

Initial Review of the Psychometric Properties of a Computerised Career Preference Test for Career Guidance Assessment

Marié de Beer

University of South Africa

Address correspondence to Marié de Beer, Department of Industrial and Organisational Psychology, University of South Africa, PO Box 392, UNISA, 0003. Email: dbeerm@unisa.ac.za

Psychometric properties of the Career Preference Computerised Adaptive Test (CPCAT) (De Beer & Marais, 2010; De Beer, Marais, Maree, & Skrzypczak, 2008) are reported. Participants were high school students (n=343; males=279, females=164) at Grade 9 and Grade 11 level from a South African school district. Reliability and construct validity indices suggest the CPCAT could be of utility in the career counseling of high school students.

Keywords: career guidance, career preferences, interest, construct validity, Career Preference Computerised Adaptive Test (CPCAT)

The changing world of work has impacted on the way in which individuals' careers typically progress. Career paths are nowadays typically made up of different vocational experiences and "the traditional notion of career as a job that an individual entered after education and remained with until retirement is, for the majority of individuals, no longer relevant or appropriate" (Simons, Goddard & Patton, 2000, p. 351). Furthermore, according to Patton, Watson and Creed (2004, p. 35) "where previously there were a small number of relatively clearly defined trade and professional pathways, there are now a large number of skill areas with multiple entry points. As such, there is an increasing demand for advice in the broad array of training opportunities and job pathways available". According to De Bruin and De Bruin (2009) the person-fit approach to career counseling involves self-knowledge, knowledge about the world of work and evaluation of the fit between personal characteristics and the world of work. Information on one's interest profile (career preferences) constitute one aspect of self-knowledge in career guidance.

According to Kanjee (2006), computer technology has had a significant impact on assessment practices with improved security and accuracy offered through the use of computers. Kanjee (2006, p. 495) stated further that "computers also allow for greater flexibility in the administration of assessment instruments, make scoring easier, and allow for the use of innovative item formats." Langley and Schepers (1990) were some of the first researchers to explore the use of computerized systems for career guidance in South Africa when they evaluated the DISCOVER computerized career guidance system. They reported that the instrument yielded acceptable psychometric properties and that for the most part both guidance counselors and students were positive about the program. Other related South African research on computer-assisted career guidance was reported by Pretorius, Heyn and Broekmann (1991) who proposed that computerized career counseling systems could to some extent address the shortage of skilled career counselors. They furthermore reported that many of the subjects preferred to use the computer to interaction with a counselor. More recently, Maree (2010) proposed that the lack of appropriate vocational-related assessment instruments need to be addressed

to provide career counseling information – in particular to the rural and township sector in South Africa.

This article focuses on the use of a new instrument for measuring career preferences, namely the Career Preference Computerised Adaptive Test (CPCAT). The CPCAT includes a focus on career related fields, activities and environments in its approach to career preference assessment. A description of the specific career fields, activities and environments is available from the author. The combination of these various aspects allows for not only a measure of the level of interest in each of these categories, but also for the relative level of interest across pertinent dimensions.

Goals of the Study

The study reports reliability and construct validity information for the CPCAT. The specific questions of interest were whether the CPCAT showed adequate internal consistency reliability and construct validity.

The CPCAT Assessment Process

The CPCAT utilises the power of computer technology by interactively and adaptively assessing the career preferences of individuals and providing an individual profile that can be used in career guidance and general vocational assessment. Individuals initially indicate their career-related preferences in the three broad categories. Following two rounds of questions posed from all the sub-dimensions in each of the three broad dimensions, the sub-dimensions rated highest are then combined to provide a final profile indicating relative rating across the broad dimensions. This makes available unique and valuable information for guiding individuals towards career-related decision making.

Method

Participants and Setting

Participants were Grade 9 (N= 262; 162 or 61.8% female and 100 or 38.2% male) and Grade 11 high school students group (N=181; 117 or 64.6% female and 64 or 35.4% male) attending a South African school (see Table 1).

