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Validation of the Short Form of the Career Development Inventory - Australian Version with a Sample of University Students

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Abstract

This paper reports on a further exploration into the reliability and validity of the shortened form of the Career Development Inventory - Australia (Creed & Patton, 2004), a career maturity measure being developed to meet the need for a shorter and up-to-date measure to provide data on this career development construct. Data gathered from 170 final year education students (34 males, 132 females) provided partial support for the measure's internal consistency, factor structure and construct validity.

Introduction

Central to the understanding of career behaviour, the concept of career maturity has emerged as a major variable of interest in career development research in recent years. Career maturity is broadly defined as the individual's readiness to make informed, age-appropriate career decisions and manage his/her career development tasks (Savickas, 1984). Career maturity is seen as an important construct to assess and develop in career programs for adolescents and adults as it involves awareness of an individual's level of career progress in relation to his/her career related development tasks (Crites, 1976).

Several assessment instruments have been developed to measure the construct of career maturity, with Levinson, Ohler, Caswell, and Kiewra (1998) and Bingham and Krantz (2001) identifying six: the Career maturity Inventory (Crites, 1978a, 1978b), the Career Development Inventory (Super, Thompson, Lindeman, Jordaan, & Myers, 1988), the Adult Career Concerns Inventory (Super, Thompson, & Lindeman, 1988), the Assessment of Career Decision Making (Harren, 1979; Buck & Daniels, 1985), the Career Beliefs Inventory (Krumboltz, 1994) and the Career Decision Scale (Osipow, Carney, Winer, Yanico, & Koschier, 1976). The construct of career maturity has received renewed research interest, with a special issue of *The Career Development Quarterly* being devoted to it in 1998. Accordingly, assessment of the construct is also a subject of vigorous research, with most recent efforts responding to calls for shortened versions of the measure. For example, Crites and Savickas (1995, 1996) developed a shortened and revised version of one instrument, the Career Maturity Inventory – Revised based on criticisms of the length of time required to complete the original measure (Powell & Luzzo, 1998). However, analyses of psychometric properties of the revised version have either been non-existent (McDivitt, 2001; Powell & Luzzo) or have shown limited support for its internal reliability and construct and criterion validity (Busacca & Taber, 2002).

The Career Development Inventory – Australian version

Since its introduction in 1984, the Career Development Inventory – Australian Version (CDI-A; Lokan, 1984) has become a widely used measure of career maturity (e.g., Clayton & Fletcher, 1994; Creed & Patton, 2003; Levy, 1987; Lokan & Biggs, 1982; Patton & Creed, 2001) in Australia and other countries (e.g., South Africa; Patton, Watson, & Creed, 2004). The 72-item CDI-A is a shortened version of the 120-item Career Development Inventory (CDI; Super, Thompson, Lindeman, Jordaan, & Myers, 1981; Super, Thompson, Jordaan, Lindeman, & Myers, 1984). The CDI-A incorporates spelling, terminology, and references to institutions, information sources and occupational conditions that are appropriate to an Australian setting.

In relation to the Career Development Inventory, researchers (Bingham & Krantz, 2001; Levinson et al., 1998; Lokan, 1984) have also raised concerns about its length, the repetitive nature of some of the items, the amount of reading required in the vignette item-formats, the complexity of the language required for younger age groups, and the difficulty of completing the two cognitive subscales. These issues act as a barrier to collecting information on career maturity.

Researchers have therefore also identified a need for a shortened, less repetitive and less complex version of the CDI-A. The CDI-A incorporates two attitudinal subscales, namely Career Planning (CP) and Career Exploration (CE), and two general cognitive subscales, World of Work Information (WW) and Career Decision Making (DM). Creed and Patton (2004) observed that young people have difficulty completing the CDI-A in a 40 minute school period and students respond negatively to the demands of completing the WW and DM subscales.

The demand for a shortened version of the CDI-A has been met by Creed and Patton (2004) with the development of the CDI-A (SF). Using a sample of 2173 high school students (years 8-12), Creed and Patton developed a 33-item shortened form of the original CDI-A. The CDI-A (SF) was devised with reference to content coverage and statistical criteria. In particular, consideration was given to a) construct coverage, b) the corrected item-own and item-other domain total correlations for the attitudinal scales, and the item-difficulty scores for the cognitive scales and c) selecting items that only loaded onto the appropriate factor.

