifically, the correlations among adjacent types (RI, IA, AS, SE, EC, and CR) are expected to be greater than the correlations among alternate type pairs (RA, IS, AE, SC, ER, and CI) and pairs of opposite types (RS, IE, and AS). The correlations among alternate type pairs (RA, IS, AE, SC, ER, and CI) are also expected to be greater than the correlations among pairs of opposite types (RS, IE, and AS) (Rounds, Tracey, & Hubert, 1992).

A more constrained version of the model, namely the circumplex model, requires that the distances between opposite, adjacent, and alternate types are equal (Tracey & Rounds, 1997). This model can be visually represented as an equilateral hexagon (see Figure 1). In the present study the focus falls on the less restrictive version of Holland's model of vocational personality types, namely the circular order model.

A meta-analysis of 77 R-I-A-S-E-C matrices by Tracey and Rounds (1993) provided support for the hypothesized circular ordering of the six personality types in the United States of America. The study also showed that the structure of the circular order model is invariant across gender. However, most of the correlation matrices included in the meta-analysis reflected data obtained from white English-speaking Americans and it is not clear whether the findings also apply to other ethnic or language groups.

It cannot be automatically assumed that the circular order model is valid in cultures and countries other than the U.S. Hence, it is important to empirically evaluate the cross-cultural generalizability of the model. If the circular order model does not fit in a particular country or culture, it indicates that the meaning of the six vocational personality types in that country or culture may be different from the meaning of the types in the U.S. This has important implications for career counseling practice—if the structural relations among the personality types are different in a new culture or country, then interpretations based on Holland's theory and research findings in the U.S. are not necessarily applicable. Rounds and Day (1999) summarizes the importance of cross-cultural studies into the structure of vocational interest measures:

A pressing question today involves whether vocational interest measures and scales can be applied cross-culturally and multiculturally. If different groups consistently respond in different patterns to the same measures, one explanation is that the groups have differing mental representations of the world of work. This is a matter of structure: If it is not cross-cultural, scores on interest inventories cannot be interpreted the same way for all people. In other word [sic], the construct validity of the measures is in doubt. (Rounds & Day, 1999, p. 104)

The support for the cross-cultural validity of Holland's circular order model has been mixed, with some researchers reporting support (see for instance Fouad & Dancer, 1992; Hansen, Sarma, & Collins, 1999; Harrington & O'Shea, 1980; Swanson, 1992), and others reporting limited or no support (see for instance Alves Ferreira & Hood, 1995; Feldman & Meir, 1976; Glidden-Tracey & Parraga, 1996; Haverkamp, Collins, & Hansen, 1994). One shortcoming of cross-cultural studies into the circular order model is that researchers often rely on visual inspection of R-I-A-S-E-C correlation matrices or graphical multidimensional scaling solutions to evaluate the fit between the data and the hypothesized circular order model. Rounds et al. (1992) emphasized that visual inspection provides inadequate tests of the circular order model.

Hubert and Arabie (1987) have provided researchers with a randomization test that can be used to statistically test hypotheses about ordered relations between variables in a correlation matrix. Rounds and Tracey (1996) used the randomization test in a comprehensive cross-cultural meta-analysis of R-I-A-S-E-C matrices that involved 18 different countries and several different ethnic groups in the U.S. The meta-analysis revealed that the data of the American minority and international groups did not fit the circular order model as well as the data from the American white majority group. However, in more recent studies using large representative samples, Day and Rounds (1998) and Day, Rounds, and Swaney (1998) did not find meaningful differences between American ethnic/racial groups in terms of Holland model-data fit. They explained that the difference between their results and those of Rounds and Tracey (1996) may be ascribed to sampling problems in the earlier study.

Holland's model of vocational personality types has also been widely used in South African career counseling research and practice. The main reasons for the acceptance of Holland's model in South Africa appear to be (a) the lack of a competing indigenous model of career interests, (b) the practical usefulness of the simple concepts of the model, and (c) the absence of appropriate cross-culturally validated standardized South African psychometric instruments.

Although Holland's model and related psychometric instruments are popular in South Africa, there have only recently been efforts to investigate the validity of the circular order model in the South African context. Du Toit (1988) and Gevers, du Toit, and Harilall (1995) reported support for the circular R-I-A-S-E-C ordering of the personality types for black students. Van der Walt (1994) reported that the structure of interests for a group of predominantly white adults corresponded in general with Holland's representation. However, using facet analysis, Wheeler (1992) did not find support for the hypothesized R-I-A-S-E-C ordering among black Grade 12 students. Watson, Schonegevel, and Stead (1997) also failed to find support for the R-I-A-S-E-C model among black students (across gender and socio-economic status).

It is important to note that none of the South African studies described above employed a precise test of the circular order model. Therefore, the objective of the present study was to statistically test the validity of Holland's circular order model for black South African students using Hubert and Arabie's (1987) randomization test.

## METHOD

### Participants

The participants were recruited from two South African provinces, namely the North West Province and the Eastern Cape Province. The North West participants were 459 men and 573 women who were randomly selected to represent the population of black students in the province. The mean age of the men and women was 19 years ( $SD = 2$  years) and 20 years ( $SD = 4$  years), respectively.

The Eastern Cape participants consisted of 144 men and 242 women. The mean age of the men and women was 19 years ( $SD = 3$  years) and 20 years ( $SD = 3$  years), respectively. A process of convenience sampling was used to collect the data for the Eastern Cape sample.

The two groups were treated separately for the following reasons: (a) the Eastern Cape group was predominantly from an urban environment and the North West group mainly from a rural environment; (b) the principal language of the Eastern Cape is isiXhosa and of the North West is seTswana.

## Instrument

The 1987 South African version of the Self-Directed Search (SDS; Gevers et al., 1995) was used to operationalize Holland's six personality types. The items for the 1987 South African SDS were primarily drawn from the 1985 American edition, but certain items from the DISCOVER version (Harris-Bowlsbey & Rayman, 1978) were also included in the questionnaire. The South African SDS contains 216 items and has four types of scales: activities, competencies, occupations, and rating of own abilities. It was standardized on a sample of 4,573 high school students. Reliability coefficients for the six types ranged between .77 and .88. These coefficients can be regarded as sufficiently high for research purposes. The medium of instruction at secondary schools in South Africa is English and the participants completed the English version of the SDS.

## Analysis

Hubert and Arabie's (1987) randomization test of hypothesized order relations was used to test the validity of the circular order model. This test determines the extent to which postulated circular orderings manifest in empirical data. Tracey (1997) explains that the first step in the randomization procedure is to completely specify the order predictions of the model of interest. The circular order model specifies that the six vocational personality types are arranged in a circular manner. This requires that the correlations between adjacent types be greater than those between all nonadjacent types and that the correlations between alternate types be greater than those between opposite types (Tracey & Rounds, 1997). A total of 72 order predictions were made. The next step is to examine the number of times the order predictions are met in the data correlation matrix. The statistical significance associated with the number of predictions met is obtained through a procedure where the rows and columns of the correlation matrix are randomly relabeled. Rounds et al. (1992) explain that there are 6! possible permutations, which means that the correlation matrix can be relabeled in 720 different ways. The exact probability associated with the original number of observed confirmations is equal to the proportion of relabelings that yield more predicted confirmations than the number confirmed within the observed correlation matrix.

The correspondence index can be used as a descriptive index of the correspondence between the hypothesized order relations and the observed order relations in a correlation or any other proximity matrix (Hubert & Arabie, 1987). This index reflects the proportion of confirmed predictions to total predictions minus the proportion of violations to total predictions (Hansen, Scullard, & Haviland, 2000). The correspondence index can take on values between  $-1$  and  $1$ , with  $0$  indicating chance agreement or disagreement. Rounds et al. (1992) explained that the correspondence index

can be used to compare the relative fit of competing theoretical models as well as to compare the relative fit of different matrices to a theoretical model. Although no specific cutoff value for suggesting a reasonable or good model data fit exists, values closer to 1 indicate a greater fit to a model. The correspondence indices of this study were compared with the mean correspondence index of the 24 international matrices based on the SDS in the Rounds and Tracey study (1996).

The SPSS ALSCAL algorithm for multidimensional scaling (MDS) was used to graphically examine the spatial relationships of the six vocational personality types. MDS is a set of statistical techniques that provide a multidimensional spatial representation of the structure of a given set of interrelated data. The relationships represented by the similarity data are expressed spatially, so that variables judged to be psychologically dissimilar are located graphically as distant points and psychologically similar data are represented as points closer in geometric space. The stress value (Kruskal's Stress Formula 1) indicates how well the obtained MDS configuration accounts for the proximity data. Stress values range from 0 to 1 with 0 indicating a perfect fit between the obtained spatial configuration and the relevant data. Kruskal and Wish (1978) suggested that stress values less than .10 indicate adequate fit. It is important to note that the stress value does not reflect the degree to which the data conforms to the hypothesized R-I-A-S-E-C order (Hansen, Scullard, & Haviland, 2000).

## RESULTS

Means and standard deviations for the women and men of the Eastern Cape and North West Provinces are found in Table 1. Tables 2 and 3 contain the correlation matrices of the North West and Eastern Cape samples, respectively. The results of the randomization test of hypothesized order relations are summarized in Table 4. This table contains the number of predictions met out of the possible 72 order predictions, as well as the correspondence indices and associated probabilities. The randomization test indicated that for the Eastern Cape participants, 53 of the 72 model predictions were met for the men and 52 for the women ( $p = .07$  for men; and  $p = .08$  for women). The correspondence indices were .49 and .48, respectively. The nonsignificant probabilities suggest that the number of predicted order relations violated is not significantly smaller than the number that would be expected under the null hypothesis of a random relabeling of the types. For the North West participants, 48 and 47 of the 72 order predictions were confirmed for the men and women, respectively ( $p = .03$  for men and women). The correspondence indices for the men and women were .35 and .32, respectively.

Overall, the results of the randomization test of hypothesized order relations suggest that for all four samples, the circular order model did not ade-

**Table 1**  
**Means and Standard Deviations of the Six Types**  
**of the Self-Directed Search (South African Version)**  
**for Eastern Cape and North West Province Students**

SDS types	Eastern Cape				North West			
	Women <sup>a</sup>		Men <sup>b</sup>		Women <sup>c</sup>		Men <sup>d</sup>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Realistic (R)	11.4	7.7	18.1	9.9	14.4	7.8	20.4	8.5
Investigative (I)	20.7	10.3	19.4	9.8	25.2	8.7	24.2	8.6
Artistic (A)	20.6	9.9	21.0	11.0	22.5	9.3	21.5	9.6
Social (S)	26.1	8.7	23.5	9.7	28.7	8.2	27.8	8.7
Enterprising (E)	22.8	9.5	24.4	10.2	21.5	8.6	23.9	8.8
Conventional (C)	24.6	10.4	24.2	10.8	22.1	9.2	22.2	9.3

a.  $n = 242$ .

b.  $n = 144$ .

c.  $n = 573$ .

d.  $n = 459$ .

quately fit the data (although the probability levels of the North West Province men and women were statistically significant), with large numbers of nonconfirmed predictions and low correspondence index values.

To gain a better understanding of the results of the randomization test, it was compared to those obtained in studies conducted in other countries. Rounds and Tracey (1996) calculated correspondence indices for 96 R-I-A-S-E-C matrices from several different countries. However, the 96 matrices reflected data obtained with several different interest inventories. Since only the SDS was employed in the present study, it was decided to limit the comparisons only to those matrices that were obtained with the SDS. Accordingly, 24 matrices were selected from Rounds and Tracey's pool of 96 matrices. The correspondence indices and  $p$  values for the 24 international and the 4 South African matrices are presented in Table 5. The mean correspondence index for the 24 international indices (excluding the 4 South African matrices) was .45 with a standard deviation of .14. The correspondence indices for the Eastern Cape groups (.49 for men and .48 for women) were close to the mean, but the correspondence indices for the North West groups (.35 for men and .32 for women) were substantially lower than the mean. Rounds and Tracey concluded that the fit between the international matrices and Holland's model was unsatisfactory (U.S. benchmark was .70). Hence, because the fit obtained in the present study was no better than that reported by Rounds and Tracey for the international matrices, the results of the comparison support the conclusion of unsatisfactory fit for the South African groups.

**Table 2**  
**Intercorrelations of the Six Types of the Self-Directed Search**  
**(South African Version) for North West Province Students**

Type	R	I	A	S	E	C
Realistic (R)		.575	.572	.545	.603	.590
Investigative (I)	.538		.439	.544	.431	.485
Artistic (A)	.418	.329		.682	.687	.616
Social (S)	.422	.497	.609		.689	.614
Enterprising (E)	.500	.387	.653	.700		.774
Conventional (C)	.491	.475	.576	.626	.791	

*Note.* Correlations based on the women ( $n = 573$ ) are presented above the diagonal; correlations based on the men ( $n = 459$ ) are presented below the diagonal.

**Table 3**  
**Intercorrelations of the Six Types of the Self-Directed Search**  
**(South African Version) for Eastern Cape Province Students**

Type	R	I	A	S	E	C
Realistic (R)		.512	.364	.281	.231	.165
Investigative (I)	.536		.290	.490	.068	.087
Artistic (A)	.497	.276		.512	.497	.406
Social (S)	.443	.464	.526		.460	.362
Enterprising (E)	.093	.023	.274	.448		.757
Conventional (C)	.110	.114	.221	.386	.758	

*Note.* Correlations based on the women ( $n = 242$ ) are presented above the diagonal; correlations based on the men ( $n = 144$ ) are presented below the diagonal.

The data were also subjected to a multidimensional scaling analysis in order to obtain graphical representations of the relations between the six vocational personality types. The solutions of the two-dimensional metric ALSCAL analyses for the four groups are presented in Figures 2 to 5. The stress values for the different groups were .15 for the North West Province men, .13 for the North West Province women, .06 for the Eastern Cape Province men, and .25 for the Eastern Cape Province women. These values, with the exception of the Eastern Cape men, suggest that the two-dimensional model did not fit the data very well.

The plots in Figures 2 to 5 indicate differences in the configurations and ordering of the six personality types. The ordering of the personality types for the Eastern Cape (see Figure 2) and North West women (see Figure 3) almost corresponded with that of the R-I-A-S-E-C model—the only excep-

**Table 4**  
**Results of the Randomization Test and Multidimensional Scaling**  
**Analysis for the Eastern Cape and North West Province Groups**

	Randomization Test			Multidimensional
	Predictions	<i>p</i>	CI	Scaling
				Stress
<b>Eastern Cape Province</b>				
Men	53	.07	.49	.06
Women	52	.08	.48	.25
<b>North West Province</b>				
Men	48	.03	.35	.15
Women	47	.03	.32	.13

*Note.* CI = correspondence index.

tion was the reversal of A and S (R-I-S-A-E-C). The shape of the configuration for the North West women roughly approximated a circular structure.

The configuration of the Eastern Cape men (see Figure 4) also almost conformed to the R-I-A-S-E-C model—the exception was the reversal of I and R (I-R-A-S-E-C). However, the shape of the multidimensional scaling solution did not approximate a circular structure. The ordering of the personality types for the North West men (see Figure 5) was R-I-S-C-E-A and showed several violations of the order hypothesis. The shape of the configuration also did not approximate a circular structure. It is interesting to note that the Artistic type was incorrectly placed in all four multidimensional scaling analyses. This finding suggests that the meaning of this type may be different from that postulated by Holland's circular order model.

## DISCUSSION

The results of the randomization test of hypothesized order relations for the Eastern Cape men and women indicated nonsignificant probabilities and relatively low correspondence indices (see Table 4). This leads to the conclusion of an unsatisfactory fit between the observed data and the hypothesized circular order model for the Eastern Cape groups. The results of the randomization test for the North West men and women indicated significant probabilities but low correspondence indices (see Table 4). It is interesting to note that the correspondence indices for the North West groups were lower than those of the Eastern Cape groups. This seems counterintuitive, because the fit of the North West group was better than that of the Eastern Cape group in a statistical sense. It should be kept in mind, however, that the cor-

*(text continues on p. 74)*

**Table 5**  
**Comparison of Self-Directed Search**  
**Correspondence Index Values in Different Countries**

Source	N	Gender	Country	CI	<i>p</i>
<b>Self-Directed Search</b>					
Bingham (1977/1978)	93	F	U.S. African American	.43	.07
Boyle (1992)	401	M	Australia	.32	.02
Erlianto (1982)	146	M	Indonesia	.58	.02
Fitzsimmons & Melnychuk (1979)	200	M/F	Canada	.47	.07
Mercurius-Fraser (1980)	444	F	Guyana	.35	.05
Mercurius-Fraser (1980)	387	M	Guyana	.30	.13
Mercurius-Fraser (1980)	144	F	Guyana	.44	.07
Mercurius-Fraser (1980)	156	M	Guyana	.25	.05
Sedlacek (1992)	298	M/F	U.S. African American	.42	.05
<b>SDS:</b>					
<b>Australian adaptation</b>					
Lokan (1988)	920	F	Australia	.58	.02
Lokan (1988)	849	M	Australia	.22	.05
<b>SDS: Chinese translation</b>					
Jin (1986/1987)	228	F	Taiwan	.47	.05
Jin (1986/1987)	247	M	Taiwan	.32	.08
Jin (1986/1987)	205	F	Taiwan	.57	.02
Jin (1986/1987)	182	M	Taiwan	.40	.08
<b>SDS: Hebrew translation</b>					
Meir (1992)	160	M/F	Israel	.75	.03
Meir & Ben-Yehuda (1976)	217	M/F	Israel	.50	.03
Peiser (1984)	870	M	Israel	.78	.02
<b>SDS: Malay translation</b>					
Salleh (1984/1985)	86	F	Malaysia	.36	.05
Salleh (1984/1985)	80	M	Malaysia	.50	.02
<b>SDS: Pakistan adaptation (English)</b>					
Khan (1992)	133	F	Pakistan	.46	.03
Khan (1992)	243	M	Pakistan	.53	.02
<b>SDS:</b>					
<b>New Zealand adaptation</b>					
Tuck & Keeling (1980)	252	F	New Zealand	.33	.05
Tuck & Keeling (1980)	247	M	New Zealand	.46	.07
<b>SDS: South African adaptation (English)</b>					
du Toit & de Bruin	144	M	South Africa (Eastern Cape)	.49	.07
du Toit & de Bruin	242	F	South Africa (Eastern Cape)	.48	.08
du Toit & de Bruin	459	M	South Africa (North West)	.35	.03
du Toit & de Bruin	573	F	South Africa (North West)	.32	.03

*Note.* The data in the rows above the South African data are from "Cross-Cultural Structural Equivalence of RIASEC Models and Measures," by J. Rounds and T. J. Tracey, 1996, *Journal of Counseling Psychology*, 43, pp. 317-318. Copyright 1996 by the American Psychological Association. Adapted with permission.

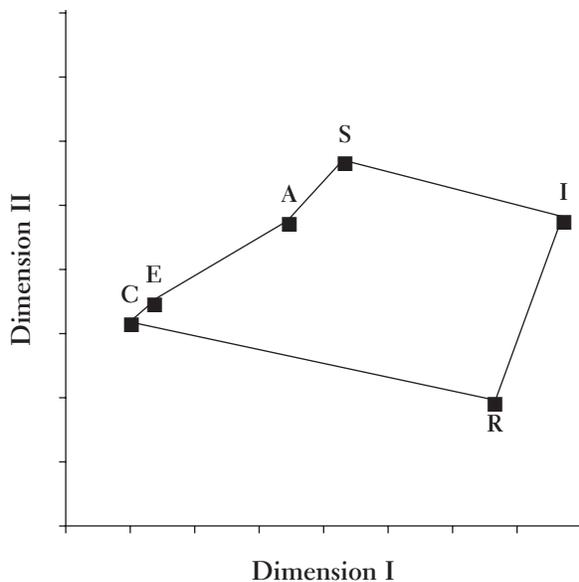


Figure 2. Multidimensional scaling solutions based on Holland's six vocational personality types for Eastern Cape women.