Assessments

Participants completed the CPCAT, a newly developed measure of career preference. The CPCAT is based on a three-dimensional model that includes measurement of career-related preferences in terms of career fields, career-related activities and career-related environments – as well as a relative rating between the sub-dimensions of these three main dimensions. They also took the Pathfinder Interest measure (Pathfinder, n.d.). The Pathfinder computerised interest measure and vocational information tool was chosen for its computerized administration and reasonably short administration time and used to obtain construct validity information for the CPCAT.

Procedure

Permission for the study was granted by the regional office of the Department of Education and the school. Parental consent was obtained for participants who were minors. Students took the tests during normal school time during Life Orientation (LO) lessons.

Analysis

Coefficient alpha analysis was used to evaluate the internal consistency reliability of the CPCAT. Correlations were obtained to evaluate the construct validity of the CPCAT by com-

paring its dimensions with those of the Pathfinder interest measure.

Results

The coefficient alpha reliability results for the CPCAT sub-dimensions for the current sample group are reported in Table 2. The majority of the coefficient alpha values (27 of the 34) meet the .80 level considered acceptable by most (Roodt, 2009). The seven sub-dimensions for which alpha coefficients fall below .80 all have alpha coefficients higher than .70. Since individual results are not based on sub-dimension results, these values were considered to be at an acceptable level.

Correlation Results for Construct Validity Evaluation

A total of 274 of the participants completed both the CPCAT and the Pathfinder and for these individuals correlations between the sub-dimensions were used to evaluate the construct validity of the CPCAT. Because of the large number of sub-dimensions involved, only correlations that would be larger than or equal to .3 when rounded off to one decimal were considered as these would be considered to indicate relationships of medium effect (Henson & Smith, 2000). Positive and negative correlations that are both statistically highly significant ($p < 0.001$) and practically significant

Table 1

Grade and Gender Distribution of the Realized Sample per Instrument

Numbers per grade level	Grade 9 [N=262]		Grade 11 [N=181]	
Numbers per gender	Female [N=162]	Male [N=100]	Female [N=117]	Male [N=64]
CPCAT results available	150 (92.6%)	94 (94%)	70 (80.9%)	29 (45.3%)
PATHFINDER results available	135 (83.3%)	74 (74%)	64 (54.7%)	19 (29.7%)

Table 2

Coefficient Alpha Internal Consistency Reliability Values for the Different Sub-Dimensions of the CPCAT

Fields	Alpha	Activities	Alpha	Environments	Alpha
Agriculture	0.722	Administration	0.725	Formal	0.844
Art	0.915	Autonomy	0.796	Indoors	0.857
Business	0.879	Holistic	0.716	Informal	0.802
Conservation	0.833	Challenges	0.887	Outdoors	0.780
Historical	0.851	Creativity	0.861	People	0.804
Information Technology	0.899	Entrepreneurial	0.873	Things	0.761
Language	0.830	Management	0.812		
Law	0.884	Practical	0.812		
Medical	0.907	Precision	0.803		
Numerical	0.910	Public Speaking	0.844		
Science	0.875	Service	0.882		
Security	0.719	Task Variety	0.810		
Sport	0.908				
Teaching	0.813				
Technological	0.874				
Tourism	0.909				

Note. N=343, 4 items per sub-scale.

Table 3

Statistically and Practically Significant Correlations Between CPCAT and Pathfinder Sub-Dimensions

Pathfinder Dimensions	CPCAT Sub-Dimensions	R	P
Technology and Science	F6: Information Technology	.405	.000**
	F7: Language	-.277	.000**
	F10: Numerical	.269	.000**
	F15: Technology	.612	.000**
Biological Science and Medicine	F1: Agriculture	.379	.000**
	F4: Conservation	.394	.000**
	F9: Medical	.614	.000**
	F11: Science	.583	.000**
Finance and Economics	F3: Business	.585	.000**
	F9: Medical	-.280	.000**
	A6: Entrepreneurial	.411	.000**
	A7: Management	.340	.000**
	E2: Indoors	.346	.000**
	E4: Outdoors	-.276	.000**
Art and Design	F2: Art	.434	.000**
	A5: Creative	.266	.000**
Social Service and Health Care	F7: Language	.276	.000**
	F9: Medical	.319	.000**
	F12: Security	.247	.000**
	A11: Service	.538	.000**
	E5: People	.266	.000**
Language and Literature	F2: Art	.380	.000**
	F7: Language	.314	.000**
	F14: Teaching	.325	.000**
	F16: Tourism	.285	.000**
	A10: Public speaking	.402	.000**