As with the original CDI-A, the CDI-A (SF) comprises two attitudinal subscales (CP and CE) and two cognitive subscales (WW and DM). The CP subscale comprises two domains of Planning Orientation (items 1-6) and Specificity of Information (items 7-10).

With regards to the Planning Orientation (PO) domain, the six items cover the content areas of discussing plans with an adult, choosing subjects relevant to future job, choosing a career, and life after current study course. With regards to the Specificity of Information (SI) domain, the four items cover the content area of self-knowledge of job duties, ability, job advancement, and working conditions.

The CE subscale comprises two domains Resource Awareness (items 11-14) and Resource Use (items 15-18). For Resource Awareness (RA), the four items cover possible sources of advice (e.g., career counsellors, teachers, adults in authority, job incumbents). For the Resource Use (RU) domain, the four items cover actual sources of advice (adults in authority, written material, audio or visual aids, and job incumbents). The WW subscale (items 19-26) comprises eight items and covers content areas of information on exploratory methods, life stages, developmental tasks, job satisfaction, job seeking, occupational fields and job training. For the DM subscale (items 27-33), the seven items cover the domain areas of understanding the relative importance of different types of occupation, personal and situational characteristics. Evidence of the construct validity was obtained through principal axis factor analysis with an oblique (direct oblimin) rotation for years 8-12 and the total sample using the four attitudinal domain totals (PO, SI, RA, and RU) and the two cognitive subscale totals (WW and DM). Two factors were rotated to reflect the attitudinal and cognitive dimensions. The pattern matrix indicated that the attitudinal and cognitive domains and subscales loaded onto their respective factors. All factors had eigenvalues greater than one, and accounted for greater than 62% of the variance in each case, providing evidence that the factor structure of the CDI-A (SF) was consistent with the original factor structure of the CDI-A.

Creed and Patton (2004) provided further evidence of the construct validity of the shortened version in the form of statistically significant correlations between the CDI-A (SF) and other career-related variables such as the career indecision and career certainty subscales of the Career Decision Scale (CDS; Osipow, Carney, Winer, Yanico, & Koschier, 1976), Career Decision-Making Self-Efficacy (CDMSE-SF; Betz, Klein, & Taylor, 1996) and self-esteem (RSE; Rosenberg, 1965). Evidence of construct validity was indicated by appropriate age differences in scores, with older students reporting higher levels of career maturity than younger students. The authors concluded that the CDI-A (SF) shows promise as a career maturity measure for adolescents and may be useful in situations where it is not possible or inappropriate to use the CDI-A. Similar to the CDI-A, the CDI-A (SF) can be interpreted at the subscale (CP, CE, WW, DM), the composite scale (Career Development Attitude, Career Development Knowledge), and total scale (Career Orientation Total) levels. However, there is less support for the CDI-A (SF) at the domain level, because of the lower internal reliability for the RU domain. While there is advice in the CDI-A manual to interpret the CDI-A at the total score level (COT), Creed and Patton suggest that this is inadvisable for both the CDI-A and the CDI-A (SF) as this involves collapsing the two independent attitudinal and cognitive domains, which is likely to lead to spurious interpretations.

The present study

The main purpose of the present study is to continue to test the psychometric properties of the CDI-A (SF). To date, the measure has only been examined in a sample of high school students (Creed & Patton, 2004). The present study extends the use of the CDI-A (SF) by using a sample of 170 university students ranging in age from 19 to 48 years. To examine the psychometric soundness of the CDI-A (SF), internal reliability coefficients are generated and compared with data provided by Creed and Patton. To confirm the content validity of the composite scales – Career Development Attitude (CDA) and Career

Development Knowledge (CDK), principal axis factor analysis is performed for the total scores of the attitudinal domains and cognitive subscales. The attitudinal domain items are also subjected to principal axis factor analysis. Factor analysis, however, is not performed for the items comprising the cognitive subscales as they are scored on a dichotomous scale (Gorusch, 1983). Factor analysing dichotomous items is likely to result in as many factors as there are items with different item difficulties because the Pearson correlation reduces the ϕ -coefficient (Ferguson, 1941; Stouffer, Guttman, Suchman, & Lazarsfeld, 1950). Construct validity is explored by examining the relationships between CDI-A (SF) subscales and other career-related variables (e.g., career decision-making self-efficacy and self-esteem). Furthermore, to evaluate whether the sample responded to the CDI-A (SF) in a manner that is consistent with the wider career development literature, a MANOVA is conducted to examine career maturity based on gender, age, chosen occupational area, and course of study.