R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional.

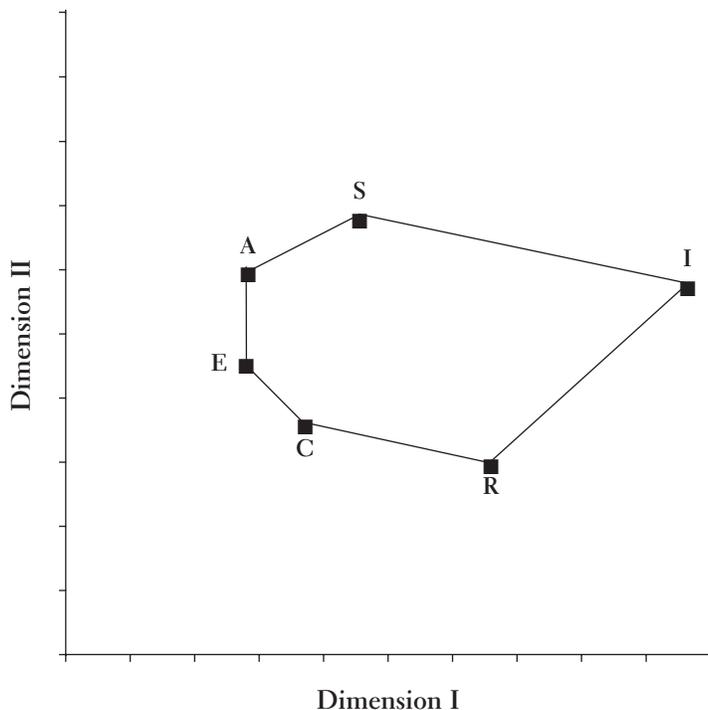


Figure 3. Multidimensional scaling solutions based on Holland's six vocational personality types for North West women.

R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional.

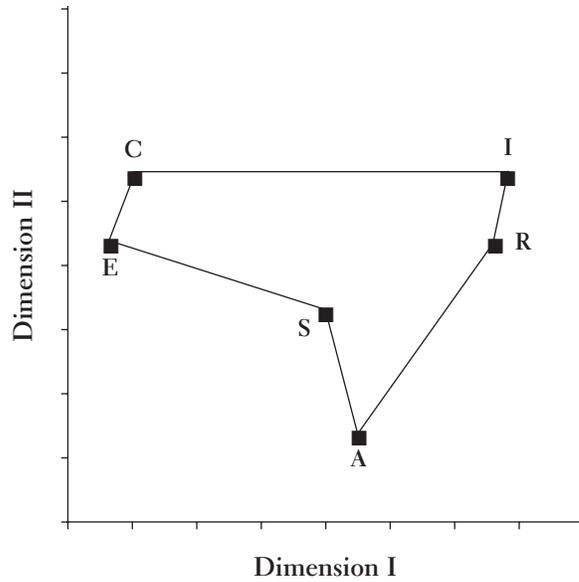


Figure 4. Multidimensional scaling solutions based on Holland's six vocational personality types for Eastern Cape men.

R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional.

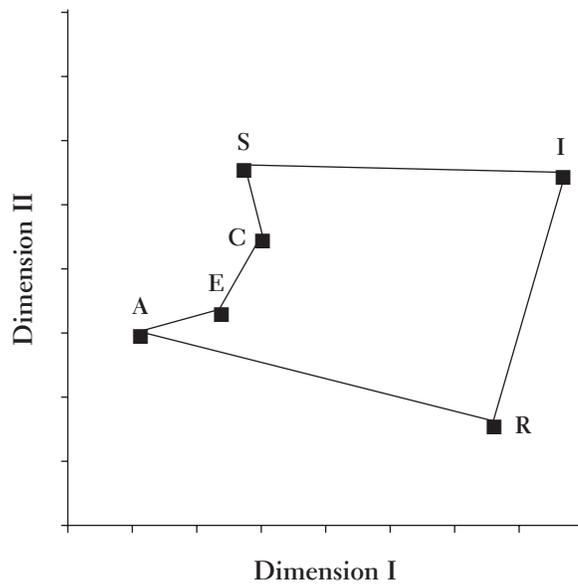


Figure 5. Multidimensional scaling solutions based on Holland's six vocational personality types for North West men.

R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising, C = Conventional.

respondence index is only an interpretive aid and not necessarily related to the results of the probability test (T.J.G. Tracey, personal communication, January 23, 2001). The significant probabilities for the North West groups show that the model fit is beyond chance, but the low correspondence indices suggest that the absolute correspondence between the observed matrices and Holland's model is poor. It is concluded that the validity of the hypothesized model for the North West groups has not been supported. This conclusion is supported through the comparison of the results of the present study with those obtained in several other countries.

The results of the MDS analyses also suggested an unsatisfactory fit between the observed data and the hypothesized circular order model. The expected R-I-A-S-E-C ordering was not observed in any of the four MDS solutions. In this regard the Artistic type appeared to be the one most consistently misplaced. Furthermore, only the solution of the North West women approximated a circular or hexagonal shape.

Hansen et al. (2000) pointed out that cultural values influence "how individuals mentally organize the world of work and their place in it" (p. 160). A commonly held view is that black South Africans emphasize a value called "ubuntu." This value is associated with collectivism and requires that the needs of the group should be given preference over the needs of the individual. The essence of ubuntu is expressed in the saying, "A person is a person because of people." This value is in contrast to the emphasis that western societies put on individual achievement, satisfaction, and actualization. It is possible that this contrast in values can manifest in differences in the meaning of vocational interests. Specifically, in societies that value ubuntu one would expect interests to play a less important role in career choice than it would play in societies where self-actualization and fulfillment of the individual is prized.

Hansen (1987) argued that socio-economic factors may explain differences in the structure of interests in different cultural groups. In this regard it is important to note that South Africa's unemployment rate is estimated to be as high as 36.2% (Statistics South Africa, 1999). This high level of unemployment can conceivably play an important role in young black South Africans' perceptions of occupations and the world of work. However, Watson et al. (1997) reported the interesting finding in South Africa that the interest data of a lower socioeconomic group showed a better correspondence with Holland's model than did the interest data of a middle-class socioeconomic group.

The high intercorrelations between the R-I-A-S-E-C types in all four groups also provide a possible explanation for the poor fit of the circular order model. It is possible that the participants expressed a feeling of hope of gaining employment while completing the SDS. In the light of the high unemployment rate in South Africa, they may have thought that if they indicated interest in several fields it would improve their chances of being employed. In this regard it is important to note that many South Africans do not have

the opportunity to choose an occupation on the basis of their preferences and dislikes.

A further possible explanation for the unsatisfactory fit between the data and Holland's model is that the participants did not fully understand the meaning of the items. It should be remembered that the participants completed the SDS in English, which in almost all the cases would have been their second or even third language. An interesting question is whether a better fit can be obtained if the SDS is translated into isiXhosa and seTswana.

In summary, the results of the randomization test of hypothesized order relations and the multidimensional scaling analyses did not provide support for the structural validity of Holland's circular order model of vocational personality types. Although this finding could lead one to question whether black South Africans perceive the world of work and the role that interests play in the choice of work in a way that correspond with Holland's model of vocational personality types, it is perhaps too early to draw such a strong conclusion. Further research on the influence of language on the structure of interests or vocational personalities should shed light on whether the poor fit obtained in the present study is the result of language difficulties. In this regard it is necessary to translate the SDS into indigenous South African languages and to then test the validity of Holland's circular order model with participants that completed the SDS in their first language. If a poor fit is still obtained in such studies, the validity of interest inventories that are based on Holland's circular order model in the South African context would have to be questioned.

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# Family Interaction Patterns and College Student Career Development

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We examined whether and how family interaction patterns relate to role salience and vocational identity in a predominantly Anglo-American college student sample (107 women, 65 men). Results indicated significant links between perceived emotional closeness and structural flexibility in the family-of-origin and higher levels of participation in, commitment to, and value expectations for home and family roles. Levels of work-role salience and vocational identity were not significantly related to family-of-origin interaction patterns. Appraising and attending to family-of-origin dynamics may be useful in career assessment and counseling that involves helping clients understand and fit family into their life-careers. Ultimately, determining with more certainty the precise degree of transportability of the family circumplex model to the vocational domain will require continued research in this vein.

**Keywords:** Work and family, life-role salience, vocational identity, career development, Holland's theory, Super's theory

Vocational theorists have long assumed that the family plays a pivotal role in career choice and development (Herr & Lear, 1984). Over 40 years ago, Super (1957) contended that family variables such as attitudes and interpersonal relations influence career choice and adjustment. Roe (1956, 1957) hypothesized that family interaction patterns contribute significantly to vocational outcomes, although research has provided at best nominal support for Roe's proposed link between parental attitudes and children's ultimate career choices (Osipow, 1983; Roe & Lunneborg, 1990). Other theorists have also

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 78-90  
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identified family factors that may influence career choice and development such as parents (Holland, 1959, 1997), family training experiences and modeling (Krumboltz, 1979; Mitchell & Krumboltz, 1990), family-mediated sex-role typing (Gottfredson, 1981), and family emotional support in identity development (Bordin, 1990). Indeed, most major career theories specify or imply relationships between family variables and vocational outcomes and career development processes (Blustein, Walbridge, Friedlander, & Palladino, 1991). Tests of Roe's (1956, 1957) theory aside, however, few studies have directly investigated these purported career-family links. This research gap perhaps prompted Blustein and his colleagues (1991) to comment that "the exact nature of the family's contribution to the career decision-making process remains unclear" (p. 39).

To investigate potential links between family and career-related variables, we examined in the present study the explanatory value of a theoretical model derived from family systems theory for understanding role salience and vocational identity—key constructs articulated in Super's (Super, Savickas, & Super, 1996) and Holland's (1997) career choice and development theories, respectively. Specifically, we examined family interaction patterns relative to levels of work and family role salience and to levels of vocational identity. Role salience denotes the extent to which an individual participates in, commits to, and expects to realize values through roles played out in various theaters such as school, work, family, community, and leisure (Super et al., 1996). Vocational identity means possessing "a clear and stable picture of one's goals, interests, and talents" related to work (Holland, Gottfredson, & Power, 1980, p. 1191). We chose to examine these two vocational variables in relation to the dimensions of a family systems model because role salience incorporates both the work and family domains and because previous research has supported a significant relationship between vocational identity and perceived family functioning (Lopez, 1989; Penick & Jepsen, 1992).

Research, including that of Blustein et al. (1991), as well as theoretical articles on psychological separation and attachment (Lopez, 1992; Lopez & Andrews, 1987) have begun to specify family influences on career choice and development. Some of this research has directly investigated work-family links specified in theory (for a review, see Greenhaus & Parasuraman, 1999). Notably, Smart (1989) examined and found evidence for the relative influence of family background factors (e.g., SES and parents' occupations) on Holland vocational type development. Similarly, Trice, Hughes, Odom, Woods, and McClellan (1995) found support, albeit mixed, for hypothesized family-career relationships derived from the theories of Ginzberg (1952), Roe (1957), Havighurst (1964), and Gottfredson (1981).

To further determine whether family variables explain significant amounts of variance in constructs articulated in career theories, some researchers have turned to Bowen's (1978) family systems theory and Minuchin's (1974) structural family theory. Numerous conceptual articles have also used family the-

ories to describe career development and to suggest career counseling interventions (Bradley, 1984; Bradley & Mims, 1992; Bratcher, 1982; Lopez, 1992; Moon, Coleman, McCollum, Nelson, & Jensen-Scott, 1993; Morrow, 1995; Okiishi, 1987). Empirical works have produced a distinct body of literature on family-of-origin dynamics and career development and decision-making processes. Results of two studies in this realm found weak empirical support (Kinnier, Brigman, & Noble, 1990) and no empirical support (Eigen, Hartman, & Hartman, 1987) for a relationship between family interaction patterns and career decision making. Findings from other studies in this vein, however, indicate that family interaction patterns do significantly relate to variables such as vocational identity (Lopez, 1989; Penick & Jepsen, 1992), mastery of the career developmental tasks of crystallizing and specifying an occupational choice (Penick & Jepsen, 1992), career search self-efficacy (Ryan, Solberg, & Brown, 1996), and patterns of coworker relations (MacGregor & Cochran, 1988). Overall, this line of inquiry lends empirical support to the assertion that family interaction patterns may contribute significantly to vocational outcomes (Schulenberg, Vondracek, & Crouter, 1984). It also bolsters Penick and Jepsen's call for further research on the relationship between family dynamics and career development.

A literature review of family influences on career development identified family interaction patterns as a fruitful domain within which to explain vocational outcomes (Schulenberg et al., 1984). Family interaction patterns have been conceptualized along two dimensions of a circumplex model that includes an adaptability and a cohesion component (Olson, Sprenkle, & Russell, 1979). The adaptability component refers to the degree of structural and functional flexibility present in a family system. On the adaptability dimension, families may range from chaotic to flexible to structural to rigid. Families in the mid (flexible and structural) ranges evidence more healthy adaptability than those at the extremes (chaotic and rigid) because they can appropriately change their structure (e.g., membership) and function (e.g., how they communicate) in response to environmental demands and stressors. The cohesion component of the model refers to the degree of emotional closeness between and among family members. On the cohesion dimension, families may range from enmeshed to connected to separated to disengaged. Connected and separated families maintain more moderate levels of closeness and intimacy and function more effectively than those with relationships that are enmeshed or disengaged. Theoretically, then, extremes on either component suggest family dysfunction, whereas low to moderate adaptability and cohesion levels indicate more balanced or optimal family functioning. Psychometrically, these components are measured using a linear scale such that higher scores on an index of either dimension indicate more healthy family functioning (Olson, 1991).

Research has yielded a broad base of empirical support for the family systems circumplex model (for reviews, see Gorall & Olson, 1995; Olson, 1993). In their literature review, Schulenberg et al. (1984) called for empiri-

cal studies of the applicability of this model to career development and vocational behavior. To date, we could find only one such study that has responded to this call (Eigen et al., 1987). The Eigen et al. (1987) study found that chronically career undecided students were more apt to come from either firmly structured and emotionally connected families (i.e., too tight) or from vaguely structured and emotionally separated families (i.e., too loose). These findings prompted Eigen et al. to conclude that using the model in the vocational domain warrants further research.

### **Purpose of the Study**

In the present study, we examined whether and how levels of family adaptability and cohesion relate to role salience and vocational identity as components of career development. As an exploratory study, we structured the investigation around two basic research questions. First, we examined whether and how scores on a measure of family adaptability and cohesion would relate to scores on a measure of salience for work and family roles. We could find no research that specifically examines the extent to which family functioning influences the levels of salience individuals develop for work and family roles. Could it be, for example, that individuals who perceive their families-of-origin as more well-functioning indicate higher levels of salience for work and family roles because their families appropriately support and encourage their participation in, commitment to, and value expectations for these roles?

Second, we investigated whether and how adaptability and cohesion scores would relate to scores on a measure of vocational identity. Blustein (1994) theorized that optimal vocational identity development requires balanced family adaptability and cohesion. In this sense, we were interested in the question of to what extent does perceived health of the family-of-origin relate to vocational identity development. Could it be, for example, that individuals who perceive their families as more functionally adaptable and cohesive possess a clearer sense of their vocational goals, talents, and interests?

## **METHOD**

### **Participants**

A total of 172 undergraduate students (107 women, 65 men) participated in the study. One participant did not indicate age or gender on the personal data sheet provided. Most participants (91.3%) were seniors between the ages of 21 and 25 years (age range = 17-25 years). Of the participants who responded to the demographic questionnaire, 70% were liberal arts majors,

26% were commerce majors, 3% were either education, engineering, or nursing majors, and 1% was undecided. The vast majority of participants identified their ethnic background as Anglo-American.

## Measures

### *Family Interaction Patterns*

Perceived levels of cohesion and adaptability within the family of origin were operationally defined by scores on the Family Adaptability and Cohesion Evaluation Scales-III (FACES III; Olson, Portner, & Lavee, 1985). FACES III represents the third in a series of FACES instruments designed to measure the two primary dimensions of the Olson et al. (1979) circumplex model. The instrument's 20 items divide evenly into 10 Adaptability scale items and 10 Cohesion scale items. Adaptability items measure the perceived level of flexibility within the family system and its capacity to change its structure and relationships in response to situational or developmental stress. Cohesion items measure the perceived degree to which family members feel connected to or separated from the family system. Using a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*), respondents indicate the extent to which each statement describes their family of origin. Scores range from 10 to 50 on each subscale and from 20 to 100 for the total measure. Higher scores on either dimension indicate more functional family relationships (Olson, 1991). Higher Adaptability scores indicate more functionally "flexible" families. Higher Cohesion scale scores indicate more functionally "connected" families.

Olson, Portner, and Lavee (1985) reported separate internal consistency estimates for Adaptability ( $r = .62$ ), Cohesion ( $r = .77$ ), and the FACES III total scale ( $r = .68$ ). They also reported 4- to 5-week test-retest reliability coefficients of .80 (Adaptability) and .83 (Cohesion). The present sample produced coefficient alphas of .75 for Adaptability, .91 for Cohesion, and .87 for the total measure. Evidence also exists to support the content and construct validity of the measure (Olson et al., 1985).

### *Work and Family Role Salience*

We used the Salience Inventory (SI; Super, 1985) to operationally define levels of salience for work and family roles. The 170-item SI measures the extent to which individuals participate in, commit to, and expect to realize values in five life roles: student, worker, citizen, homemaker (including spouse and parent), and leisurite. Three composite scales—Participation, Commitment, and Value Expectations—assess each of these five roles thereby yielding 15 subscale scores. The Participation scale uses 50 items to assess

behaviors performed presently or in the recent past (i.e., “what you actually do or have done recently”) in the five life roles. The Commitment scale contains 50 items measuring attitudes toward (i.e., “how do you feel about”) each role. The Values Expectations scale contains 70 affectively based items measuring the anticipated degree to which each life role will allow values to be realized. Higher scores on any one scale indicate more salience for the corresponding role. Only data derived from the Working and Home and Family subscales of the instrument were used in the present study.

Internal consistency estimates (Cronbach’s alpha) for the six SI subscales used in the present study ranged from .82 to .91 ( $M = .86$ ). Test-retest correlations range from .81 to .94 for a sample of college students and from .82 to .95 for a sample of adults (Nevill & Super, 1986). The SI has also been judged by Nevill and Super to have acceptable content, construct, and concurrent validity. A review of the literature related to the SI described support for the predictive value of SI scores and the construct validity of its scales (Nevill & Calvert, 1996).

### *Vocational Identity*

Level of vocational identity was operationally defined by the Vocational Identity Scale (VIS) of My Vocational Situation (MVS; Holland et al., 1980). According to Holland et al., vocational identity means possessing awareness of and an ability to specify one’s interests, personality characteristics, strengths, and goals as they relate to career choices. The VIS contains 18 statements to which individuals respond “true” or “false.” Each true response receives a score of zero and each false response receives a score of one. Summing the total number of false responses yields a score ranging from 0 to 18. Higher scores indicate higher levels of vocational identity.

Holland, Johnston, and Asama (1993) and Leong and Morris (1989) provided evidence for the validity of using the VIS as an index of vocational identity. The MVS manual reports an internal consistency reliability of .89 for the VIS. Internal consistency estimates of the VIS items in the present study reached a coefficient alpha value of .86.