Note. $p < .001$ (statistically highly significant) and $|r| \geq 3$ (practically significant); $N=274$

(absolute value $|r| \geq 0.3$ – see Cohen, 1992) are reported in Table 3.

The results are supportive in terms of the constructs measured – the higher correlations are according to theoretical expectation for the constructs and dimensions – thus providing evidence of the construct validity of the CPCAT.

Discussion

The results of the present study provide positive evidence of the reliability and construct validity of the CPCAT. Coefficient alpha internal consistency reliability results are within an acceptable range and correlation patterns provide supporting evidence for the construct validity of the CPCAT.

The CPCAT holds promise as a tool to assist in finding the appropriate study field, position or career path for high school students. As a web-based instrument, it could be more easily accessible – even in rural and township sectors – to provide information that can assist individuals with career-related decision making. This could address some of the concerns of Maree (2010) about the lack of assessment instruments. Although the current study provides encouraging initial results for the CPCAT during its development, the limitation of using only high school

students needs to be addressed by further research to evaluate the psychometric and other properties of the CPCAT for other target groups such as students and working individuals.

References

- Cohen, J. (1992). Quantitative methods in psychology: A power primer. *Psychological Bulletin*, 112(4), 155–159.
- De Beer, M., & Marais, C. P. (2010, July). *Career Preference Computerised Adaptive Test (CPCAT) profiling of engineering student applicants*. Poster presented at the Annual Conference of the Society for Industrial and Organisational Psychology (SIOPSA), Pretoria, South Africa.
- De Beer, M., Marais, C. P., Maree, D. J., & Skrzypczak, F. (2008, July). The Career Preference Computerised Adaptive Test (CPCAT) – Development and features. Paper presented at the 6th Conference of the International Test Commission, Liverpool, UK.
- De Bruin, G. P., & De Bruin, K. (2009). Career counselling assessment. In C. Foxcroft & G. Roodt (Eds.), *Introduction to psychological assessment in the South African context* (3rd ed.). Cape Town, South Africa: Oxford University Press.

- Henson, R. K., & Smith, A. D. (2000). State of the art in statistical significance and effect size reporting: A review of the APA task force report and current trends. *Journal of Research and Development in Education*, 33(4), 285–296.
- Kanjee, A. (2006). Assessment research. In M. Terre Blanche, K. Durrheim, & D. Painter (Eds), *Research in practice: Applied methods for the social sciences* (2nd ed.). Cape Town, South Africa: University of Cape Town Press.
- Langley, R., & Schepers, J. M. (1990). Gerekenariseerde loopbaanvoortligting: 'n Evaluering van die DISCOVER-stelsel [Computerised career guidance: An evaluation of the DISCOVER-system]. *South African Journal of Psychology*, 20(4), 287–293.
- Maree, K. (2010). Assessment in psychology in the 21st century – A multi-layered endeavour. *South African Journal of Psychology*, 40(3), 229–233.
- Pathfinder (n.d.). Software for Pathfinder career options and interest assessment obtained from Mindmuzik Media ISBN 1-919880-08-9 (www.careers.co.za).
- Patton, W., Watson, M.B., & Creed, P.A. (2004). Career maturity of Australian and South African high school students: Developmental and contextual explanations. *Australian Journal of Career Development*, 13(1), 33–41.
- Pretorius, T. B., Heyns, P. M., & Broekmann, N. C. (1991). The field trial of a new computer-assisted career guidance system in South Africa. *International Journal for the Advancement of Counselling*, 14, 235–244.
- Simons, R., Goddard, R., & Patton, W. (2000). Measuring vocational interests: A call for multi-sample norms. *Career Development International*, 5(7), 351–359.