Method

Participants

Participants were 170 students from a faculty of education at an Australian university. The students had a mean age of 25.32 ($SD = 6.97$ years), and comprised 34 males and 132 females, with four participants who did not indicate gender. Participants comprised students in their final year of a Bachelor of Education degree ($n = 85$), a double degree ($n = 34$), or a graduate education program ($n = 36$). A smaller number of participants were studying to become teachers via other pathways ($n = 11$) and four participants did not indicate their course of study. Participants were studying to become primary ($n = 62$; 36.9%), secondary ($n = 70$; 41.2%) or early childhood ($n = 36$, 21.4%) teachers, and two respondents did not indicate their intended area of teaching.

Materials

Career maturity. Creed and Patton's (2004) shortened form of the Australian version of the Career Development Inventory (CDI-A) was used to measure participants' level of career maturity. The CDI-A (SF) consists of four subscales assessing specific dimensions of career development – career planning, career exploration, knowledge of the world of work and career decision-making skills.

Career Planning (CP) comprises 10 items in which participants report on the career planning that they have undertaken and the degree of that engagement (e.g., "How much have you thought and planned about taking subjects that will help you on the job in the future?"). Participants' responses are given on a nominal scale (A to E) reflecting low to high levels of CP. Participants' scores on the CP are determined by adding the rating values for the responses given (A = 1, B = 2, C = 3, D = 4, and E = 5). The number of A responses are then multiplied by 1, B responses are multiplied by 2, C responses are multiplied by 3, D responses are multiplied by 4 and E responses are multiplied by 5.

Career Exploration (CE) comprises 8 items. The first four items ask participants to rate people as sources of career information (e.g., "Would you go to careers teachers, career advisors, or school counsellors for information or help in making your plans for work or further education?"). The remaining four items ask for ratings of the usefulness of the information received from various sources. For example, one item asks "Which of the following sources (e.g., other adults who know things and can help people) have already given you, or directed you to, helpful information for making your future plans?" Participants' responses are given on a nominal scale (A to D) reflecting low to high levels of CE. The response category N (neutral) may also be given. Participants' scores on the CE are

determined by adding the rating values for the responses given (A = 1, B = 2, C = 3, D = 4, and N = 1). The number of A responses are then multiplied by 1, B responses are multiplied by 2, C responses are multiplied by 3, D responses are multiplied by 4 and N responses are multiplied by 1. Scores on the Career Planning (CP) and Career Exploration (CE) scales may be combined to measure Career Development Attitude (CDA). Creed and Patton reported satisfactory internal reliability coefficients for the subscales CP ($\alpha = .87$) and CE ($\alpha = .73$) and the composite scale CDA ($\alpha = .87$).

World of Work Information (WW) comprises 8 items which assess knowledge of the career development tasks in the Exploratory and the Early Establishment Stages as described by Super et al. (1957). Career Decision-Making (DM) consists of 7 items and involves participants solving career related problems based on verbal sketches of people making career decisions. Scores on the WW and DM scales consist of the number of items answered correctly. Scores on the World of Work (WW) and Career Decision Making (DM) scales may be summed to measure Career Development Knowledge (CDK). Creed and Patton (2004) reported satisfactory internal reliability coefficients for the subscales WW ($\alpha = .73$) and DM ($\alpha = .70$) and the composite scale CDK ($\alpha = .82$).

Self-esteem. The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965) was used to provide a measure of global self-worth. The RSE comprises 10 items (e.g., “I feel that I have a number of good qualities”), and participants were asked to rate how strongly they agreed or disagreed with each statement. Answers were scored on a four-point response format using descriptors of “strongly agree” to “strongly disagree”, resulting in a total scale range of 10-40, with higher scores indicating greater self-worth. The internal reliability coefficient was .86 in the current study.