## RESULTS

Scale means and standard deviations on all measures were computed separately for both women and men. To test for gender differences, *t* tests of independent means were conducted for each measure used in the present study. Descriptive statistics appear in Table 1. *t*-test results indicated significant gender differences in mean scores on the FACES III total scale ( $M = 62.89$  for women;  $M = 57.62$  for men) and on the FACES III Cohesion scale ( $M = 37.61$  for women;  $M = 34.08$  for men). The effect sizes of these differ-

**Table 1**  
**Descriptive Statistics, Reliability Estimates, and**  
***t* Tests of Independent Means for All Measures**

	<i>Alpha</i>	Males		Females		Total		<i>t</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>FACES III</b>	.87	57.62	11.53	62.89	10.58	60.94	11.19	-3.00**
COHES	.91	34.08	7.82	37.61	7.78	36.29	7.94	-2.88**
ADAPT	.75	23.77	5.57	25.36	5.67	24.80	5.60	-1.77
<b>VIS</b>	.86	11.40	4.44	9.99	4.85	10.56	4.72	1.74
<b>SI</b>								
CW	.82	33.14	4.44	32.07	4.97	32.47	4.78	1.46
CH	.91	33.92	5.73	35.21	5.22	34.73	5.42	-1.46
PW	.86	24.29	5.29	22.87	5.71	23.49	5.67	1.66
PH	.85	23.52	5.34	24.87	5.03	24.39	5.18	-1.63
VEW	.84	44.85	5.72	43.46	5.80	44.02	5.79	1.53
VEH	.86	43.06	6.78	44.07	7.00	43.68	6.90	-0.93

*Note.*  $N = 172$ . Reported alpha values are for total sample. FACES III = Family Adaptability and Cohesion Evaluation Scales; COHES = Cohesion Scale; ADAPT = Adaptability Scale; VIS = Vocational Identity Scale; SI = Salience Inventory; CW = Commitment to Work; CH = Commitment to Home; PW = Participation in Work; PH = Participation in Home; VEW = Value Expectations for Work; VEH = Value Expectations for Home. Score ranges are 20-100 for FACES III; 10-50 for COHES and ADAPT; 0-18 for VI; 10-40 for CW, CH, PW, and PH; 14-56 for VEW and VEH.

\*\* $p < .01$ .

ences were .47 and .44, respectively, and of low to moderate magnitude (Cohen, 1988). Given these findings, we decided to combine the data for subsequent analyses rather than conduct separate analyses by gender.

A zero-order correlation matrix was produced for the FACES III scales with all scales of the criterion measures. Table 2 contains the Pearson product-moment correlation matrix for all measures. The Participation in Home (PH), Commitment to Home (CH), and Value Expectations for Home (VEH) scale scores of the SI related positively and significantly to scores on particular FACES III scales. Significant correlations at the  $p < .01$  level emerged between PH and the FACES III total score ( $r = .45$ ; effect size = .20), PH and Adaptability ( $r = .27$ ; effect size = .07), CH and FACES III total ( $r = .32$ ; effect size = .10), CH and Cohesion ( $r = .34$ ; effect size = .11), VEH and FACES III total ( $r = .23$ ; effect size = .05), and VEH and Cohesion ( $r = .22$ ; effect size = .04). Although of relatively low magnitude, these statistically significant findings indicate the presence of a positive relationship between perceived level of family functioning and salience for home and family roles such as parent, spouse, and child. These data suggest that individuals who

**Table 2**  
**Correlation Matrix for All Measures**

	1	2	3	4	5	6	7	8	9	10
1. FACES III	1.00									
2. COHES	.88**	1.00								
3. ADAPT	.74**	.34**	1.00							
4. VIS	.02	.04	-.03	1.00						
5. PW	.03	.02	.00	.18*	1.00					
6. CW	.03	.06	-.03	.26**	.39**	1.00				
7. VEW	-.04	-.05	-.03	.20*	.39**	.64**	1.00			
8. PH	.45**	.44	.27**	.19*	.27**	.19*	.12	1.00		
9. CH	.32**	.34**	.15	.29**	.08	.32**	.10	.59**	1.00	
10. VEH	.23**	.22**	.12	.26**	.18*	.19*	.30**	.50**	.64**	1.00

*Note.*  $N = 172$ . FACES III = Family Adaptability and Cohesion Evaluation Scales; COHES = Cohesion Scale; ADAPT = Adaptability Scale; VIS = Vocational Identity Scale; CW = Commitment to Work; CH = Commitment to Home; PW = Participation in Work; PH = Participation in Home; VEW = Value Expectations for Work; VEH = Value Expectations for Home.

\* $p < .05$ . \*\* $p < .01$ .

rate their families of origin as more flexible and emotionally connected participate more in family-related activities such as parenting, caretaking, or homemaking. They also feel more emotionally invested in home and family roles both now and for the future, and they expect to realize their values through involvement in roles in the family domain. Turning to the FACES III scale scores relative to the SI work-role scale scores and VIS scores, Table 2 indicates no significant correlations between these variables. Neither level of family adaptability nor cohesion appears linked to salience for work or vocational identity.

## DISCUSSION

The present investigation examined whether family interaction patterns, as conceptualized in a circumplex model derived from family systems theory (Olson et al., 1979), could be used to empirically demonstrate purported links between family-of-origin dynamics and vocational behavior. Results indicated that the adaptability and cohesion dimensions of the family circumplex model do, indeed, have a direct relationship to salience for home and family roles. Our findings suggest that individuals who perceive their families of origin as more functionally adaptable and cohesive participate more in home and family roles later in life. Such individuals also appear to

feel more committed to, or emotionally invested in, home and family roles, and they anticipate that they will realize their values through involvement in these roles. Greater levels of salience for home and family roles at least correspond to and may result from individuals' perceived experiences of growing up in a family system that possessed the ability to adapt appropriately to change and that maintained a healthy emotional closeness. Consequently, in terms of family-role salience, it may indeed be important for researchers and counselors to consider the family as an important factor in the level of importance people ascribe to roles such as parent, partner, spouse, and homemaker played out in the theater of home and family life.

Family adaptability and cohesion did not relate significantly to levels of work-role salience or vocational identity among the college students studied. Here, our findings suggest that individuals develop and maintain levels of work-role salience and vocational identity independent of the levels of emotional closeness and rule and role flexibility that they perceive existed in their families of origin. We surmise from our data that the degree of healthful emotional closeness and structural flexibility in the family of origin contributes in no significant way to the degree of importance placed on the work role in one's life or on the level of vocational identity development achieved. One tenable explanation for these findings concerns the age group, which ranged from 17 to 25 years, and the predominantly Anglo-American ethnicity of the present sample. Individuals at this age typically are separating and individuating from parents and therefore seek to establish their own identities in the work role separate from their families (Lopez, 1992). The largely Anglo-American ethnicity of the sample supports this interpretation. Anglo-Americans would be likely to maintain an individualistic cultural orientation that promotes decision-making based on one's own wishes versus submitting to the goals of the family unit (Triandis, 1995) and, particularly for late adolescent Anglo-Americans, the wishes and expectations of parents.

That we found family interaction patterns to be not significantly related to work-role salience and vocational identity in the present sample of college students differs from some theorizing and research outcomes that indicate a direct relationship between family and career-related variables (Blustein, 1994; Penick & Jepsen, 1992). For example, whereas Penick and Jepsen (1992) found evidence for perceived family functioning as a significant predictor of adolescent vocational identity, the present data do not support its use as a predictor of college student vocational identity. The present findings concerning the family and career-related variables are more consistent with those of Eigen et al. (1987) who found no significant relationship between the dimensions of the Olson et al. (1979) family circumplex model and career indecision. Our findings, in one sense, raise questions about the usefulness of family-of-origin dynamics in explaining vocational behavior outcomes of work-role salience and vocational identity. Generalized to individuals similar to the participants comprising the present sample (i.e., Anglo-American college students), these particular findings suggest that vocational

researchers and career counseling practitioners may need to focus less on assessing and considering family background and more on appraising and discussing individual traits (e.g., aptitudes, interests, and values), states (e.g., decided or undecided), and goals when examining the salience of work in people's lives as well as the levels of vocational identity individuals possess. This suggestion gains support from previous research indicating that the family may have little influence on Anglo-American career development and vocational behavior (Hartung, Speight, & Lewis, 1996).

The non-randomness and homogeneity of the sample used in the present study clearly constrain the generalizability of the results. Also, asking participants to retrospectively assess the degrees of cohesion and adaptability that existed in their families of origin may have produced biased or erroneous results due to memory inaccuracies. The use of self-report measures also raises questions of social desirability effects that may limit the validity of the present findings. Including a measure of social desirability in subsequent studies may attenuate this potential problem.

A logical next step in this line of inquiry would be to explore the research questions posed in the present study with a more representative and systematic sampling methodology. Doing so may yield more generalizable and conclusive findings. Further research that includes participants of more culturally diverse backgrounds should be conducted to determine whether the current findings would replicate in a sample that includes greater racial-ethnic heterogeneity. Ultimately, determining with more certainty the precise degree of transportability of the family circumplex model to the vocational domain will require continued research in this vein. One additional avenue for future inquiry that in retrospect seems intuitively appealing would be to specifically examine the adaptability component of the Olson et al. (1979) model in terms of its relationship to the construct of career adaptability as articulated by Savickas (1997). An interesting question to investigate, for example, would be whether individuals who come from more functionally adaptable family-of-origin systems also evidence higher levels of career adaptability.

Vocational theorists and practitioners have long recognized family factors as potentially valuable for understanding and explaining individual career development and vocational behavior (Fouad, 1993; Ibrahim, Ohnishi, & Wilson, 1994; Leong, 1993; Leong & Leung, 1994; Zimmerman & Cochran, 1993). Empirical research, including the present study, has produced mixed results, however, in terms of supporting or not supporting links between family and vocational variables. The present findings suggest that, among Anglo-American college students, perceived levels of structural flexibility and emotional connection in the family of origin have no specific association with levels of work importance or clarity and stability of vocational goals, interests, and talents. The family adaptability and cohesion dimensions of the Olson et al. (1979) model as influences on work-role salience and vocational identity thus seem questionable given the present findings. The

degrees to which an individual participates in, commits to, and expects to realize values in home and family roles, however, do appear linked to perceived emotional and structural health in the family of origin. Potential therefore exists in using the Olson et al. (1979) family systems model as an explanatory tool for understanding family role salience levels. Career counselors who assist clients with life-career planning from a developmental, multiple role perspective may thus benefit from assessing clients' family-of-origin dynamics. Such assessments may help clients to better understand what home and family roles mean to them as they design their life careers.

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# Factors Influencing Career Decision Making in Adolescents and Adults

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The structure of the Career Decision-Making Difficulties Questionnaire (CDDQ) was validated and compared across two age cohorts using Structural Equation Modelling. One hundred and twenty-one upper high school students (78 females, 43 males—mean age 15.92 years) participated in Study 1, while 127 adults (86 females, 41 males—mean age 33.44 years) completed the survey for Study 2. The model confirmed the multidimensional structure of the CDDQ, although five first-order factors provided a better fitting model than the three higher-order factors postulated. The model fit both groups, suggesting that a common pattern of difficulties was experienced by people of different ages, although older career deciders reported fewer difficulties on all CDDQ subscales than did students.

**Keywords:** Career decision making, adult deciders, adolescents, career decision difficulties, structural equation modelling

Much of the research into career decision making (CDM) has represented the construct as a developmental task of adolescence (Crites, 1973; Super & Forrest, 1972). However, as changes in the workplace force us to revamp our concepts of long-term, stable patterns of jobs and careers, CDM is increasingly being seen as an ongoing part of one's involvement in the world of work. These changes require us to ascertain how well a construct that was originally defined and measured in the context of young people making career entry-level choices relates to the CDM behaviour of older workers faced with mid-career choice opportunities or dilemmas. There is also a need to re-examine the nomological framework of CDM, to determine its relationship with other constructs such as vocational interests, personality, and intelligence. The research reported here aims to address both these issues. Study 1 was intended to develop and test a model that brought together a wide range

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 91-126  
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of variables considered to be important in CDM, while Study 2 looked at that model's applicability to an older population engaged in career shift.

The notion of CDM has evolved from its original representation as a static, onetime event to its current conceptualisation as a dynamic construct incorporating both readiness and outcome variables. The role of vocational psychology has always been to help people make good career decisions (Savickas, 1995), and while this continues to be the main function of career counselling and the main focus of career development theory, there have been many changes in the way this task has been approached and conceptualised since the beginning of the 20th century. At that time Parsons (1909) defined three key requirements of career deciders: self-knowledge, knowledge of work opportunities and conditions, and the ability to combine rationally the two sets of information. Parsons's work provided the basis for the matching or trait-and-factor approach.

Osipow, Carney, and Barak (1976) presented a different approach to understanding the career process when they directed their focus to looking at barriers preventing people from making career decisions. Their Career Decision Scale (CDS) investigated aspects of indecision, and while this scale was well-accepted and widely used over a number of years, there were lingering criticisms about the uncertainty of its factor structure and the complex nature of its items. A recent revision addressed these shortcomings and produced the Career Decision-Making Difficulties Questionnaire (CDDQ; Gati, Osipow, & Krausz, 1996).

### **The Relationship Between Personality, Interests, and CDM**

The CDS is one of many scales which have been developed to measure career decision making (CDM), most of which share a common theme of measuring dispositional variables, skills/knowledge variables, and external environmental influences on CDM (Albion, 2000). Individual traits measured include aspects of general motivation (Crites, 1978; Holland, Daiger, & Power, 1980; Krumboltz, 1994; Super & Forrest, 1972), undecidedness (Osipow, Carney, Winer, Yanico, & Koschier, 1987), decision anxiety (Sampson, Peterson, Lenz, Reardon, & Saunders, 1996), and locus of control (Taylor, 1982). Recent research has shown consistent relationships between personality constructs and interest categories (Wright, Reardon, Peterson, & Osborn, 2000), with Gottfredson, Jones, and Holland (1993) finding that Extraversion is associated with Social and Enterprising interests, whereas Openness is related to Investigative and Artistic interests, and Conscientiousness is related to Conventional interests. Costa, McCrae, and Holland (1984) had earlier reported that people with high scores on Openness were more likely to pursue Artistic and Investigative occupations.

There are also some data indicating relationships between personality and CDM. Bansberg and Sklare (1986) found that introverted students reported

more decision difficulties than those who were extraverted. Costa et al. (1984) reported that Neuroticism could be related to occupational difficulties such as job dissatisfaction or anxiety, the latter being already noted as an anticipated source of career decision difficulties (Sampson et al., 1996). Osipow (1999) reported an unpublished study of decisiveness conducted by Haraburda (1998), which suggested links between undecidedness and all five personality dimensions. Haraburda found that high scores on decisiveness were associated with low Neuroticism and fewer psychological symptoms, whereas low scores on decisiveness were associated with low scores on Extraversion, Openness, Agreeableness, and Conscientiousness. Despite the possibility that some of these findings were influenced by social desirability and other biases affecting self-report measures, it is likely that the inclusion of personality variables would enhance the predictive power of the CDM model.

Career interests are usually expressed as behaviours or actions, and are a means by which people attain their values and meet their needs (Super, 1995). There is some evidence that people with different interests approach CDM in distinctively different ways and with varying degrees of success. Holland and Nichols (1964) found that students with creative interests appeared to exhibit high degrees of career indecision, as did students with characteristics conducive to achievement. Holland, Gottfredson, and Power's (1980) finding that Conventional and Realistic types had low scores on a Vocational Identity scale suggested that they may be less effective decision makers than Social types who, according to Holland (1973), were more insightful and therefore likely to be competent decision makers. These findings suggest that people's interest type will predict their decisional status. In the present study, it was therefore hypothesised that Artistic, Conventional, and Realistic types were likely to demonstrate more indecision, while those with more person-oriented interests such as Social and Enterprising types should be more decided. The outcome for Investigative types was less easy to predict on the basis of previous research. While it might be assumed that they would be more undecided because of their open-minded approach, their insightfulness may provide a counter influence.

### **Influence of Gender Stereotypes**

According to Gottfredson's (1996) theory of Circumscription and Compromise, career aspirations are circumscribed from early childhood based on gender-stereotyped notions of what careers are appropriate. If these stereotyped ideas remain unchallenged and unchanged as the child reaches maturity, then they will continue to impact CDM. The circumscription of career possibilities limits the number of options under consideration, leading to a faster decision being made. However, if there is exposure to "non-traditional" career opportunities, the information may improve the quality of decisions, but it is also likely to prolong the CDM process as people include

previously excluded options. It is therefore hypothesised that people who adhere to gender stereotypes will be less undecided than those who do not.

### **CDM and Intelligence**

The modern paradigm of intelligence differentiates the notion of intelligence-as-typical performance from the notion of intelligence-as-optimal performance (Ackerman & Heggstad, 1997). Whereas tests designed to assess intelligence have primarily focused on the latter and have attempted to insulate the construct from any possible educational, social, or environmental influences, measures of intelligence-as-typical performance approach the task of assessing intelligence from the different perspective of trying to understand how a person is likely to perform in a variety of situations and circumstances. As interests and personality are conceptualized and measured in terms of typical performance, this new perspective has encouraged and enabled researchers such as Ackerman and Heggstad (1997) to investigate the overlap between intelligence and personality, and between intelligence and interests. Through their research, they have identified four trait-complexes: (a) Social, which consists of Enterprising and Social interests, Extraversion, Social Potency, and Well-Being; (b) Clerical/Conventional, comprising Perceptual Speed, Conventional interests, Control, Conscientiousness, and Traditionalism; (c) Science/Math, which consists of Mathematical Reasoning, Visual Perception, and Realistic and Investigative interests; and (d) Intellectual/Cultural, made up of Investigative and Artistic interests, Crystallised Intelligence, Ideational Fluency, Absorption, Typical Intellectual Engagement, and Openness.

While the trend in career development theory has been away from the trait-and-factor approach based on the individual career decider to a more general, developmental and environmental approach, the emergence of this new paradigm for intelligence suggests that the time may be right to reconsider careers from an individual differences perspective. The integrative approach of this study will follow the tenor of Ackerman and Heggstad (1997) and will include measures of general intellectual functioning, personality, and interests. Trait clusters will be represented in the structural equation model as correlated variables.

### **Outcome Measures of CDM**

An investigation of the decision-making process necessarily involves consideration of the quality of the decision. However, one can only adjudge whether a career decision was "good" or "bad" in the long term, so any attempt to determine the efficacy of an individual's decision at the time it is taken would be a futile endeavour. While prescriptive theories of decision

making suggest that some methods are objectively better than others, in reality, the value of decision making ultimately comes down to the subjective and individual appraisal of the person making the choice. On these grounds and in the absence of any reliable or defensible objective measures, we therefore followed the methodology of the CDDQ (Gati, Krausz, & Osipow, 1996) in using participants' own subjective ratings of their experience of the decision-making process as the outcome measure. An individual's involvement in the process of deciding on his or her career and study plans would therefore be measured by (a) level of decidedness, (b) satisfaction with that level of decidedness (or undecidedness), and (c) degree of confidence in the decision.

### **Aims of Study**

The integrative approach of the following studies will incorporate aspects of decision theory, personality theory, and notions of intelligence in the development and testing of a structural equation model (SEM) that will explain variance in the outcome variable, career decision status. The CDDQ (Gati, Osipow, et al., 1996) will form the basis of the model, with additional constructs including personality traits, career interests, intelligence, and gender-role stereotyped attitudes. A structural model will be proposed and tested on a sample of young people in Study 1 and an adult sample in Study 2.

### **The Conceptual Model**

When using SEM, Hoyle and Panter (1995) recommended the presentation of a conceptual model outlining the set of variables and their relationships before presentation of the full statistical model. They advised against presenting a full model incorporating all indicator variables, suggesting instead the introduction of a simpler representation of the constructs and theories involved without adding the extra complication of multiple indicators, notation for path diagrams, and the like. To demonstrate graphically the relationships to be evaluated, the conceptual model incorporating the hypothesised relationships among variables is shown in Figure 1. In this simplified model, the three indicators influencing and influenced by "difficulties" appear as single variables (Lack of Readiness, Lack of Information, and Inconsistent Information), rather than as latent variables having their own multiple indicators (items of the CDDQ).

The two latent variables presented in Figure 1 are CDM difficulties and CDM status, each of which has multiple indicators. The Status variable is implied by the shared variance of the observed variables, Undecidedness, Satisfaction, and Confidence. The relationships among the variables are represented by pathways leading from the latent variable to its indicators, which is the pattern of relationships most generally associated with latent variables in SEM.

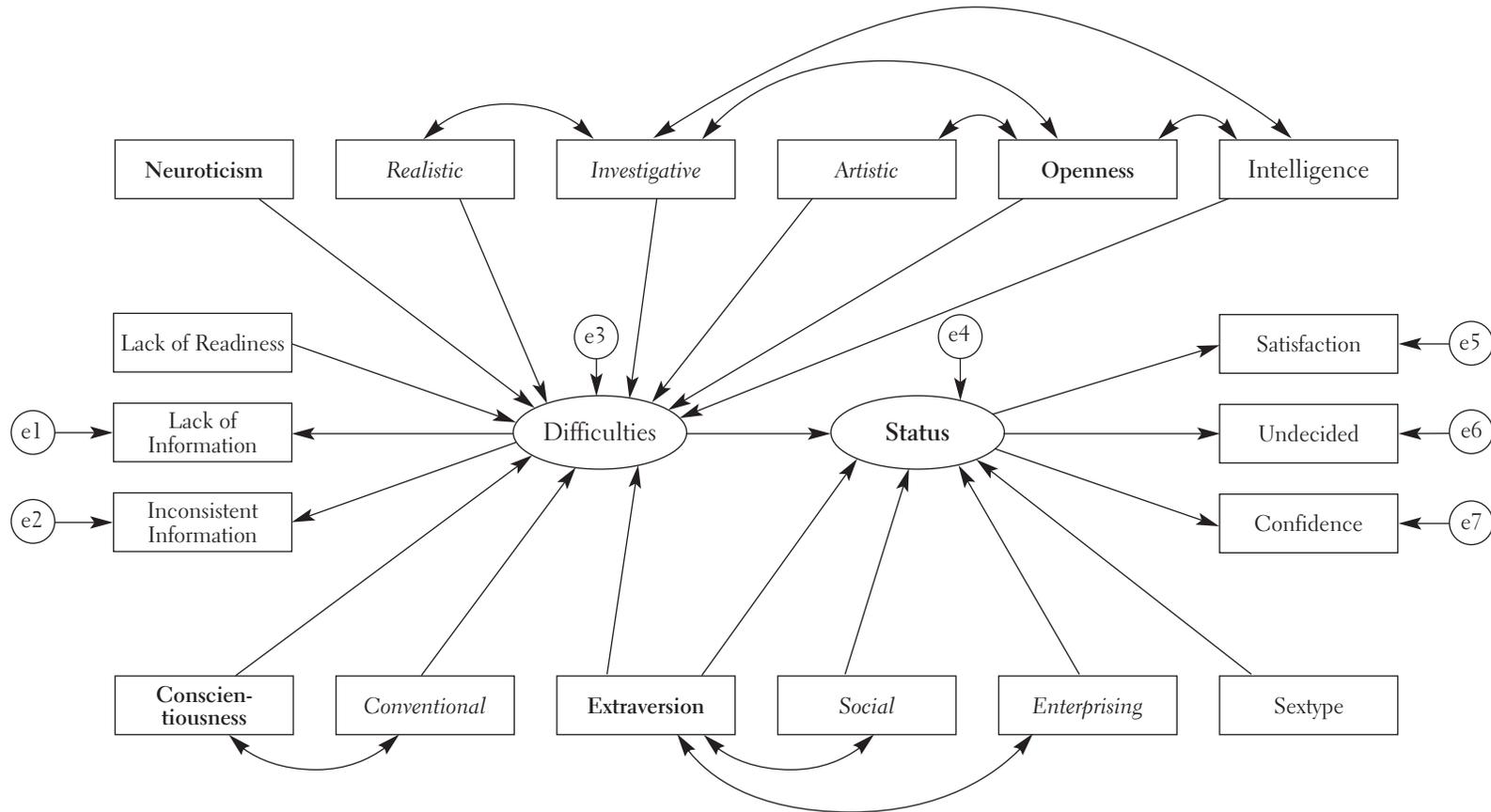


Figure 1. Conceptual model of the career decision-making process.

However, the latent variable Difficulties is presented as a composite variable consisting of multidirectional influences. Gati, Krausz, et al. (1996), in their development of the CDDQ, differentiated two separate phases of the CDM process—one phase prior to the process, and the other during the process. They allocated items in their taxonomy of difficulties to each, seeing Lack of Readiness issues impacting prior to the process, with Lack of Information and Inconsistent Information having effect during the process. This suggested that Lack of Readiness, which defined pre-existing characteristics of the decision makers, could be represented as a cause of CDM difficulties rather than as an effect or simply a covariate. The latent variable Difficulties was represented as a complex variable being influenced by Lack of Readiness and then in turn exerting influence on the two marker variables, Lack of Information, and Inconsistent Information. MacCallum and Browne (1993) presented a similar case where they defined a model by identifying some of their latent variables not as constructs defined by manifest variables, but as composite variables which were a linear combination of their observed causal indicators. In order to specify this combination of reflective and formative elements in a model, there were a number of specific conventions that needed to be observed. One of these was that any indicators that were designated as causal should be represented as exogenous manifest variables with no paths leading to them (MacCallum & Browne, 1993). Their influence was modelled by drawing the path to their composite variable. Using these guidelines, the model was specified to indicate that Lack of Readiness exerted influence on the latent variable Difficulties which was an unobserved variable implied by the covariance of Lack of Information and Inconsistent Information.

Individual difference variables, including personality, interest, and intelligence, were grouped according to the trait clusters suggested by Ackerman and Heggstad (1997). The role of gender stereotyped attitudes was modelled by the pathway from the variable measuring sex-type to CDM Status. All variables are posited as exerting influence on the latent variables rather than on individual indicators. A full description of the derivation of this model is presented in a separate paper (Albion & Fogarty, 2001).

## STUDY 1

### Method

#### *Participants*

One hundred and twenty-one students (78 girls and 43 boys) from Years 11 and 12 at a regional Queensland school participated in Study 1. The

mean age was 15.75 years ( $SD = 0.86$  years) for the girls and 16.20 years ( $SD = 0.80$  years) for the boys. Seventy-eight of the students were in Year 11, 42 were in Year 12, and one student on an accelerated learning program was in Year 10. The sample was an accidental sample of students who volunteered to complete the surveys during regular class periods.

### *Materials*

*The Career Decision-Making Difficulties Questionnaire (CDDQ).* The CDDQ (Gati, Osipow, et al., 1996) consists of introductory questions seeking demographic data and a general overview of level of career indecision, including specific questions about level of undecidedness, satisfaction with decision status, and confidence in current choice. These items were used as the outcome measures contributing to the latent variable Status. Then follow 44 statements of attitudes to and beliefs about career decision making (CDM) to which respondents are asked to indicate their level of agreement on a 9-point scale, ranging from 1 (*Does not describe me*) to 9 (*Describes me well*).

The CDDQ differentiates three categories of difficulty—Lack of Readiness to make a career decision, Lack of Information, and Inconsistent Information. These three categories are further subdivided into a number of subscales. Lack of Readiness incorporates Lack of Motivation (3 items), Indecisiveness (4 items), and Dysfunctional Myths (3 items). The second category, Lack of Information, is subdivided into Lack of Knowledge about the Process (3 items), Lack of Knowledge about the Self (8 items), Lack of Knowledge about Occupations (4 items), and Lack of Knowledge about How to Access Additional Sources of Information (2 items). The third category, Inconsistent Information, consists of Unreliable Information (6 items), Internal Conflicts (7 items), and External Conflicts (4 items). The scale also yields a total score which is an indication of the severity of difficulties being faced by an individual respondent.

Preliminary administration of the CDDQ (Gati, Krausz, et al., 1996) has shown that while two of the subscales have good internal consistency (Inconsistent Information,  $\alpha = .89$ , and Lack of Information,  $\alpha = .95$ ), the Lack of Readiness scale ( $\alpha = .63$ ) has moderately low reliability. Overall reliability of the scale was reported to be .94. The multidimensionality of the scale was established and verified using the ADDTREE cluster analysis algorithm (Gati, Krausz, et al., 1996; Gati, Osipow, Krausz, & Saka, 2000; Osipow & Gati, 1998).

*The International Personality Item Pool (IPIP) Five-Factor Domain Scale.* The IPIP Five-Factor Domain Scale (Goldberg, 1997) consists of items that define the five personality domains: Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). Each domain

is measured by 20 items. Respondents indicate on a 5-point Likert scale the extent to which they agree with each item. Average alpha coefficients are about .80, and the average correlation between the IPIP scales and the NEO scales (Costa & McCrae, 1991) is .73, or .94 when corrected for attenuation due to the unreliabilities of the two scales. As this test was developed and normed on an adult sample (Goldberg, 1997), it was decided to administer the items to a focus group of five young people aged between 15 and 17 years, to assess its suitability for use with this population. Some minor modifications were subsequently made to some items in order to adapt them to the vernacular and circumstances of Australian youth.

*Shipley Institute of Living Scale.* The Shipley Institute of Living Scale (Zachary, 1991) was used to provide a measure of participants' general intellectual functioning. The scale consists of two subtests, Vocabulary and Abstraction, which incorporate some of the constructs that Ackerman and Heggstad (1997) included in their Intellectual/Cultural trait complex, crystallised intelligence and ideational fluency.

Zachary (1991) found the test to be internally consistent ( $\alpha = .92$ ) and temporally stable. Test-retest coefficients ranged from .62 to .82. Its validity was established by the high correlations reported in studies conducted between 1946 and 1986 which demonstrated consistent relationships between Shipley Total Raw Score and Full Scale IQ scores on the Wechsler-Bellevue Intelligence Scale (Wechsler, 1939) with coefficients ranging from .68 to .79; Full Scale IQ scores on the Wechsler Adult Intelligence Scale (Wechsler, 1955) with coefficients ranging from .73 to .90; and Full Scale IQ scores on the Wechsler Adult Intelligence Scale-Revised (Wechsler, 1981) with coefficients ranging from .74 to .85. The test is timed, with respondents being given 10 minutes to complete the 40 multiple choice vocabulary questions, and an additional 10 minutes for the 20 items in the abstract reasoning section.

*Interest Determination, Exploration and Assessment System (IDEAS) Interest Inventory.* The IDEAS Interest Inventory (Johansson, 1990) is a pencil and paper test designed to assess people's preferences for a range of activities and interests. Respondents are asked to indicate on a 5-point Likert scale their interest in each of the 128 activities included in the inventory. There are eight items for each of 16 categories, which can be reorganised to represent Holland's (1973) six occupational types.

A review of the test's psychometric properties (Miller & Hoffbauer, 1994) indicated good validity and good internal consistency for each subscale (ranging from .80 to the low .90s). Test-retest reliability is generally good, with correlations over periods of 1 week, 2 weeks, and 30 days being .75 and above. As there are considerable published data from career-related research employing Holland's types, IDEAS scores in this study were converted to Holland's six (R-I-A-S-E-C) categories.

*Personal Attributes Questionnaire (PAQ)*. The short 24-item form of the PAQ (Spence & Helmreich, 1978; Spence, Helmreich, & Stapp, 1974) was used in this study. Each item consists of a pair of contradictory statements, such as "Not at all aggressive"–"Very aggressive." Respondents mark on a 5-point Likert scale, the description which they feel best represents them. There are three subscales: Masculinity (M), Femininity (F), and Masculinity-Femininity (M-F). Reliability data (Spence & Helmreich, 1978) indicate that these subscales are internally consistent, with alpha values of .85, .82, and .78 being reported for the M, F, and M-F scales, respectively. Spence (1983) suggested categorizing respondents by gender-type using a median split method. Masculine types are defined as those who score above the median on the M scale and below the median on the F scale, Feminine types as those scoring high on F and low on M, Androgenous as those who are high on both, and Undifferentiated as those scoring low on both.

## PROCEDURE

Participation was encouraged by offering students individual written feedback on their personality profiles, career interests, and CDM difficulties. The first author personally explained and administered the tests to class groups of students over a period of 3 days. Students completed the tests in 50 to 60 minutes.

## RESULTS

### Descriptive Statistics

Over 70% of students indicated that they were slightly or very undecided about their career choice, while most (84.3%) rated their satisfaction with their level of decidedness as moderate to high, and 86.6% rated their confidence in their current career choice as moderate to high. In other words, although these high school students were undecided about careers, they were not unduly worried by their indecision. Highest mean CDDQ scores were obtained on Dysfunctional Myths (4.88 out of 9), Indecisiveness (4.38), and the four Lack of Information subscales (3.88 to 4.08). Lowest scores were recorded for External Conflicts (2.43) and Lack of Motivation (2.89).

Before proceeding with the confirmatory analysis of the model, reliability coefficients were calculated for the instruments used in the study and were found to correspond well with those reported by the authors of the various measures. Most scales demonstrated very good internal consistency, except

for the Lack of Readiness scale of the CDDQ ( $\alpha = .62$ ), and two of the three scales of the PAQ. Lack of Readiness had demonstrated similarly relatively poor alpha coefficients in previous validation studies (Gati et al., 2000; Osipow & Gati, 1998), which suggested that the subscale structure of the CDDQ warranted further investigation. This was undertaken as part of the evaluation of the measurement model specifying the pattern by which each of the test items loads onto the subscales (Albion & Fogarty, 2001).

Moderately low alphas for the Masculinity ( $\alpha = .74$ ) and Masculinity-Femininity ( $\alpha = .67$ ) subscales of the PAQ suggested that the scale may no longer reliably measure the constructs for which it was designed. Factor Analysis also identified some problems with some items, and while it was decided not to exclude the PAQ from the study at this point, the problems were noted and were taken into consideration when interpreting results. Using the median split method, 19 girls (24.36% of all girls) were classified as Feminine type and 9 boys (20.94% of all boys) as Masculine type. The majority of the sample were Undifferentiated or Androgenous. The categorical "sextype" variable was defined by dividing the sample into two subgroups based on sex matched gender-type. Feminine-typed females and Masculine-typed males formed one group, and all others formed the second group.

## Correlations

Whereas structural modelling in AMOS uses the analysis of covariances (Arbuckle, 1997), Hoyle and Panter (1995) recommended the reporting of correlational data to indicate the basic relationships of elements within the model. The correlation matrix showing relationships among the various measures is in Table 1.

The three categories of difficulties that make up the subscales of the CDDQ were all positively and significantly correlated with each other. Coefficients ranged from .56 to .74 ( $p < .01$ ). The three outcome variables, Confidence, Undecidedness, and Satisfaction, were also significantly inter-correlated, with correlations ranging from  $-.72$  to  $-.75$  ( $p < .01$ ). The categories of difficulties exhibited significant correlations with the three outcome variables, being positively related with Undecidedness, and negatively related with Satisfaction and Confidence. While gender was not related to any of the CDM variables, scores on the Masculine scale of the PAQ were significantly correlated with both decision difficulties and outcomes. Four of the five personality dimensions exhibited high correlations with most CDM difficulties and outcomes, and it appeared that relationships between scores on the Masculine scale and the CDM variables were more readily explained by the high correlation between Masculine-type and these personality dimensions, than by considering them as gender-related influences. To test this

*(text continues on p. 105)*

**Table 1**  
**Study 1: Correlational Data for High School Students Using the IDEAS Interest Inventory, the International Personality Item Pool (IPIP) Five-Factor Domain Scale, Age, the Shipley Institute of Living Scale, Gender, the Career Decision-Making Difficulty Questionnaire (CDDQ), and the Personal Attributes Questionnaire (PAQ)**

	IDEAS						IPIP					
	Artist 1	Conv 2	Enter 3	Invest 4	Real 5	Social 6	Agree 7	Cons 8	Extra 9	Neurot 10	Open 11	Age 12
1	1.00											
2	.27**	1.00										
3	.40**	.58**	1.00									
4	.07	.23*	.46**	1.00								
5	.14	.34**	.41**	.49**	1.00							
6	.50**	.51**	.61**	.19*	.38**	1.00						
7	.28**	.13	.12	-.05	.14	.58**	1.00					
8	-.03	.16	.03	.09	.22*	.10	.38**	1.00				
9	.19*	.00	.38**	.06	.07	.29**	.30**	.10	1.00			
10	.02	.12	-.06	-.10	-.28**	-.09	-.25**	-.23*	-.39**	1.00		

11	.52**	-.07	.31**	.33**	.19*	.28**	.33**	.23*	.42**	-.26**	1.00	
12	.01	-.09	-.05	.35**	.15	-.03	.03	.09	-.11	-.07	.10	1.00
13	.15	-.02	.11	.31**	.11	.01	-.03	-.13	.10	-.08	.24**	.17
14	-.38**	-.15	-.11	.25**	.25**	-.29**	-.38**	-.10	-.19*	-.18*	-.06	.25**
15	.02	.14	-.05	-.17	-.09	.05	-.04	-.21*	.24**	.38**	-.27**	-.11
16	-.02	.26**	.15	-.07	-.04	.19*	-.03	-.24**	-.24**	.25**	-.31**	-.08
17	-.04	.18*	.05	-.18*	-.02	.05	-.10	-.16	-.18*	.32**	-.19*	-.12
18	-.01	-.12	-.05	.15	.07	-.04	.18	.39**	.28**	-.23*	.22*	.13
19	.05	.11	.04	-.17	-.10	.06	-.12	-.28**	-.18	.19*	-.13	-.19*
20	-.05	-.03	.01	.22*	.10	-.06	.10	.40**	.28**	-.20*	.19*	.14
21	-.14	-.27**	.03	.17	.13	-.25**	-.22*	.06	.23*	-.22*	.16	.09
22	.23*	.12	.06	-.18	-.03	.43**	.57**	.22*	.18	-.13	.17	-.01
23	.01	-.09	.23*	.15	.14	.08	.17	.28**	.46**	-.30**	.35**	.04
24	.13	.23*	.09	-.09	-.00	.24**	.17	.02	.11	-.01	-.02	-.11

(continued)

Table 1: Continued

	CDDQ								PAQ			
	Intell 13	Gender 14	L/Rdns 15	L/Info 16	Incons 17	Satis 18	Undec 19	Confid 20	M-F 21	Femin 22	Masc 23	Sxtyp 24
13	1.00											
14	.07	1.00										
15	-.11	-.13	1.00									
16	-.07	-.13	.59**	1.00								
17	-.20*	.01	.56**	.74**	1.00							
18	-.01	-.03	-.42**	-.58**	-.44**	1.00						
19	.07	-.04	.35**	.58**	.48**	-.75**	1.00					
20	-.00	.10	-.43**	-.54**	-.41**	.86**	-.72**	1.00				
21	.04	.21*	-.27**	-.13	-.06	.16	-.13	.20	1.00			
22	-.07	-.25**	-.05	-.13	-.13	.11	-.13	.05	-.43**	1.00		
23	.03	-.04	-.21*	-.22*	-.22*	.36**	-.40**	.36**	.31**	.22*	1.00	
24	.05	-.04	.02	.15	.07	-.14	.16	-.18*	-.21*	-.14	.23*	1.00

*Note.*  $N = 121$ . IDEAS = Interest Determination, Exploration and Assessment System; Artist = Artistic; Conven = Conventional; Enter = Enterprising; Invest = Investigative; Real = Realistic; Agree = Agreeableness; Cons = Conscientiousness; Extra = Extraversion; Neurot = Neuroticism; Open = Openness; Intell = Intelligence; L/Rdns = Lack of Readiness; L/Info = Lack of Information; Incons = Inconsistent Information; Satis = Satisfaction; Undec = Undecided; Confid = Confidence; M-F = Masculinity-Femininity; Femin = Femininity; Masc = Masculinity; Sxtyp = Sex-typed.