Career decision making self-efficacy. The 25-item short version of the Career Decision-Making Self-Efficacy Scale (CDMSE-SF; Betz, Klein & Taylor, 1996) measures confidence regarding ability to make career-oriented decisions. A sample item is, “How confident are you that you could determine what your ideal job would be?” Participants rated their level of confidence on a 5-point scale, with end-points of “no confidence at all” to “complete confidence”. Higher scores indicate more career-related confidence. Betz et al. reported adequate validity for the scale, and indicated satisfactory internal reliabilities. The internal reliability coefficient for the total score was .94 for the present study.

Procedure

The data collected here constitutes one aspect of a longitudinal study examining career development and burnout among preservice teachers (Keeffe, Patton, & Spooner-Lane, submitted). Surveys containing the scales used in the study, as well as demographic questions (e.g., age, gender, teaching area, and study pathways), were distributed by the researchers to all final year education students in a classroom setting.

Results

Summary Data

In the present study, means, standard deviations, and internal reliability coefficients were generated for the two composite scales, four subscales, and four domain scales. Using one sample *t*-tests, mean subscale scores for the total sample of university students on the CDI-A (SF) were compared with a sample of high school students mean subscale scores as

reported in Creed and Patton's (2004) study (see Table 1). The sample comprised 2173 year 8 to year 12 students aged 12 -18.

Table 1
Means, Standard Deviations, and Internal Reliability Coefficients for the Present Study and Creed and Patton's (2004) Study of High School Students

Subscale	Domain	Present Study			Creed and Patton (2004)		
		α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>
		University Students N = 170			High School Students (Years 8-12) N = 2173		
CP		.84	38.52	5.79	.87	33.30	7.07
	PO	.79	21.46	4.01	.81	19.79	4.28
	SI	.78	16.14	3.49	.86	13.51	3.70
CE		.63	22.33	5.40	.73	19.50	4.80
	RA	.53	11.99	2.80	.72	11.23	2.76
	RU	.51	11.70	3.51	.64	8.28	3.05
WW		.87 ¹	6.88	1.99	.73 ¹	5.50	2.15
DM		.87 ¹	5.74	2.03	.70 ¹	3.94	2.05
CDA		.83	60.85	10.02	.87	-	-
CDK		.93 ¹	12.62	3.81	.82 ¹	-	-

Note. CP = Career Planning; CE = Career Exploration; WW = World of Work; DM = Career Decision Making; CDA = Career Development Attitude; CDK = Career Development Knowledge; PO = Planning Orientation; SI = Specificity of Information; RA = Resource Awareness; and RU = Resource Use.

¹ = Internal reliability calculated with the Kuder-Richardson 20 formula, all other variables were calculated using Cronbach's alpha.

The internal reliability coefficients for the four subscales (CP, CE, WW, DM) and the two composite scales (CDA, CDK) of the CDI-A (SF) exceeded .80, except for CE which was less than adequate at .63. Creed and Patton (2004) reported internal reliability coefficients ranging from .70 to .87 for the four subscales and the two composite scales. The internal reliability coefficients for the four domain scales ranged from .51 to .79. The coefficient alphas were low for the CE domains ($\alpha = .53$ for RA and .51 for RU). Creed and Patton also reported a low internal reliability coefficient for RU ($\alpha = .64$).

Overall, the sample reported high levels of CDA and CDK. In particular, preservice teachers reported high levels of CP and WW and moderate levels of CE and DM. A series of one-sample *t*-tests with a 99% confidence interval level revealed that in comparison with Creed and Patton's (2004) sample of high school students, the present sample of university students reported significantly higher levels of CP, $t(169) = 11.77, p < .001$; CE, $t(169) = 6.83, p < .001$; WW, $t(169) = 9.07, p < .001$; and DM, $t(169) = 11.53, p < .001$.

Construct Validity

Construct validity of the CDI-A (SF) is investigated three ways. First, the factor structure of the CDI-A (SF) is investigated using factor analysis. Second, the relationship between the CDI-A (SF) and CDMSE-SF and RSE is examined using a correlation matrix.

Third, group differences for gender, age, study course and area of teaching using the CDI-A (SF) are explored.