\* $p < .05$ . \*\* $p < .01$ .

assumption, partial correlations were obtained for the six decision difficulties and outcome variables and the three gender-type scores, while controlling for the five personality factors. Of the 18 correlations calculated, only the one between Masculine-type and Undecidedness ( $r = -.30, p < .01$ ) remained significant at the .05 level when the influence of personality was accounted for in this way. More current research on gender stereotypes has suggested that the construct of masculinity might be better defined as instrumentality, self-assertiveness, or dominance (Golombok & Fivush, 1995). These data tended to support this view, and it was adjudged that the gender-typed variables were likely to add little to the model of career decidedness that would not be contributed by the personality constructs.

This study provided support for previous research findings (e.g., Costa et al., 1984; Gottfredson et al., 1993; Wright et al., 2000), that strong relationships exist among interest and personality variables. Extraversion was associated with Social and Enterprising interests, and Openness was associated with all interest categories except Conventional. Agreeableness exhibited a strong relationship with Social interests ( $r = .58, p < .01$ ), and a moderately strong relationship with Artistic interests ( $r = .28, p < .01$ ). Few relationships were found among CDM variables and interest categories, although Conventional interest was positively related to Lack of Information and Inconsistent Information. Those with Investigative interests were more confident of their career choice and reported fewer difficulties due to Inconsistent Information, and students with Social interests reported more problems due to Lack of Information. Intelligence was uncorrelated with decision outcomes, but was negatively related to Inconsistent Information ( $r = -.20, p < .05$ ).

The more detailed structure of the CDDQ as proposed by Gati, Krausz, et al. (1996) was then tested by SEM using the Maximum Likelihood (ML) method of estimation with the AMOS 3.6 program (Albion & Fogarty, 2001). Gati, Krausz, and Osipow's (1996) hierarchical cluster structure suggested a third-order general factor (Difficulties), and three second-order factors (Lack of Readiness, Lack of Information, and Inconsistent Information), which were further composed of three, four, and three primary factors, respectively. However, SEM analysis indicated that for these data, a simplified model consisting of 5-item parcels provided a better fit. The first two factors comprising the latent variable Difficulties were Lack of Motivation and Indecisiveness, which Gati, Krausz, et al. (1996) described as having influence before the decision process. They were included as background predictor variables, while Lack of Information, Internal Conflicts, and Conflicts with Others acted as indicator variables. Lack of Motivation was shown to impact on both Difficulties and Status. The amended structural model of the CDDQ is presented in Figure 2.

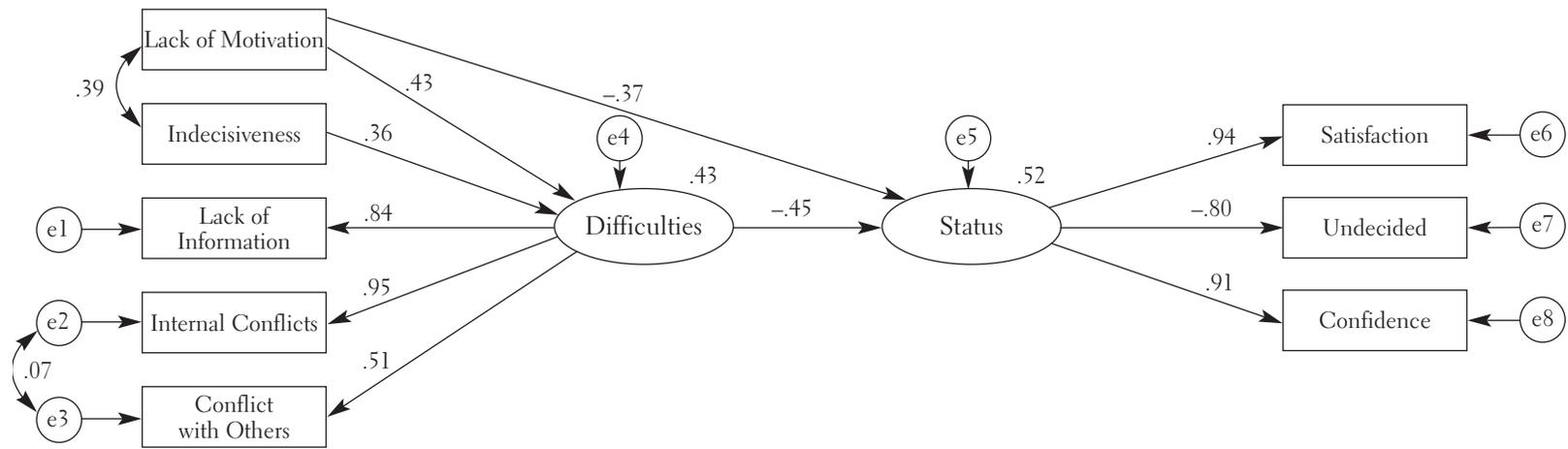


Figure 2. Amended structural model of the Career Decision-Making Difficulties Questionnaire.

## Evaluation of the Full Model

Having developed a modified model which accounted for the relationships among the CDDQ variables and CDM status (Albion & Fogarty, 2001), the model was extended to include relationships between individual difference variables and CDM difficulties and status as hypothesised in Figure 1. This model (not reported) was not a good fit,  $\chi^2$  (158,  $N = 121$ ) = 543.98,  $p < .01$ , CMIN/df = 3.44, TLI = .57, CFI = .64, RMSEA = .14.

The analysis revealed many nonsignificant pathways, which indicated that a number of the variables included in the theoretical model had no practical part to play in predicting either CDM difficulties or CDM status. The correlation between the error terms associated with Internal Conflicts and Conflicts with Others also proved to be nonsignificant. The model proposed that the individual difference variables (personality trait—Conscientiousness, and career interest—Conventional) exerted their influence via the latent variable Difficulties. However, the nonsignificant pathways associated with these variables indicated that they could not account for the observed correlations.

Modification indices provided by AMOS suggested that the fit of the model could be improved by allowing a number of intercorrelations among Lack of Motivation and Decisiveness and the two personality variables that were demonstrated as having significant relationships in the model, Conscientiousness and Neuroticism. The recommended modifications included correlations between Lack of Motivation and Neuroticism, Indecisiveness and Neuroticism, Conscientiousness and Lack of Motivation, and Conscientiousness and Neuroticism.

These modifications made good theoretical sense, as aspects of the personality trait Neuroticism have generally been associated with depressive affect, apprehensiveness, discouragement, hopelessness, and vulnerability to stress and anxiety (Costa & McCrae, 1991). These negative emotions would certainly impact on motivation and decisiveness. On the other hand, Conscientiousness has been associated with positive motivational attributes, such as prudence, diligence, and purposefulness (Costa & McCrae, 1991), not only providing justification for including the relationship between Conscientiousness and motivation, but also indicating that this trait would be related to Neuroticism. Modification indices also suggested that Conscientiousness exerted its influence on the outcome variable Status rather than the Difficulties variable. It was decided to respecify the model by incorporating all of the above amendments, and by removing all nonsignificant pathways. The model (see Figure 3) was then reevaluated. This time the fit indices indicated that the model fit the data,  $\chi^2$  (29,  $N = 121$ ) = 30.67,  $p = .38$ , CMIN/df = 1.06, TLI = 1.00, CFI = 1.00, RMSEA = .02.

It is interesting to note that the addition of the individual difference variables to the model did little to increase the predictive power of the model. There was a slight increase (44% cf. 43%) in the prediction of Difficulties,

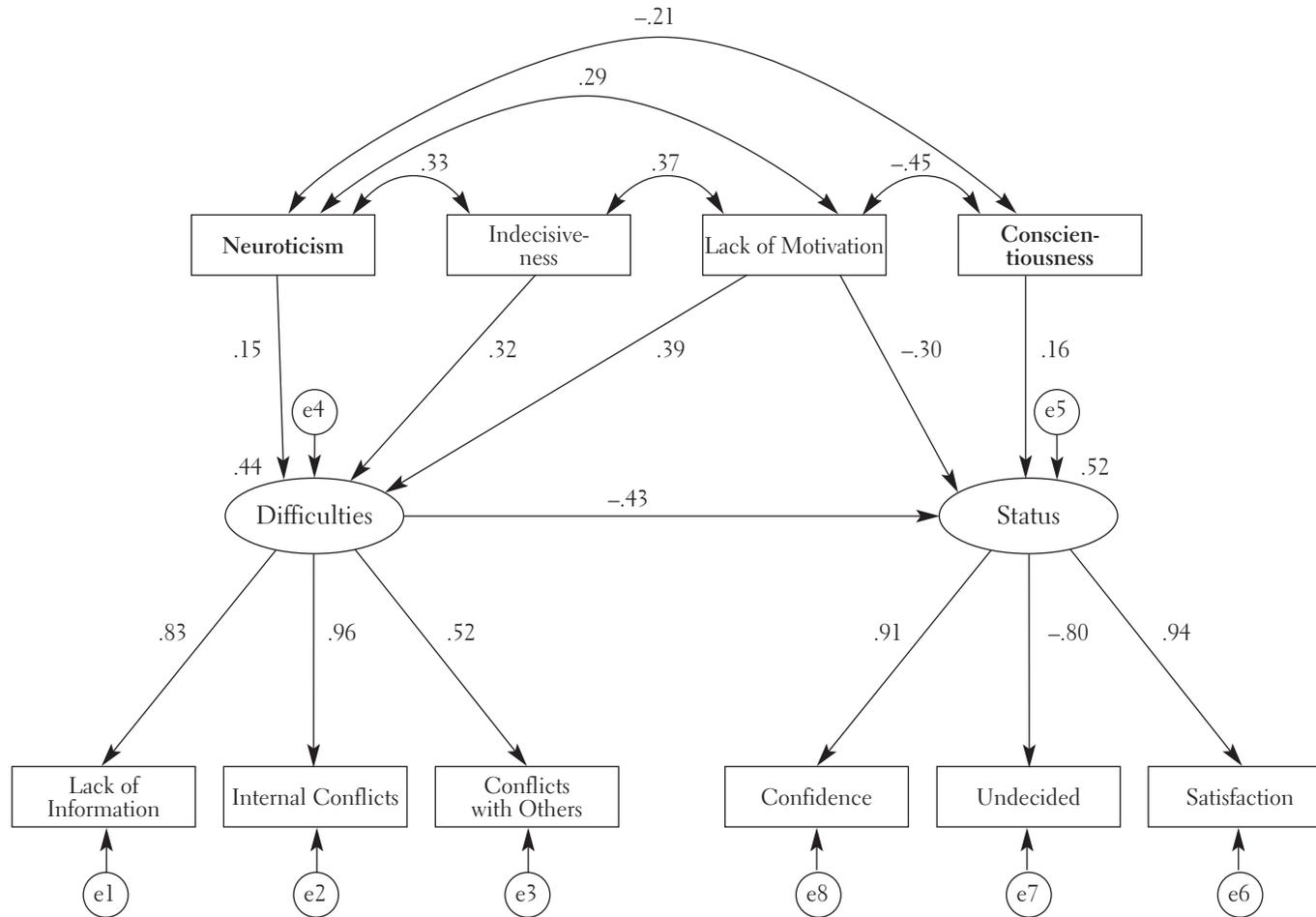


Figure 3. Modified model of career decision-making status for high school students.

but there was no variation in the prediction of decision Status in the full amended model (52%) from what was predicted by the model incorporating CDDQ variables only (see Figure 2). It appeared that any effects due to an individual's personality were substantially accounted for by the Lack of Motivation factor. Although parsimonious models are highly valued in SEM (e.g., Browne & Cudeck, 1993; Gerbing & Anderson, 1993), and it could be argued that the individual difference variables were superfluous, it was decided that their inclusion in the model could be justified. Both Conscientiousness and Neuroticism were significantly related to many variables in the model, and their inclusion added to the interpretability of the model by elaborating on some of the specific ways in which CDM difficulties impacted on CDM status. Furthermore, the presence of significant correlations between Lack of Motivation and both Conscientiousness and Neuroticism allows for the possibility that these two personality dimensions can account for some of the variance in this CDM variable. The use of a model containing both causal and reflective indicators (MacCallum & Browne, 1993) did not permit the fitting of regression pathways between these personality constructs and Lack of Motivation. Separate analyses, however, indicate that Neuroticism and Conscientiousness account for 24% of the variance in Lack of Motivation.

## Discussion

Although this model provides a useful representation of many of the factors influencing CDM in young people, it does not fully support the hypotheses nor meet all the aims of the study. In particular, the role of intelligence remains substantially unexplained. Results accorded with Ackerman and Heggestad's (1997) notion that intelligence, personality, and interests are overlapping constructs, with analysis of these data indicating that crystallized intelligence, as measured by the Shipley scale (Zachary, 1991) is positively correlated with Investigative career interests and the personality dimension of Openness. However, although it may be that intelligence and interests influence the *content* of an individual's career choice, they appear to be nonsignificant in the elements of the *process* of CDM.

The study was also unable to demonstrate the expected indirect relationship between intelligence and CDM, a pathway which ran from Intelligence to the latent construct Difficulties (via the influence of the Lack of Information factor) and from there to Status. The most likely explanation for the failure to find any such relationship is that no objective measure of career knowledge was included in the test battery, with the assessment of career knowledge relying solely on self-report data. Brown (1996) cited evidence that self-estimates of ability were often as reliable a measure as aptitude tests. However, although this may be the case for abilities which are regularly assessed (such as school-based abilities) or for which there are opportunities for social comparison (such as sporting or artistic abilities), it may not apply

to idiosyncratic knowledge bases such as career information. It is possible that for this type of knowledge self-reports may be more closely related to self-efficacy estimates, a relationship that warrants further investigation (Brown, 1996). Further investigation is needed to determine the role of intelligence in CDM.

Gender also proved to be inconsequential in the prediction of decision status. The poor psychometric qualities of the PAQ (Spence & Helmreich, 1978; Spence et al., 1974) precluded any conclusions being drawn from its results. In addition, high intercorrelations between the PAQ variables, personality traits, and CDM factors prompted a partial correlation analysis which supported the contention that any contribution made by the attributes measured by the PAQ was subsumed in the assessment of the personality dimensions.

Despite those aspects of the conceptual model that were not supported, the model of CDM developed in this study does provide useful information. The model confirms that the categories of difficulties contained in the CDDQ (Gati, Krausz et al., 1996) are significant determinants of the decision status of young people. The factorial structure also supports the multidimensionality of undecidedness, making the scale a useful tool for career counsellors to diagnose specific problem issues faced by undecided clients.

While the CDDQ is comprehensive in its measure of CDM difficulties, and a measure of these difficulties can predict a substantial amount of decision status, the model shows that the explanation of CDM can be elaborated by including background variables such as personality traits. The data provide substantial evidence for the hypothesised role of personality in CDM. Two of the Big-Five (Costa & McCrae, 1991) personality traits, Conscientiousness (C) and Neuroticism (N) were correlated with the two causal indicators, Lack of Motivation and Indecisiveness, and also had significant direct effects on decision status and decision difficulties respectively.

Individuals who score high on the C scale are usually competent, orderly, dutiful, achievement oriented, self-disciplined, and thoughtful (Costa & McCrae, 1991). It is not surprising, then, that C would be a determining factor in CDM. Endowed with such attributes as organisational ability, industriousness, self-confidence, and persistence, students high in this dimension are likely to approach the CDM task as they do most others—with enthusiasm and diligence. So it can be seen that just as C is a predictor of workplace achievement (Dye, 1991, cited in Costa & McCrae, 1991), it also provides a good indication of people's decidedness and confidence at their time of entry into the world of work.

High scorers on the N scale are typically apprehensive, prone to worry and distress, are likely to feel sadness and hopelessness, self-consciousness and shyness (Costa & McCrae, 1991). These traits are also likely to prevent a person from actively engaging in effectively dealing with opportunities and situations at all stages of their development, including the range of activities involved in deciding on a career. High Ns are likely to pay more attention to threatening than nonthreatening stimuli, and to interpret ambiguous stimuli in a negative manner (Walsh, Wilding, & Eysenck, 1994). This tendency to

focus on difficulties, and free-floating anxiety—a characteristic of those who score high on Neuroticism (Costa & McCrae, 1991)—make it likely that such anxiety will exacerbate the concern commonly associated with career indecision. Their compounded anxiety would serve to prevent them from taking the necessary action (making a choice) to reduce their distress. In fact, research has shown that when faced with indecision, such individuals are more likely to employ emotion-focused coping strategies such as escape-avoidance rather than more effective problem-focused strategies (Dorn & Matthews, 1992).

Despite previous research findings that people with different career interests differed in their CDM (Holland, Gottfredson et al., 1980; Holland & Nichols, 1964), our data did not provide evidence of career interests being implicated in the prediction of career decision status.

Comrey (1988), when discussing scale development in personality and social psychology, urged researchers to go beyond the immediate context in which the scale was developed. He stressed the importance of determining how the scale “correlates with important major variables such as age, IQ, and socioeconomic status; and how its mean and standard deviation vary across naturally occurring groups of general interest” (p. 761). Through Study 1, we have determined that CDM, as defined by Gati, Osipow, et al. (1996) in the CDDQ, links with career interest and personality variables in predictable ways but has no links with intelligence and gender-type measures. Study 2 extends this research to an adult population. Although the model has accounted for 52% of the self-reported CDM status of a sample of young final stage high school students, it remains to be seen whether the same factors impact on the decision-making process of older career deciders.

## STUDY 2

Since the emergence of developmental career theories, it has been commonly accepted that careers progress and evolve throughout life. Super, Savickas, and Super’s (1996) refinement of earlier theory which enunciated a life-span, life-space approach to career development, continued to focus on the unfolding nature of careers. They emphasised the idea that career development was a continuous process as people chose, entered, and adjusted to a variety of occupations over their lifetime.

However, most career decision research has focused on school/college leavers making career-entry choices. Crites’s (1973) early work suggested that CDM was usually completed by the time an individual reached 21 years of age, and Super (1980) proposed a similar timeline for his Exploration stage (14-24 years). It was this stage that he considered most significant in terms of career decision making. Research into adult career development more commonly looked at postdecision factors such as work adjustment (e.g., Dawis, 1994; Dawis & Lofquist, 1976), and career progress (e.g., Holland & Gott-

fredson, 1994). More recent work has acknowledged that many adults also face career decisions at many different stages of their life, and that different factors will be important at the various stages. For example, Patton and McMahon's (1997) systems model described the variability in factors that influenced a person's career choices across the life-span. As people's characteristics and life circumstances changed, so did the factors influencing their career decision making. The Career Thoughts Inventory (Sampson et al., 1996) is an example of a recent assessment and counselling tool that was designed to be used with both student and adult populations. The manual supports this multi-age use by providing adult and student norms. However, most of their adult data were obtained from "non-client" populations, that is, adults who were employed or not seeking employment. There is a shortage of data describing adult career deciders.

In an attempt to find an adult group for whom CDM could be considered as relevant an issue as it is for school leavers, cooperation was sought from staff involved with the Tertiary Preparation Program (TPP) at the researchers' university. TPP is a course for adults who are seeking admission to a university course but do not have the necessary academic qualifications to enroll through the normal process. Completion of the course, which includes modules in mathematics, communication, and study skills, along with a career development component, enables them to demonstrate their ability to undertake tertiary study. Participants in this program have distinctive characteristics regarding their career decision status. Most have had limited opportunities to access post-school education, and some have had little previous formal education, but all are motivated to enhance their education and subsequent career prospects.

The purpose of Study 2 was to determine whether the model developed in Study 1 fits data gathered from an adult sample engaged in CDM activities. It was hypothesised that while the overall level of difficulties might be similar, the pattern of difficulties would be different for the two age groups. This expectation was based on Patton and McMahon's (1997, 1999) systems theory. Specifically, in relation to the CDDQ, it was expected that the older group would have similar motivation levels to those of the student group. Developmental theory suggests that adults are likely to have higher levels of self-knowledge than young people, so some differences were anticipated on the Lack of Knowledge scale. However, no other variations were expected in the level of difficulties experienced by each group.

## Method

### *Participants*

This study used adult participants ( $N = 127$ ), consisting of 86 females and 41 males, who ranged in age from 18 to 65 years. The mean age was 33.84

years for females ( $SD = 9.58$ ) and 32.58 years for males ( $SD = 8.14$ ), with an overall mean age of 33.44 years ( $SD = 9.13$ ). Twenty-seven adults were employed full time, 21 were studying full time, while 61 were in part-time study or work or a combination of both. Sixteen adults were unemployed, and two people did not indicate their current occupational status. The majority of participants were recruited from people enrolling in the university's Tertiary Preparation Program (TPP).

### *Materials*

As in the previous study, participants completed the CDDQ (Gati, Krausz et al., 1996); the 100-item version of the IPIP Five-Factor Domain Scale (Goldberg, 1997); the Shipley Institute of Living Scale (Zachary, 1991); the IDEAS Interest Inventory (Johansson, 1990); and the PAQ (Spence & Helmreich, 1978; Spence et al., 1974).

### *Procedure*

Letters explaining the project and inviting students to participate were sent with enrolment materials to 423 TPP enquirers. Participants were offered individual career assessments as an incentive, and 176 positive replies were received. Questionnaires were sent out to each of these people, and 117 completed forms were returned for analysis. Additional data were obtained from 10 adult acquaintances who volunteered to participate in order to obtain career advice. Participants were requested to follow all test instructions diligently, taking particular care with timing of the Shipley Scale.

## **Results**

### *Descriptive Statistics*

Approximately 65% of these adult respondents indicated that they were slightly or very undecided about their career choice. However, as with the younger sample, most (81.9%) rated their satisfaction with their current level of decidedness as moderate to high, and as many as 91.4% rated their confidence in their career choice as moderate to high. Mean CDDQ scores were lower than those reported by the younger sample, although the pattern of scores was almost the same. Highest means were obtained on Dysfunctional Myths (4.60 out of 9), Indecisiveness (3.83), and the four Lack of Information subscales (3.22 to 3.79). Lowest scores were recorded for External Conflicts (1.87) and Internal Conflicts (2.61).

Reliability analysis indicated that the psychometric properties of the scales were similar for both samples. The subscales comprising the Lack of Readiness scale and the M-F scale of the PAQ were again problematic. In addition, the Internal Conflicts ( $\alpha = .69$ ) and Lack of Knowledge about Additional Sources ( $\alpha = .76$ ) subscales of the CDDQ also had relatively low internal consistency for the adult group.

Participants were gender-typed according to the median split method suggested by Spence (1983), which classified 11 males (26.8% of all males) as Masculine type and 24 females (27.9% of all females) as Feminine type. The majority of participants were either Androgenous or Undifferentiated.

### *Correlations*

The correlation matrix showing relationships among the scales and demographic variables is presented in Table 2.

Relationships among the three categories of difficulties variables and the decision outcome variables were similar to, but slightly less robust than, those found in Study 1. The difficulties variables were all related to each other (coefficients ranged from .28 to .78,  $p < .01$ ) as were the decision outcomes (coefficients ranged from  $-.55$  to .65,  $p < .01$ ). All difficulty variables were negatively related to satisfaction and confidence, and positively related to undecidedness.

Again, consistent relationships emerged between Extraversion and Enterprising and Social interests, but for this older sample a strong relationship also emerged between Extraversion and Artistic interests ( $r = .39$ ,  $p < .01$ ). Openness was also related to Artistic interests as in Study 1 and in earlier research (Costa et al., 1984; Gottfredson et al., 1993), but surprisingly, there was no significant relationship between Openness and Investigative interests. Agreeableness was strongly related to Social interests, and to a lesser degree to Artistic and Conventional interests.

As in Study 1, the personality traits of Conscientiousness, Extraversion, Neuroticism, and Openness were significantly related to the CDM variables. Conventional interests were again related to CDM difficulties associated with Lack of Information, but for this group, the only other relationship between interest and CDM factors was the significant correlation between Enterprising interests and difficulties due to Lack of Information and Internal Conflicts. The relationships between CDM difficulties and Investigative and Social interests that had been found in Study 1 did not emerge for this group.

While difficulty and decision variables were again unrelated to gender differences, some relationships reemerged with gender-type scores. PAQ Masculine scores were negatively associated with decision difficulties and undecidedness, and positively with confidence and satisfaction. Scores on the Masculine-Feminine scales were related to difficulty variables but not

decision status, and the only difficulty or decision variable with which Feminine scores were related was Indecisiveness. Partial correlations of gender-type and decision and difficulty variables, while controlling for the five personality traits, again added credence to the assumption that gender-type relationships were more readily explained as personality differences.

### *Fitting the Model*

The model developed in Study 1 was fit to the current data set and proved to be a reasonably good fit,  $\chi^2(29, N = 127) = 50.25, p < .01$ , CMIN/df = 1.73, TLI = .93, CFI = .96, RMSEA = .08, with most of the fit indices reaching acceptable levels. The pathway from Lack of Motivation to Status was not significant for this group. As well as having satisfactory fit statistics, the model was also able to predict as much as 46% of Difficulties and 61% of CDM status for this sample (see Figure 4).

The means on CDDQ total score and subscale scores for the two groups were compared by conducting a multivariate analysis of variance (MANOVA). Results are summarised in Table 3.

These results show that there are in fact significant differences between the manifest scores on the CDDQ for adults and young people. In all scales adults have reported fewer difficulties than were reported by young people. The scale on which least intergroup variation was evidenced was Lack of Motivation.

MANOVA analyses also demonstrated a number of gender and group differences on the other scales used in the battery. Results in Table 4 indicate that females score higher on Artistic, Social, and Conventional interests, Feminine type, Extraversion, and Agreeableness, whereas males score higher on Realistic and Investigative interests. There is an interaction effect for Androgenous type, with young females scoring higher than young males, but older males scoring higher than older females. Significant age group effects were found, with older participants scoring higher than their younger counterparts on Shipley's Vocabulary scale ( $F = 167.69, p = .00$ ), all interest categories except Conventional (Realistic,  $F = 6.44, p = .01$ ; Investigative,  $F = 11.67, p = .00$ ; Artistic,  $F = 12.19, p = .00$ ; Social,  $F = 9.50, p = .00$ ; and Enterprising,  $F = 8.01, p = .01$ ), Masculine type ( $F = 4.02, p = .05$ ), and Conscientiousness ( $F = 29.25, p = .00$ ).

## DISCUSSION

The first aim of this second study was to test whether the model of CDM developed using a sample of school-aged young adults also fit the data gathered on an older sample. The results indicate that this was the case, thus

*(text continues on p. 120)*

**Table 2**  
**Study 2: Correlational Data for Adults Using the IDEAS Interest Inventory, the International Personality Item Pool (IPIP) Five-Factor Domain Scale, Age, the Shipley Institute of Living Scale, Gender, the Career Decision-Making Difficulty Questionnaire (CDDQ), and the Personal Attributes Questionnaire (PAQ)**

	IDEAS						IPIP					Age 12	Intell 13
	Artist 1	Conv 2	Enter 3	Invest 4	Real 5	Social 6	Agree 7	Cons 8	Extra 9	Neurot 10	Open 11		
1	1.00												
2	.21*	1.00											
3	.38**	.46**	1.00										
4	.03	.05	.09	1.00									
5	.18*	.26**	.28**	.24**	1.00								
6	.30**	.45**	.40**	.01	.25**	1.00							
7	.27**	.24**	.16	-.11	-.01	.50**	1.00						
8	.19*	-.16	.09	-.10	-.02	-.13	.19*	1.00					
9	.39**	-.04	.35**	-.10	.06	.27**	.42**	.38**	1.00				
10	.00	.12	-.09	.08	.04	.13	.04	-.24**	-.31**	1.00			
11	.32**	-.31**	.12	.10	-.13	-.09	.08	.43**	.49**	-.31**	1.00		

12	.00	-.10	-.20*	.14	.05	-.11	.02	-.05	-.06	-.17	.02	1.00	
13	.13	-.14	-.13	.12	-.15	-.17	-.19	.09	.05	-.14	.22*	.30**	1.00
14	-.34**	-.25**	-.01	.25**	.24**	-.23**	-.47**	-.08	-.19*	-.06	-.01	-.07	-.04
15	-.01	.08	-.04	-.05	.08	.02	-.17	-.28**	-.27**	.32**	-.23**	-.07	-.17
16	.03	.16	.07	-.10	.03	.11	.03	-.24**	-.22*	.45**	-.33**	-.22*	-.08
17	.10	.19*	.20*	-.05	.15	.15	-.03	-.22**	-.20*	.34**	-.25**	-.15	-.05
18	.10	.13	.21*	-.06	.04	.07	-.02	-.09	-.17*	.33**	-.15	-.26**	-.08
19	.05	.09	.00	-.03	-.01	.05	.01	-.14	-.23*	.22*	-.14	-.17	-.15
20	-.00	-.09	-.15	.04	-.00	.04	.03	.24**	.14	-.23**	.21*	.07	.08
21	.07	.07	.10	-.13	-.01	.01	.02	-.16	-.05	.24**	-.16	-.06	.14
22	.08	-.02	-.06	-.05	.08	.03	.06	.26**	.13	-.29**	.29**	-.01	-.05
23	.01	-.27**	.09	.07	.03	-.21*	-.31**	.18*	.28**	-.51**	.32**	.04	.16
24	.15	.25**	.11	-.10	.00	.38**	.71**	.10	.22*	.17	-.03	-.07	-.14
25	.09	-.25**	.24**	.00	.07	-.01	-.02	.47**	.48**	-.44**	.49**	-.12	.09
26	.15	.16	.13	-.10	-.00	.17	.20*	.21*	.16	-.24**	.02	-.12	-.01

(continued)

Table 2: Continued

	Gender 14	CDDQ							PAQ				
		L/Mot 15	Indsve 16	L/Info 17	Intcon 18	Conot 19	Satis 20	Undec 21	Confid 22	M-F 23	Femin 24	Masc 25	Sxtyp 26
13													
14	1.00												
15	.14	1.00											
16	-.04	.39**	1.00										
17	.05	.55**	.52**	1.00									
18	.04	.52**	.41**	.78**	1.00								
19	.07	.31**	.28**	.37**	.48**	1.00							
20	-.07	-.40**	-.42**	-.55**	-.51**	-.18*	1.00						
21	-.07	.45**	.35**	.57**	.62**	.17	-.55**	1.00					
22	-.04	-.41**	-.32**	-.50**	-.53**	-.17	.65**	-.63**	1.00				
23	.25**	-.13	-.51**	-.17	-.18*	-.16	.15	-.09	.14	1.00			
24	-.29**	-.12	.19*	-.05	-.05	.11	.02	-.07	.12	-.42**	1.00		
25	.18*	-.38**	-.43**	-.25**	-.18*	-.16	.27**	-.25**	.32**	.56**	.01	1.00	
26	-.01	.14	.28**	.08	.11	.06	-.02	.18*	.01	-.25**	.40**	-.05	1.00

Note.  $N = 127$ . IDEAS = Interest Determination, Exploration and Assessment System; Artist = Artistic; Conven = Conventional; Enter = Enterprising; Invest = Investigative; Real = Realistic; Agree = Agreeableness; Cons = Conscientiousness; Extra = Extraversion; Neurot = Neuroticism; Open = Openness; Intell = Intelligence; L/Mot = Lack of Motivation; Indsve = Indecisive; L/Info = Lack of Information; Intcon = Internal Conflict; Conot = Conflict with Others; Satis = Satisfaction; Undec = Undecided; Confid = Confidence; M-F = Masculinity-Femininity; Femin = Femininity; Masc = Masculinity; Sxtyp = Sex-typed.

\* $p < .05$ . \*\* $p < .01$ .

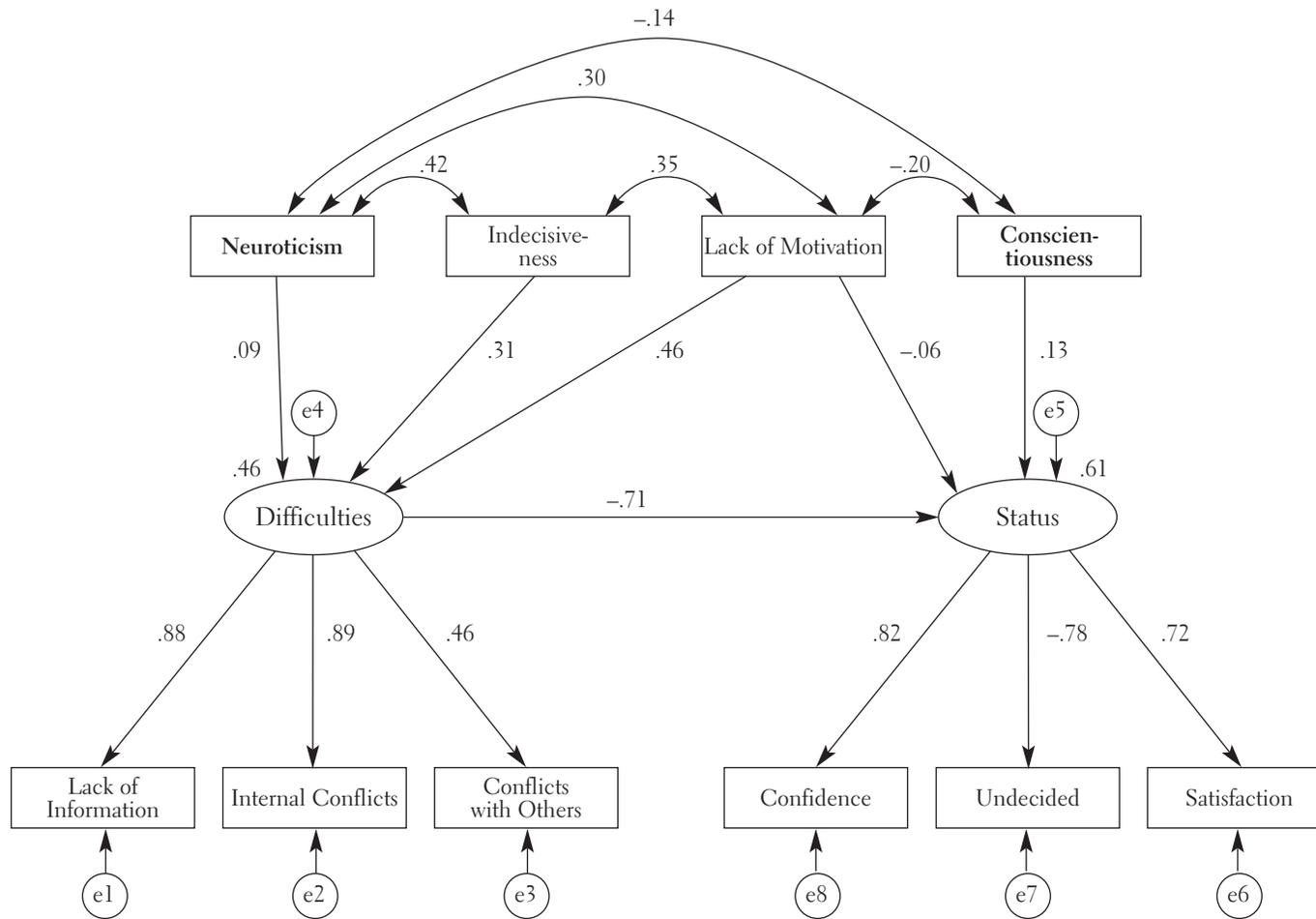


Figure 4. Modified model of career decision-making status for adults.

**Table 3**  
**Comparison of Descriptive Statistics of CDDQ Scores for**  
**Study 1 (High School Students) and Study 2 (Adults)**

Scale	Students <sup>a</sup>		Adults <sup>b</sup>		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Lack of Motivation	8.98	4.97	7.76	4.73	3.92	.049
Indecisiveness	14.55	6.21	12.84	6.71	4.33	.038
Lack of Information	66.16	32.34	56.87	33.09	4.99	.026
Internal Conflict	45.56	22.07	35.25	19.57	15.19	.000
Conflict with Others	12.23	8.75	8.83	7.03	11.41	.001
Total CDDQ Score	164.79	64.12	138.13	61.76	11.12	.001

*Note.* CDDQ = Career Decision-Making Difficulty Questionnaire.

a. *n* = 121.

b. *n* = 127.

providing evidence for the generalisability of the model. A second aim was to test for differences in the pattern of difficulties experienced by the two groups where it was hypothesised that motivation levels would be similar for both groups, given that career choice was a salient feature for adult and student participants. Although adults did report fewer problems due to lack of motivation than did the students, this was the scale where there was least variability between the groups. Lack of Motivation was not endorsed as a serious problem for either of the groups, indicating the importance generally placed on career issues by these participants.

The hypothesised difference between students' and adults' reported career knowledge was found, as were unpredicted differences on Indecisiveness, Internal Conflicts, Conflict with Others, and the total score. These differences could be explained from a developmental perspective, with adults having a more mature level of understanding and knowledge in all these areas.

Undecidedness is likely to be a feature of the CDM behavior of high school students who are at Super's (1983) exploration stage and are not completely ready to commit to a career or study choice. However, the fact that young people reported a moderate level of Indecisiveness may be due to their overgeneralising undecidedness and misinterpreting it as the more pervasive personality trait of indecisiveness.

The second subscale, Lack of Information, presented as a single dimension for both groups. It appears that if people feel they have problems due to lack of knowledge, they tend to view it as a global concern about their ignorance of the process and many or all of the factors involved in that process.

Generally, results on the CDDQ suggested that most problems faced by career deciders were related to their adherence to dysfunctional myths about

careers and to their reported lack of information about careers and the CDM process. Inspection of the predictive models developed in Studies 1 and 2 revealed that Lack of Information formed a substantial part of CDM difficulties which in turn predicted CDM status.

As noted earlier, Lack of Information is a self-report measure and is not an objective measure of career-related knowledge. Across the two studies, it was consistently unrelated to general intelligence. It remains to be established whether these reports reflect actual knowledge levels or whether they relate to metacognitive variables such as self-confidence. Further studies could elaborate on these issues. Nevertheless, an implication of these findings is that career deciders want access to good career information, particularly in the new work environment made up of “portfolio” (Spender, 1997) or “boundaryless” (Sullivan, 1999) careers. Career counsellors, or *career development facilitators*—a term preferred by Patton and McMahon (1999)—may be one source of this information, but people need also to become aware of the range of information available on the world wide web. Access to up-to-date resources will facilitate individuals’ taking responsibility for their own career development.

Sex-type presented as an ambiguous influence on CDM. It had been hypothesised that people adhering to gender stereotypes would be likely to be less undecided than those who did not hold stereotypical views. A limitation of the present studies was that the instrument used to measure stereotyped attitudes, the PAQ (Spence et al., 1974), was developed almost 3 decades ago. Since then, considerable social change has occurred, particularly in gender issues. The PAQ failed to differentiate gender-types for these samples, and it appeared that the effect of gender-type was better explained as the influences of various personality traits.

Personality indeed emerged as the major predispositional variable in the predictive models. As with sex-type, career interest types were also overshadowed by the effects of personality. However, the particular traits which acted as significant predictor variables were not exactly the same for the two age groups. Neuroticism and Conscientiousness were the major influences for young people, while only Conscientiousness, a trait associated with purposeful and planful thinking and action, emerged as significant for adults.

These two studies have indicated that the model of CDM behaviour based on the CDDQ is relevant to career deciders of all ages. Difficulties, particularly those associated with perceived lack of career knowledge, are significant predictors of career decision status across both age groups. While individual difference variables such as personality will influence a person’s career decidability, it appears that CDM difficulties can be effectively ameliorated by providing access to relevant, up-to-date resources and information. A crucial role of teachers, parents, career advisors, and mentors is to help provide this information.