Factor Analysis of the CDA and CDK Composite Scales

To confirm that the factor structure of the CDI-A (SF) appropriately reflects Career Development Attitude (CDA) and Career Development Knowledge (CDK), the total scores for the attitudinal domains (PO, SI, RA, RU) and the cognitive subscales (WW, DM) were subjected to principal axis factor analysis with oblique rotation (see Table 2). Two factors were extracted with a loading cut-off of .30. The KMO measure of sampling was .69 and the Bartlett's Test of Sphericity was significant ($< .001$). Examination of the pattern matrix revealed that the attitudinal domains and the cognitive subscales loaded onto their respective factors. The two factors had eigenvalues greater than 1.00 and accounted for 70.46% of the variance.

Table 2

Principal Axis Factor Analysis with Oblique Rotation of the Attitudinal Domains and the Cognitive Subscales

		Composite Factors	
CDI-A Subscale	Domain	CDA	CDK
CP	PO	.67	.11
	SI	.84	-.03
CE	RA	.85	.08
	RU	.69	-.12
WW		.08	.92
DM		-.06	.98
Eigenvalue		2.57	1.66
%		42.88	27.58
Variance			
Correlation		= .16	

Note. CP = Career Planning; CE = Career Exploration; WW = World of Work; DM = Career Decision Making; PO = Planning Orientation; SI = Specificity of Information; RA = Resource Awareness; and RU = Resource Use.

Factor Analysis of the Attitudinal Domain Items

The items comprising the attitudinal domains (PO, SI, RA, RU) of the CDI-A (SF), were subjected to a principal axis factor analysis with oblique rotation (see Table 3). Four factors were extracted with a loading cut-off of .30. The KMO measure of sampling was .81 and the Bartlett's Test of Sphericity was significant ($< .001$). The forced four factor oblique rotation solution explained 44.7% variance. Examination of the pattern matrix revealed that Career Planning was primarily defined by items reflecting Planning Orientation (PO) and Specificity of Information (SI) and Career Exploration was defined by items reflecting Resource Awareness (RA) and Resource Use (RU). Contrary to predictions PO item 4 crossloaded onto RA, PO item 5 loaded more highly onto RA and item 6 loaded onto SI rather than PO. The loading for PO item 1 was slightly less than .30. Factor 4 had an eigenvalue less than 1.00.

Table 3
Principal Axis Factor Analysis with Oblique Rotation of the CDI-A (SF)

			Factor			
CDI-A Subscale	Domain	Item	SI	RU	PO	RA
Career Planning	1. PO	1 (2)	.15	.16	-.29	-.16
		2 (3)	.02	.009	-.88	.11
		3 (4)	.03	.05	-.86	.06
		4 (9)	.09	-.13	-.38	-.35
		5 (11)	.08	-.12	-.28	-.44
		6 (12)	.42	-.04	-.21	-.15
	2. SI	7 (13)	.93	.02	-.02	.21
		8 (14)	.87	-.04	-.01	-.03
		9 (19)	.44	.02	-.07	-.33
		10 (15)	.44	.11	-.07	-.07
		11 (23)	-.05	-.01	.07	-.62
Career Exploration	3. RA	12 (24)	.26	-.14	.08	-.36
		13 (25)	.14	.05	.02	-.51
		14 (28)	-.03	.14	-.05	-.64
		15 (33)	.24	.40	.12	-.26
	4. RU	16 (34)	-.07	.74	-.04	-.04
		17 (35)	.05	.32	.01	.09
		18 (36)	-.12	.38	-.13	-.27
		Eigenvalue		4.84	1.33	1.11
% Variance		26.93	7.37	6.15	4.22	
Correlation						
	1		-			
	2		.13	-		
	3		-.43	-.003	-	
	4		-.34	-.19	.41	1.00

Note. PO = Planning Orientation; SI = Specificity of Information; RA = Resource Awareness; and RU = Resource Use.

The item number for the original survey is reported in the parenthesis.

Correlation Matrix

The inter-correlations between the four subscales of the CDI-A (SF) and the two composite scales of the CDI-A (SF), as well as the inter-scale correlations between the CDI-A (SF), CDMSE-SF and the RSE are presented in Table 4.