**Table 4**  
**Comparison of Scores on Shipley, IDEAS, PAQ, and IPIP Scales**  
**by Gender for Study 1 (High School Students) and Study 2 (Adults)**

Scale/subscale	High School Students <sup>a</sup>						Adults <sup>b</sup>					
	Female <sup>c</sup>		Male <sup>d</sup>		<i>F</i>	<i>p</i>	Female <sup>e</sup>		Male <sup>f</sup>		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
<b>SHIPLEY</b>												
Vocabulary	25.64	3.67	26.81	4.00	2.70	.106	33.56	4.43	33.20	4.33	0.19	.664
Abstraction	33.72	3.38	33.44	4.75	0.14	.711	33.43	5.21	33.07	4.88	0.14	.713
<b>IDEAS</b>												
Realistic	11.10	5.27	14.10	5.94	8.22	.005	13.09	4.87	15.63	4.60	7.83	.006
Investigative	10.91	6.69	14.53	7.13	7.76	.006	14.05	6.15	17.28	5.68	8.07	.005
Artistic	16.90	8.37	10.45	6.01	19.84	.000	18.85	5.26	14.70	5.98	15.90	.000
Social	16.18	6.26	12.53	4.92	10.91	.001	17.97	4.41	15.34	6.66	6.97	.009
Enterprising	13.31	5.05	12.21	4.81	1.35	.247	14.83	5.25	14.70	6.16	0.02	.901
Conventional	12.24	6.24	10.44	5.00	2.64	.107	14.30	5.68	11.21	5.80	8.12	.005

<b>PAQ</b>													
Androgenous	25.12	3.96	23.17	4.56	5.55	.020		22.86	4.26	25.27	4.83	8.13	.005
Masculine	28.51	4.79	28.09	4.68	0.22	.643		28.67	4.73	30.51	5.05	4.02	.047
Feminine	31.81	4.91	29.30	4.53	7.62	.007		32.09	4.08	29.44	4.38	11.22	.001
<b>IPIP</b>													
Neuroticism	37.63	13.65	32.72	11.57	3.98	.048		35.28	13.74	33.56	14.09	0.43	.515
Extraversion	49.65	12.39	44.70	11.53	4.65	.033		47.09	10.87	42.61	11.53	4.54	.035
Openness	52.23	10.03	51.07	7.65	0.44	.510		52.98	9.60	52.88	8.69	0.00	.956
Agreeableness	58.99	11.06	49.88	9.82	20.28	.000		61.47	7.88	52.37	8.58	34.94	.000
Conscientiousness	46.18	13.62	43.67	8.94	1.17	.281		54.14	10.49	52.34	11.15	0.78	.378

*Note.* IDEAS = Interest Determination, Exploration and Assessment System; PAQ = Personal Attributes Questionnaire; IPIP = International Personality Item Pool.

- a.  $n = 121$ .
- b.  $n = 127$ .
- c.  $n = 78$ .
- d.  $n = 43$ .
- e.  $n = 86$ .
- f.  $n = 41$ .

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# Concurrent Validity of the Kuder Career Search Activity Preference Scales and Career Clusters

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The Kuder Career Search, the most recent edition of the Kuder Preference Records, is available in an online administration format. This study was conducted to compare the results of the online Career Search with concurrent measures of career interest and self-efficacy. The Activity Preference scales were generally related as expected to the concurrent interest and efficacy measures; most correlations between corresponding scales were small to moderate. The rank order of the Career Clusters was correlated with the ranks of the concurrent interest scales. An initial evaluation of the validity of the online version of the Kuder Career Search is provided in light of these findings.

**Keywords:** Career assessment, Internet assessment, concurrent validity, ethical standards, career counseling

The Kuder Preference Records have been published for over 60 years. The first Kuder Preference Record was published in 1939 and contained 40 items, each with five activity options, and yielded seven scales: Literary, Scientific, Artistic, Persuasive, Social Service, Musical, and Computational (Kuder & Zytowski, 1991). Kuder used the homogeneous scaling method in his approach to interest measurement, which is based on clustering empirically related items together (Zytowski & Kuder, 1986). The Kuder Form B, published in 1943 (Kuder & Zytowski, 1991) was distinguished by the use of the triad response format and the addition of Mechanical and Clerical scales. A 10th scale, Outdoor, was added to Form C of the Kuder. The Kuder Occupational Interest Survey (KOIS) Form DD was published in 1966 and consisted of occupational and college major scales. This was a major change because of the use of criterion groups to construct the occupational and col-

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**AUTHOR'S NOTE:** This research was partially supported by a grant from National Career Assessment Services.

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JOURNAL OF CAREER ASSESSMENT, Vol. 10 No. 1, February 2002 127-144  
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lege major scales instead of homogeneous scaling. The 1985 version of the KOIS incorporated criterion group scales and traditional homogeneous interests scales, labeled Vocational Interest Estimates, in a single report (Kuder & Zytowski, 1991). The Kuder Preference Records have been distinguished by a history of technical sophistication and innovation.

The Kuder Career Search (KCS; Zytowski, 2001a) is the most recent generation of the Kuder Preference Records. The KCS, developed from the Kuder Occupational Interest Survey (KOIS; Kuder & Zytowski, 1991), incorporates four significant improvements over the KOIS. First, the KOIS Vocational Interest Estimates are now labeled Activity Preference scales and have been given the following updated scale names: Nature, Mechanical, Science/Technical, Art, Music, Communications, Human Services, Sales/Management, Computations, and Office Detail. The updated scale names give the KCS a more contemporary and appealing presentation.

The second and most important innovation is the availability of the KCS in an online format. Test takers may purchase the KCS individually or log on to a Web site maintained by a school, counseling center, or other organization. The online administration enables students to complete the KCS at their own pace and convenience; students may partially complete the KCS, log off, and then complete the assessment at a later time. The most attractive feature of the online version of the KCS is the immediate availability of results, which are available in 2-page summaries or extended 12-15 page reports (Zytowski, 2001b). Also appealing is the immediate access to the online Occupational Outlook Handbook and occupational news groups. Students can proceed directly from reviewing their results to searching for career information; they do not have to conduct separate web searches to attain career information or seek out print resources in a career library.

The third innovation is that the KCS includes results for six Career Clusters that correspond to the six Holland (1997) interest types: Outdoor/Mechanical (Realistic), Science/Technical (Investigative), Arts/Communication (Artistic), Social/Personal Services (Social), Sales/Management (Enterprising), and Business Detail (Conventional). A rank ordering of the Career Clusters with descriptive paragraphs is reported to the test taker along with corresponding career information. Career Cluster ranks are derived by comparing the individual profiles to those of criterion pools of workers employed in each of the six Cluster areas (Zytowski, 2001b). The KCS does not include occupational or college major scales, which are still available with the KOIS Form DD. Provision of the Career Clusters helps students to access career information that is organized according to the Holland hexagon.

The final innovation is that each KCS report includes five Person Matches, which are job titles and descriptive job sketches written by workers representing 90% of the job titles in the Occupational Outlook Handbook table of contents (Zytowski, 2001a). These five Person Matches represent the top 1% of matches between the interest profiles of test takers and the data-

base of workers who have completed the KCS and written descriptive work narratives. These changes make the KCS an attractive interest assessment instrument for middle school, high school, and college students.

Although newly revised career interest instruments generally have been demonstrated to be substantially correlated with their previous editions (Fouad, 1999), counselors can not assume that online assessments share all of the psychometric properties of their paper-and-pencil predecessors (Oliver & Chartrand, 2000; Sampson & Lumsden, 2000). According to the ethical standards developed by the National Career Development Association (NCDA, 1998), counselors are responsible for determining the reliability and validity of online assessments. The purpose of this study was to evaluate the concurrent validity of the KCS Activity Preference Scales and Career Clusters. The validity of the Person Match was not evaluated in this study.

One of the traditional approaches to establishing external validity is to assess the concurrent validity of a given instrument (Fouad, 1999). I compared the KCS Activity Preference scales to the Self-Directed Search (SDS; Holland, Fritzsche, & Powell, 1994) Summary scales and the Strong Interest Inventory (SII; Harmon, Hansen, Borgen, & Hammer, 1994) General Occupational Themes (GOTs) because they are widely used interest assessments for high school and college populations. Zytowski (1992) described how the Kuder Activity Preference scales correspond to the Holland (1997) hexagon. The Nature and Mechanical scales correspond to the Realistic interest area. Science/Technical corresponds to Investigative. Art, Music, and Communications correspond to Artistic. Human Services corresponds to Social. Sales/Management corresponds to Enterprising. Computations and Office Detail correspond to Realistic. It was my general expectation that these pairs of KCS-SDS and KCS-SII scales would be positively correlated and that these correlations would exceed other bivariate correlations between the two sets of instruments. The KCS Activity Preference scales also were correlated with the Kuder Task Self-Efficacy Scales (KTSES; Lucas, Wanberg, & Zytowski, 1997). The KCS and KTSES measure interest and self-efficacy in the same domains: Nature, Mechanical, Science/Technical, Art, Music, Communications, Human Services, Sales/Management, Computations, and Office Detail. Based on the social cognitive theory of career development (Lent, Brown, & Hackett, 1994), I expected to find positive correlations between each pair of corresponding interest and self-efficacy scales. I also expected to find positive correlations between the Career Cluster rank orders and those of the SDS and SII interest scales. This study was designed to provide an initial evaluation of the validity of the Activity Preference and Career Cluster measures derived from the online version of the KCS. The specific hypotheses are listed here.

1. Nature and Mechanical Activity Preferences will be correlated with SDS and SII Realistic and the corresponding KTSE scales.

2. Science/Technical Activity Preference will be correlated with SDS and SII Investigative and KTSE Science/Technical.
3. Art, Music, and Communications Activity Preferences will be correlated with SDS and SII Artistic and the corresponding KTSE scales.
4. Human Services Activity Preference will be correlated with SDS and SII Social and KTSE Human Services.
5. Sales/Management Activity Preference will be correlated with SDS and SII Enterprising and KTSE Sales/Management.
6. Computations and Office Detail Activity Preferences will be correlated with SDS and SII Conventional and the corresponding KTSE scales.
7. The Career Cluster rank order will be positive correlated with the rank orders of the SDS Summary scales and the SII GOTs.

## METHOD

### Participants

The participants were 197 (99 women, 98 men) first-semester university freshmen enrolled in a career exploration class at a large midwestern public university. There were 171 (87%) Caucasian, 5 (2.5%) African American, 13 (6.6%) Asian American, and 3 (1.5%) Hispanic students. Two (1%) students indicated they were members of other racial/ethnic groups. Average participant age was 18.34 years ( $SD = 0.53$  years). All of these students were undecided about their college majors. At this university, all undecided students are required to enroll in a career exploration course during their first semester.

## MEASURES

### KCS

The KCS (Zytowski, 2001a) consists of 60 triads describing distinct activities (e.g., Write advertising—Be in charge of a public library—Publish a newspaper); test takers rank their preferences for each of the triad items. The KCS yields percentile ranks for 10 Activity Preference (AP) scales (alpha coefficients reported in parentheses): Nature (.64), Mechanical (.80), Science/Technical (.70), Art (.71), Music (.74), Communications (.77), Human Services (.70), Sales/Management (.72), Computations (.74), and Office Detail (.75). The internal consistency coefficients for 9 of the 10 AP scales are equivalent or superior to those of their corresponding KOIS Vocational Interest Estimates (Kuder & Zytowski, 1991); only the Human Services scale has lower internal consistency.

The KCS report also provides a rank ordered list of the following six Career Clusters: Outdoor/Mechanical, Science/Technical, Arts/Communication, Social/Personal Services, Sales/Management, and Business Detail. There is no reliability or validity data available for the Career Clusters at this time.

### **SDS**

The SDS (Holland et al., 1994) is a self-administered, self-scored interest assessment based on Holland's (1997) theory of occupational interest. The SDS consists of Activities, Competencies, Occupations, and Self-Estimates sections. The Summary scales are the numerical sums of these four sections for each of the six Holland interest areas: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Only the Summary scales were used in this study. The internal consistency coefficients for the six Summary scales are .90 or above. The retest reliability coefficients for the Summary scales for intervals between 4 and 12 weeks are in the range of .76 for Conventional to .89 for Artistic and Social (Holland et al., 1994). The SDS Summary scales are related to field of study, vocational aspiration, and occupational entry (Holland et al., 1994).

### **SII**

The SII (Harmon et al., 1994) yields General Occupational Theme (GOT), Basic Interest Scale, and Occupational Scales organized according to the Holland (1997) hexagon. Only the six GOTs were used in this study. The internal consistency coefficients for the GOTs are in the range of .90 for Enterprising and Conventional to .94 for Artistic. The retest reliability coefficients for a 1-month interval for college students are in the range of .84 for Investigative to .88 for Realistic; retest reliability for 3 months for college students is in the range of .74 for Enterprising to .91 for Artistic (Harmon et al., 1994). There is strong evidence for the concurrent and construct validity of the GOTs based on membership in academic and occupational fields (Harmon et al., 1994).

### **KTSES**

The KTSES is a 30-item instrument designed by Lucas, Wanberg, and Zytowski (1997) to yield 10 self-efficacy scales corresponding to the 10 interest areas measured by the KOIS (Kuder & Zytowski, 1991). The KTSE scale scores range from 0 to 12 with higher scores indicating higher efficacy. Although KTSE scales were labeled to match the KOIS scale names, I will refer instead to the KTSE scales with labels corresponding to the KCS. The

alpha coefficients for the 10 KTSE scales (Lucas et al., 1997) are reported in parentheses: Nature (.86), Mechanical (.87), Science/Technical (.85), Art (.85), Music (.86), Communications (.81), Human Services (.75), Sales/Management (.86), Computations (.87), and Office Detail (.81). Retest reliability coefficients in a range of .64 for Science/Technical to .87 for Communications. The validity of the 10-factor structure for the KTSES was supported by confirmatory factor analysis; the KTSE scales are also related to self-esteem and career decision-making self-efficacy (Lucas et al., 1997).

### **Procedure**

The SDS and SII were administered to participants in class sessions during the first week of the Fall 2000 semester. The KTSES was administered during the eighth week of the semester. Each instrument was administered and interpreted as part of the regular course curriculum. Participants completed the KCS independently during the 13th week of the semester for extra course credit. Course instructors were available to interpret KCS findings to interested participants. KCS AP scales and Career Cluster rank order were downloaded from the administration Web site. The SDS Summary scale, SII GOT, and KTSE scale scores were recorded from participants' advising files. Therefore, alpha coefficients were unavailable for these measures.

### **RESULTS**

The KCS AP scales scores for men and women are reported in Table 1. Men scored higher than women in Mechanical and women scored higher than men in Art and Human Services. The pattern of gender differences for the AP scales is almost identical to that for the KOIS Vocational Interest Estimates (Kuder & Zytowski, 1991). Because of these gender differences, separate correlational analyses were conducted for women and men. The correlations for the scales that were hypothesized to be related are printed in bold type in Tables 2 through 7.

#### **Correlations With SDS Summary Scales**

The overall pattern of correlations between the KCS AP and SDS Summary scales was consistent with expectations. For the women, there was evidence of the predicted relations between the KCS Mechanical, Science/Technical, Art, Music, Human Services, Sales/Management, and Office Detail scales and the corresponding SDS scales (Table 2). In each case, there was a stronger correlation between the corresponding scales than

**Table 1**  
**Descriptive Statistics for KCS AP, SDS Summary, and SII GOT Scales**

Scale	Female		Male		<i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<b>Kuder Career Search</b>					
Nature	8.77	3.30	8.54	3.40	0.23
Mechanical	6.39	3.23	11.34	4.22	85.33**
Science/Technical	9.10	3.74	9.50	3.44	0.61
Art	7.11	2.81	5.66	2.89	12.74**
Music	4.88	2.23	5.58	2.77	3.85
Communications	7.39	3.69	7.45	4.03	0.01
Human Services	13.17	4.13	9.38	3.93	43.62**
Sales/Management	11.33	3.49	11.47	3.86	0.07
Computations	7.28	3.50	7.94	3.20	1.88
Office Detail	8.79	3.56	8.64	3.83	0.08
<b>Self-Directed Search</b>					
Realistic	12.23	7.91	26.11	10.42	108.23**
Investigative	20.38	9.70	23.44	8.95	5.19*
Artistic	21.76	10.11	19.43	11.23	2.29
Social	31.17	8.48	22.76	9.57	41.68**
Enterprising	26.34	10.09	27.92	9.99	1.20
Conventional	18.37	9.20	18.87	9.45	0.14
<b>Strong Interest Inventory</b>					
Realistic	39.36	7.56	47.58	9.00	45.14**
Investigative	42.21	8.97	41.59	8.63	0.23
Artistic	44.97	10.06	37.96	8.09	27.01**
Social	48.31	10.03	40.51	8.87	31.10**
Enterprising	49.37	9.03	47.69	9.86	1.46
Conventional	45.35	8.41	44.56	8.07	0.43
<b>Kuder Task Self-Efficacy Scale</b>					
Nature	4.94	3.34	6.47	2.94	11.11**
Mechanical	2.99	2.77	6.34	3.30	55.81**
Science/Technical	5.65	3.34	6.06	3.11	0.79
Art	4.59	3.35	4.60	3.04	0.00
Music	3.90	3.19	4.66	3.47	2.38
Communications	5.57	3.26	5.88	3.04	0.45
Human Services	7.81	2.60	5.61	3.12	27.11**
Sales/Management	5.71	3.38	5.55	3.36	0.10
Computations	3.77	3.05	5.58	3.14	15.70**
Office Detail	6.56	3.02	5.89	3.06	2.24

*Note.* *N* = 197 (99 women, 98 men). KCS AP = Kuder Career Search Activity Preference; SDS = Self-Directed Search; SII GOT = Strong Interest Inventory General Occupational Theme.

\*\**p* < .01.