Table 4

Pearson's Product-Moment Correlations between the CDI-A (SF), the CDMSE and the RSE Scales

	1	2	3	4	5	6	7	8
1. CP	-							
2. CE	.60**	-						
3. WW	.34**	.49**	-					
4. DM	.30**	.40**	.80**	-				
5. CDA	.90**	.89**	.46**	.39**	-			
6. CDK	.34**	.47**	.95**	.95**	.45**	-		
7. CDMSE	.37**	.33**	.16	.13	.39**	.15	-	
8. RSE	.23**	.13	-.02	-.01	.21**	-.02	.45**	-

Note. CP = Career Planning; CE = Career Exploration; WW = World of Work; DM = Career Decision Making; CDA = Career Development Attitude; CDK = Career Development Knowledge; CDMSE = Career Decision-Making Self-Efficacy; RSE = Rosenberg Self-Esteem.

** $p < .01$.

Examination of the subscale correlations on the CDI-A (SF) indicates that the attitudinal subscales CP and CE are moderately correlated ($r = .60$) and the cognitive subscales WW and DM are highly correlated ($r = .80$). Furthermore, the subscale CP is significantly associated with CDMSE and RSE in the expected direction (i.e., planning is high when career confidence and self-esteem is high). CE is also significantly positively associated with CDMSE (i.e., exploration is high when career confidence is high). The cognitive subscales (WW and DM) were not significantly associated with CDMSE or RSE.

Group Differences

A between-subjects MANOVA was performed to test for differences in gender (male, female), age (19-25 years, 26-35 years, ≥ 36 years), course of study (Bachelor of Education, double degree, graduate education), and preferred area of teaching (primary, secondary and early childhood) on the four subscales of the CDI-A (SF). Box's M test for homogeneity of variance-covariance matrices revealed that homogeneity of variance was contravened at the recommended significance level of 0.001 and therefore a more robust criterion, Pillai's Trace, was used to evaluate multivariate tests of significance. A Bonferroni type adjustment was performed to reduce the possibility of inflated Type 1 error (0.5 divided by 4 = .0125). With a 95% confidence interval level, no significant differences were found for gender, age, course of study or preferred teaching area (see Table 5).

Table 5

Summary Data for the Four CDI-A (SF) Subscales Based on Gender, Age, Study Course and Teaching Area

		CDI-A (SF) Factors									
		CP			CE		WW		DM		
		<i>n</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>	
<i>Gender</i>											
Male	32	38.47	5.67	22.03	4.50	6.71	1.66	5.47	1.96		
Female	132	38.66	5.81	22.46	5.66	6.92	2.09	5.80	2.10		
<i>Age (years)</i>											
19-25	118	38.02	5.87	22.37	5.39	6.91	1.86	5.75	1.96		
26-35	23	40.74	4.59	22.13	5.01	6.30	2.82	5.30	2.58		
36+	23	39.17	5.93	23.00	6.23	7.21	1.81	5.91	2.02		
<i>Course</i>											
B. Ed	85	38.42	5.43	22.47	4.39	6.99	1.77	5.83	1.91		
Double Degree	34	39.38	6.97	23.79	6.14	6.91	1.80	5.97	1.87		
Graduate Ed.	36	37.28	5.30	20.42	6.91	6.64	2.68	5.50	2.42		
<i>Teaching Area</i>											
Primary	62	37.82	5.10	21.08	6.33	6.77	2.34	5.63	2.31		
Secondary	70	38.63	6.79	22.39	4.92	6.71	2.06	5.70	2.05		
Early Childhood	36	39.56	4.83	24.36	3.92	7.38	0.87	5.94	1.45		

Note. B. Ed = Bachelor of Education; Graduate Ed. = Graduate Education.

Discussion

The present study partially confirmed the soundness of the psychometric properties of the 33-item short form of the CDI-A when used with a sample of multi-age university students ranging from 19 to 48 years. Whilst satisfactory to good internal reliability coefficients were reported for subscales CP, WW, and DM, a low internal reliability coefficient was obtained for CE. The internal consistency coefficients for the two scales CDA

and CDK were high and concurred with the data reported by Creed and Patton (2004) with a sample of years 8 to 12 high school students.

Construct validity of the CDI-A (SF) was explored using principal axis factor analysis. It was demonstrated that the attitudinal domains and the cognitive subscales loaded strongly onto their respective factors. Interscale correlations revealed moderate correlations between CP and CE ($r = .60$) and high correlations WW and DM ($r = .80$) which may suggest that the interpretation of career maturity is more reliable and valid when examined at a composite scale level. When the items comprising the attitudinal domains were further explored, the factor structure was less stable. The items loading onto the Career Planning domains PO and SI were not clearly defined. Although PO item 4 cross-loaded onto the Career Exploration domain RA, it loaded more highly onto the PO domain. While it was expected that item 5 would load onto the PO domain, it in fact loaded most highly onto the RA domain. In addition, PO item 6 loaded onto the SI domain. Furthermore, due to the current study's sample size (see Hair, Anderson, Tatham, & Black, 1998), PO item 1 with a loading of .29 did not meet statistical significance. Finally, an eigenvalue of less than 1.00 was produced for the Career Exploration domain RU. Based on these findings, there is less support for interpreting the CDI-A (SF) at a domain level.

Further data on validity was obtained through examination of associations within the subscales of the CD-A (SF) and with the Career Decision-Making Self-Efficacy Scale and the Rosenberg Self-Esteem Scale. Correlations were significant for the subscales of the overall Career Development Attitude and Career Development Knowledge combined scales. In addition, as expected, higher scores on the Career Development Attitude subscales of Career Planning and Career Exploration were associated with higher scores on career decision-making self-efficacy and self-esteem.

Contrary to a large range of studies conducted primarily with college students (see Patton & Lokan, 2001 for a review), no age or gender differences were found in the current study. As discussed previously, this may relate to adults having sound knowledge and skills. However, in support of developmental explanations for career maturity (Crites, 1976; Savickas, 1984), the present study illustrated that the older sample had higher mean scores on each of the four subscales than the Creed and Patton (2004) high school age sample. It might be predicted that an older, better educated sample would demonstrate greater career maturity than a younger, less educated sample. There were no significant differences on each of the four subscales for course of study, although examination of the mean scores indicated that double degree students engaged in more Career Exploration than graduate education students. This may be explained by the broader opportunities available to students who graduate with a degree in education as well as another discipline area (e.g., Science, Arts, Business). Whilst there were no significant differences on each of the four subscales for preferred area of teaching, mean scores suggested that participants preparing for teaching in the area of early childhood scored higher on Career Exploration than participants preparing for primary school teaching. As the former group of participants have a less clearly defined path to employment following their course, it would be expected at this stage of their program that their attention to Career Exploration items would be greater.

Taken together, these findings offer partial support for the construct validity of the CDI-A (SF) using an adult sample. Due to the moderate to high correlations between the CDA and CDK subscales, the lower internal reliability coefficients for the subscale CE and its domains RA and RU, and the instability of items at the attitudinal domain level, it is recommended that interpretation of the CDI-A (SF) should occur at the composite scale level.

The recent focus on lifelong career development and multiple career changes has highlighted the relevance of career maturity as a way of understanding the progress of individuals of all ages through the minicycles (Super, 1990) of career transitions. The 33-item

CDI-A (SF) appears to be a promising shortened version of the CDI-A for adults in career change when interpreted at the two factor level – Career Development Attitude and Career Development Knowledge. Due to the limited sample size in the current study and the difficulty in identifying a well-defined factor structure, further testing is required with an adult sample. The current study however, has provided encouragement for the utility of this work. Given the dearth of appropriate and psychometrically sound short measures of career maturity in the career development literature, it is important to continue to explore the soundness of this measure.

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Theory and practice

Why is career maturity an important construct to measure?

Career maturity involves awareness of an individual's level of career progress in relation to his/her career related development tasks. It is broadly defined as the individual's readiness to make informed, age-appropriate career decisions and manage his/her career development tasks.

What does the CDI-A (SF) offer practitioners and researchers?

Several assessment instruments have been developed to measure the construct of career maturity. Recent efforts have responded to calls for shortened versions of such measures. The CDI-A (SF) is being developed to offer researchers and practitioners a short measure with which to assess career maturity.