**Table 2**  
**Correlations Between KCS AP and SDS Summary Scales for Women**

KCS AP	SDS Summary scale					
	R	I	A	S	E	C
Nature	<b>.03</b>	.17	-.17	-.13	-.04	.01
Mechanical	<b>.53**</b>	-.10	.13	.04	-.06	.05
Science/Technical	.13	<b>.52**</b>	.02	-.29**	-.05	-.19
Art	.21*	.06	<b>.43**</b>	.07	-.01	.04
Music	.04	.03	<b>.23*</b>	.09	-.12	-.06
Communications	-.10	-.04	.15	.06	.09	-.10
Human Services	-.26**	.02	.03	<b>.41**</b>	-.26*	-.27**
Sales/Management	-.12	-.24*	-.14	.01	<b>.56**</b>	-.04
Computations	.11	<b>.30**</b>	-.35*	-.32**	-.12	<b>.20</b>
Office Detail	-.01	-.07	-.21*	-.29**	-.07	<b>.35**</b>

*Note.*  $n = 99$ . KCS AP = Kuder Career Search Activity Preference; SDS = Self-Directed Search. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

**Table 3**  
**Correlations Between KCS AP and SDS Summary Scales for Men**

KCS AP	SDS Summary scale					
	R	I	A	S	E	C
Nature	.12	.00	.00	.06	-.03	-.10
Mechanical	<b>.58**</b>	-.03	-.21*	-.28*	-.16	-.20*
Science/Technical	.00	<b>.38**</b>	-.03	-.16	-.12	-.27**
Art	-.04	.00	<b>.22*</b>	.12	-.02	-.07
Music	-.15	-.12	<b>.32*</b>	.02	.00	-.09
Communications	-.19	.12	<b>.37**</b>	.18	.07	-.03
Human Services	-.19	-.13	.14	<b>.38**</b>	.17	-.02
Sales Management	-.14	-.03	.14	.05	<b>.32**</b>	-.04
Computations	-.09	.07	-.22*	-.15	.11	<b>.44**</b>
Office Detail	.08	-.10	-.29**	-.26*	-.33**	<b>.28**</b>

*Note.*  $n = 98$ . KCS AP = Kuder Career Search Activity Preference; SDS = Self-Directed Search. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

for any other pair of KCS-SDS scales. The findings for the Nature, Communications, and Computations AP scales were inconsistent with expectations. Nature was not correlated with Realistic and the Communications AP scale was not related to Artistic. The Computations AP

**Table 4**  
**Correlations Between KCS AP and SII GOT Scales for Women**

KCS AP	SII GOT scale					
	R	I	A	S	E	C
Nature	.16	.24*	-.08	-.07	-.08	.01
Mechanical	<b>.55**</b>	.18	.16	.09	.00	.22*
Science/Technical	.16	<b>.51**</b>	.08	-.17	-.05	-.16
Art	.18	.18	<b>.37**</b>	.14	.10	.10
Music	.03	.00	<b>.13</b>	.01	-.15	-.05
Communications	.00	-.01	<b>.27**</b>	-.03	.13	.05
Human Services	<b>-.32**</b>	-.13	-.02	<b>.35**</b>	<b>-.31*</b>	<b>-.22*</b>
Sales/Management	-.19	-.20	-.15	-.19	<b>.32**</b>	<b>-.22*</b>
Computations	.04	.11	<b>-.33**</b>	<b>-.24*</b>	.02	<b>.20</b>
Office Detail	.02	.00	-.16	-.02	.16	<b>.25*</b>

*Note.*  $n = 99$ . KCS AP = Kuder Career Search Activity Preference; SII GOT = Strong Interest Inventory General Occupational Theme. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

**Table 5**  
**Correlations Between KCS AP and SII GOT Scales for Men**

KCS AP	SII GOT scale					
	R	I	A	S	E	C
Nature	<b>.13</b>	.10	-.01	.08	-.02	-.12
Mechanical	<b>.47**</b>	-.08	<b>-.35**</b>	<b>-.23*</b>	-.20	-.13
Science/Technical	.02	<b>.31**</b>	.08	-.18	-.19	<b>-.22*</b>
Art	-.10	-.02	<b>.33**</b>	<b>.24*</b>	.05	-.03
Music	-.19	-.14	<b>.20</b>	.02	-.15	-.16
Communications	-.12	.11	<b>.39**</b>	<b>.24*</b>	.15	-.05
Human Services	<b>-.24*</b>	-.04	.05	<b>.27*</b>	.03	.04
Sales Management	-.08	-.10	.17	.04	<b>.34**</b>	.06
Computations	-.01	.09	<b>-.22*</b>	-.19	.09	<b>.47**</b>
Office Detail	.11	-.06	<b>-.32**</b>	<b>-.28*</b>	<b>-.30**</b>	<b>.10</b>

*Note.*  $n = 98$ . KCS AP = Kuder Career Search Activity Preference; SII GOT = Strong Interest Inventory General Occupational Theme. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

scale, although not related to the Conventional scale, was positively correlated with Investigative and negatively related to Artistic and Social. The positive correlation between Computations and Investigative, although unanticipated, indicates that those interested in scientific and technical endeavors

Table 6  
Correlations Between KCS AP and KTSE Scales for Women

KCS AP	KTSES									
	Nature	Mechanical	Science/Technical	Art	Music	Communications	Human Services	Sales/Management	Computations	Office Detail
Nature	<b>.39**</b>	.20	.29**	-.13	-.05	-.22*	-.02	-.19	-.06	-.20
Mechanical	.15	<b>.34**</b>	.04	.25*	.06	-.05	-.11	-.12	.10	.02
Science/Technical	.05	.12	<b>.38**</b>	.09	.14	.05	.04	-.01	.08	-.04
Art	.21*	.12	.11	<b>.56**</b>	.10	.16	.04	.26*	.08	.02
Music	.05	-.01	-.04	-.02	<b>.39**</b>	.00	.16	.06	.06	-.06
Communications	-.07	-.03	-.07	.12	.00	<b>.53**</b>	.04	.01	.00	.13
Human Services	-.16	-.33**	-.09	-.14	-.04	.06	<b>.40**</b>	.06	-.24*	-.14
Sales Management	-.22*	-.11	-.13	-.08	-.14	.04	-.15	<b>.25*</b>	-.11	-.09
Computations	.10	.25*	.20	-.10	-.24*	-.29*	-.06	-.12	<b>.32**</b>	.15
Office Detail	-.12	-.07	-.18	-.20	-.15	-.34**	-.17	-.14	.06	<b>.07</b>

Note.  $n = 99$ . KCS AP = Kuder Career Search Activity Preference; KTSES = Kuder Task Self-Efficacy Scale. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

Table 7  
Correlations Between KCS AP and KTSE Scales for Men

KCS AP	KTSES									
	Nature	Mech- anical	Science/ Technical	Art	Music	Communi- cations	Human Services	Sales/ Manage- ment	Compu- tations	Office Detail
Nature	<b>.13</b>	.04	.05	-.12	-.10	.01	-.08	-.11	-.28**	-.16
Mechanical	.06	<b>.17</b>	-.07	-.03	-.07	-.34**	-.12	-.05	.03	-.29**
Science/Technical	.14	.17	<b>.34**</b>	.08	.05	.02	-.17	-.25*	.10	-.05
Art	-.15	-.10	.02	<b>.33**</b>	-.13	.00	-.03	.09	.09	-.02
Music	-.17	-.10	-.09	.01	<b>.45**</b>	.02	.11	.07	-.07	.03
Communications	.11	.01	.07	.18	.09	<b>.37**</b>	.11	.21*	-.11	.16
Human Services	.03	-.01	.06	.06	.07	.22*	<b>.45**</b>	.17	-.02	.08
Sales Management	-.04	-.13	-.09	.16	.01	.01	.01	<b>.25*</b>	-.01	.11
Computations	.08	.20	.15	-.18	.14	.00	.04	.01	<b>.37**</b>	.23*
Office Detail	-.14	-.03	-.10	-.27**	-.26*	-.17	-.20*	-.28*	.03	<b>-.05</b>

Note.  $n = 98$ . KCS AP = Kuder Career Search Activity Preference; KTSES = Kuder Task Self-Efficacy Scale. Correlations in bold represent hypothesized relationships.

\* $p < .05$ . \*\* $p < .01$ .

also enjoy computational activities. The negative correlations between Computations and Artistic and Social are consistent with Holland's hexagon, as Social is removed two positions and Artistic is across the hexagon from Conventional (Holland, 1997). The median correlation between corresponding KCS and SDS scales was .38.

For the men, there was evidence of the predicted relations between all of the KCS AP scales and their corresponding SDS scales except for Nature (Table 3). Overall, the median correlation between corresponding KCS and SDS scales was .32.

### Correlations With SII GOTs

For the women, the Mechanical, Science/Technical, Art, Communications, Human Services, Sales/Management, and Office Detail AP scales were positively correlated with the corresponding GOT scales (Table 4). This correspondence was particularly strong for the Mechanical and Science/Technical scales. The Nature AP scale was not correlated with Realistic; rather, it was positively correlated with the Investigative scale. The Music AP scale was not significantly correlated with the Artistic GOT. The Computations AP scale was not correlated with the Conventional GOT; it was, however, negatively correlated with the Artistic and Social GOTs, which are two and three ordinal positions away from Conventional on the Holland hexagon (Holland, 1997). The general pattern of AP-GOT correlations was similar to the pattern between the AP and SDS Summary scales, although the median correlation between corresponding AP and GOT scales was only .295.

For the men, there were significant positive correlations between the Mechanical, Science/Technical, Art, Communications, Human Services, Sales/Management, and Computations AP scales and the corresponding GOT (Table 5). The Nature scale was not significantly correlated with the Realistic GOT and was not related to the Investigative GOT as it was for the women. The Music AP scale was not significantly correlated with the Artistic GOT. The Office Detail AP scale, although not correlated with the Conventional GOT, was negatively related to the Artistic, Social, and Enterprising GOTs. As with the findings for the women, the overall pattern of AP-GOT correlations was similar to the pattern for the AP and SDS Summary Scales. The median AP-GOT correlation was .32.

### Correlations With KTSES

There was a clear pattern of results for the women. With the exception of Office Detail, each AP scale had a small to moderate positive correlation with its corresponding KTSE scale. Further, each of these nine AP scales had

its highest correlation with the corresponding KTSE scale (Table 6). The median correlation for corresponding KCS and KTSE scales was .385.

For the men, there were positive correlations between 7 of the 10 corresponding KCS and KTSE scales: Science/Technical, Art, Music, Communications, Human Services, Sales/Management, and Computations (Table 7). KCS Nature was negatively correlated with KTSE Computations and KCS Mechanical was negatively correlated with KTSE Communications and Office Services. Office Detail was negatively correlated with the Art, Music, Human Services, and Sales/Management efficacy scales. The median correlation for corresponding KCS and KTSE scales was .335.

### Correspondence of Career Cluster, SDS, and SII Rank Orders

Because the KCS Career Clusters are reported in rank order without raw scores or percentile ranks, I assigned a rank from one to six to each of the SDS Summary scales and the SII GOTs. Next, I computed a Kendall's Tau correlation between each Career Cluster and its corresponding SDS Summary scale and SII GOT ranks. The Kendall's Tau correlations between the Outdoor/Mechanical and SDS Realistic ranks were .20 for women and .33 for men. The correlations between Science/Technical and SDS Investigative ranks were .30 for women and .35 for men. The correlations between Arts/Communication and SDS Artistic ranks were .32 for women and .42 for men. The correlations between the Social/Personal Services and SDS Social ranks were .36 for women and .30 for men. The correlations between the Sales/Management and SDS Enterprising ranks were .42 for women and .24 for men. The correlations between the Business Detail and SDS Conventional ranks were .37 for women and .45 for men. All rank order correlations were significant at  $p < .05$ .

There were similar findings in the rank order correlations between the Career Clusters and the SII GOT scales. The Kendall's Tau correlations between the Outdoor/Mechanical and SII Realistic ranks were .33 for women and .38 for men. The correlations between Science/Technical and SII Investigative ranks were .42 for women and .29 for men. The correlations between Arts/Communication and SII Artistic ranks were .31 for women and .26 for men. The correlations between the Social/Personal Services and SII Social ranks were .30 for women and .31 for men. The correlations between the Sales/Management and SII Enterprising ranks were .40 for women and .35 for men. The correlations between the Business Detail and SII Conventional ranks were .34 for women and .36 for men. All rank order correlations were significant at  $p < .05$ . Overall, there were small to moderate correlations between the Career Cluster ranks and those of the SDS Summary scales and SII GOTs for both women and men.

## DISCUSSION

The purpose of this study was to provide an initial evaluation of the concurrent validity of the AP scales and Career Cluster rank orders derived from the online version of the KCS. There was a general pattern of small-to-moderate correlations between the KCS APs and the corresponding SDS, SII, and KTSE scales. The supporting concurrent validity evidence was stronger for some AP scales than for others. There were also small to moderate correlations between the KCS Career Clusters and the SDS and SII scale ranks. The following is a discussion of the findings related to each hypothesis.

The findings were mixed regarding the hypothesis that Nature and Mechanical AP scales would be related to the corresponding interest and self-efficacy measures. The Nature AP was unrelated to the SDS and SII Realistic scales for both women and men. Therefore, counselors should not infer that a high interest in Nature will be related to the career goals, values, self-beliefs, and problem-solving styles associated with the Realistic interest type (Holland, 1997). The KCS Nature scale also was unrelated to Nature self-efficacy for men. This finding is puzzling because the KCS interest and KTSES self-efficacy domains were both derived directly from the KOIS. These low correlations may be due in part to the low reliability of the Nature scale, which has an internal consistency coefficient of .64. Counselors will have to be extremely cautious in interpreting the meaning of the Nature AP scale in the absence of supporting validity evidence.

In contrast, the Mechanical scale moderately correlated with the corresponding Realistic interest measures. The median Mechanical-Realistic correlation was .54. There appears to be considerable overlap between the Mechanical AP scale and Realistic interest as measured by the SDS and SII. The Mechanical AP was correlated with mechanical self-efficacy for women, but not for men. The general pattern of results indicated satisfactory concurrent validity for the Mechanical AP.

The second hypothesis concerned the relations of the Science/Technical AP to the corresponding interest and self-efficacy scales. The median correlation between the Science/Technical AP and Investigative interest scales was .445. Interestingly, the Science/Technical interest scale was more closely related to Investigative interests for women ( $r_s = .52, .51$ ) than for men ( $r_s = .38, .31$ ). The Science/Technical interest and efficacy scales were also positively correlated for both women and men. Overall, these findings constitute satisfactory evidence for the concurrent validity for the Science/Technical AP scale.

Concerning the third hypothesis, the Art AP scale was correlated with both SDS and SII Artistic scales for both women and men. The median Art-Artistic correlation was .35. The Art AP also was related to Art efficacy for both women and men. These findings provide support for the concurrent

validity of the Art AP. The Music AP was correlated with SDS Artistic for both women and men and unrelated to SII Artistic GOT for both women and men. The median Music-Artistic correlation was only .21. The Music AP did not appear to be closely related to Artistic interests. Therefore, counselors should be cautious in interpreting the meaning of the Music AP scale and refrain from attributing Artistic characteristics such as impulsivity and originality (Holland, 1997) to this scale.

The Communications AP was correlated with both Artistic SDS and SII scales for men but only the SII Artistic scale for women. The median Communications-Artistic correlation was .32. The Communications AP was also correlated to Communications efficacy for both women and men. These findings provide support for the concurrent validity of the Communications AP. This scale appears to have a modest correlation with general artistic interests and a small to moderate correspondence with artistic efficacy.

There was a clear pattern of results regarding the fourth hypothesis. The Human Services AP had positive correlations with both the SDS and SII Social scales for both women and men. The median Human Services-Social correlation was .36. The Human Services AP and self-efficacy scales were also moderately correlated. These findings provide support for the validity of the Human Services scale.

Regarding the fifth hypothesis, the Sales/Management AP had small positive correlations with the SDS and SII Enterprising scales for both women and men. The median Sales/Management-Enterprising correlation was .33. There were also small positive correlations between the Sales/Management interest and efficacy scales. These findings provide support for the validity of the Sales/Management scale.

The findings regarding the Computations and Office Detail AP scales were only partially supportive of the sixth hypothesis. There were moderate correlations between the Computations AP scale and the SDS and SII Conventional scales for men ( $r_s = .44, .47$ ), but statistically insignificant correlations for these pairs of scales for women ( $r_s = .20, .20$ ). This difference cannot be explained by a restricted range in female scores, as the female and male interest scores were equivalent in variability. In contrast, the Computations AP and efficacy scales were significantly correlated for both women and men. This pattern of results raises questions about the validity of this scale. Although Computations interest and efficacy are correlated, counselors cannot conclude that the Computational AP is generally related to Conventional interests. The validity of the Computations AP scale remains to be more fully demonstrated.

The Office Detail AP scale was correlated with both the SDS and SII Conventional scales for women but only the SDS Conventional scale for men. The median Office Detail AP-Conventional correlation was .26. The Office Detail scale had a small association with conventional interests as measured by the SDS and SII. However, the Office Detail AP was unrelated

to the KTSE Office Detail scale for both women and men. These findings do not provide satisfactory support for the validity of the Office Detail AP scale.

I averaged the correlations between the KCS AP scales and their corresponding SDS and SII scales across the female and male groups to integrate the correlational findings between the KCS and the criterion interest measures. The following AP scales had acceptably high correlations: Mechanical (.53), Science/Technical (.43), Art (.34), Communications (.30), Human Services (.35), Sales/Management (.40), and Computations (.33). Counselors can consider these scales as measuring interests somewhat similarly to the SDS and SII. The average correlations for Nature (.11), Music (.22), and Office Detail (.24) were low and indicate that these scales cannot be considered related to the Realistic, Artistic, and Conventional interest types measured by the SDS and SII.

The average correlation between the KCS AP scales and the SDS Summary scales was .34 for both women and men; the average correlation between the KCS APs and the SII GOTs was .31 for women and .30 for men. The AP scales did not appear to be more closely related to the SDS than to the SII. In general, the KCS is, at its highest, moderately correlated with other interest measures. There appear to be some important differences in the KCS, SDS, and SII interest domains. Counselors should be aware of the differences in the ways that career interests are defined and represented by these three instruments.

The average KCS AP-KTSES correlation was .36 for women and .29 for men. To put these figures into perspective, consider that Lent et al. (1994) reported an average weighted correlation of .52 between interest and self-efficacy in their review of 13 studies. However, the relatively low KCS-KTSES correlations are not unprecedented. Lapan, Boggs, and Morrill (1989) found a pattern of correlations between the Strong Campbell Interest Inventory (Campbell & Hansen, 1981) GOTs and a corresponding efficacy measure that was quite similar to the pattern of KCS-KTSES correlations in this study. Lopez, Lent, Brown, and Gore (1997) also found small correlations between interest and efficacy for geometry ( $r = .37$ ) and algebra ( $r = .29$ ) for high school students. The correlation between the KCS and KTSES, although lower than the typical correlation between interest and self-efficacy measures, was in the range of findings established in previous research.

The findings also supported the seventh hypothesis, as the Career Cluster rank orders were positively correlated with the SDS and SII interest scale ranks. However, these correlations were rather modest. Therefore, any three-point interest code derived from the KCS is likely to vary from interest codes derived from either the SDS or SII. Counselors have to work closely with clients using their Career Cluster feedback to explore college major and occupational information organized according to the Holland hexagon.

This study had five limitations. First, the participants were first-semester university students enrolled in a class designed to help undecided students

identify academic and career goals. This sample may have had more diffuse and less crystallized interests than older university students or other first-year students with identified academic majors and career goals. If this sample had more diffuse interests and efficacy expectations, then their interest and efficacy scores may have had lower reliability, which may have reduced the correlations between the AP scales and the concurrent interest and self-efficacy measures. Use of a relatively young, undecided sample may have produced lower correlations between the KCS and the criterion measures than would have been achieved through the use of an older population actively engaged in an occupation. The second limitation was that students completed the KCS independently without the monitoring of a counselor or course instructor. Participants may have been less serious or diligent in their approach to completing this instrument than they would have been in a supervised setting. However, if lack of monitoring affects KCS results, then this influence is likely to be inherent in the use of the online version of this instrument. Third, the SDS and SII measures of the Holland interest areas are not ideal concurrent validity measures because they approximate but do not completely match the KCS AP interest domains. Recall that the original KOIS interest domains were based on clustering empirically related items; the KOIS and KCS were not designed to sample the six Holland interest domains. Therefore, it is not surprising that the KCS-SDS and KCS-SII correlations are lower than those between the SDS and SII. However, there was justification for using the SDS and SII because there is overlap in the conceptual definitions of the Kuder (Kuder & Zytowski, 1991) and Holland (1997) interest domains. Fourth, this study used concurrent measures rather than predictive criteria such as selection of academic majors or occupations. Future research should be conducted to explore the predictive validity of the KCS. Finally, the validity of the Person Match was not considered in this study. The Person Match is an important innovation and merits careful psychometric evaluation.

In summary, the current study yielded support for some parts of the Kuder Career Search. There was satisfactory concurrent validity evidence for the Mechanical, Science/Technical, Art, Communications, Human Services, Sales/Management, and Computations AP scales. There were inconsistencies in the findings for the Office Details scale that should be resolved in subsequent research. Finally, the Nature and Music APs did not appear to be related to existing measures of the Holland interest areas. Alternative concurrent validity criteria will have to be identified in order to find supporting validity data for these measures. The initial evaluation of the rank ordering of the Career Clusters was positive, as there was some correspondence to the rank orderings of the SDS and SII scales. There appears to be sufficient evidence to support use of the online version of the KCS if counselors are able to use the suggested cautions in interpreting the Nature, Music, and Office Detail AP scales.

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## INFORMATION FOR AUTHORS

Manuscripts of particular interest describe innovative career assessment strategies, developments in instrumentation, validation of theoretical constructs, relationships between existing instruments, career assessment procedures, relationships between assessment and career counseling/development, and review articles of career assessment strategies and techniques. Implications for career counseling/development should be clearly noted.

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