CONFIRMATORY FACTOR ANALYSIS OF THE CAREER DEVELOPMENT QUESTIONNAIRE AND THE CAREER DECISION-MAKING SELF-EFFICACY SCALE FOR SOUTH AFRICAN HIGH SCHOOL STUDENTS

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ABSTRACT
This study investigated the construct validity of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale for Grade 12 students from a low socioeconomic area in South Africa. The results of confirmatory factor analyses provided support for the construct validity of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale as measures of career maturity and career decision-making self-efficacy respectively. In accordance with theoretical predictions, a moderate degree of overlap between the constructs measured by the two instruments was observed. It appears that a general factor, labelled General Career Decision-Making, underlies responses to the two questionnaires. In addition to the general factor, the Career Decision-Making Self-Efficacy Scale also measures self-efficacy expectations regarding decision-making.

OPSOMMING
Hierdie studie het onderzoek ingestel na die konstruksgeldigheid van die Loopbaanontwikkelingsvraelys en die Loopbaanbesluitneming-selfdoeltreffendheidskaal vir Graad 12 leerlinge van ‘n lae sosio-ekonomiese gebied. Die resultate van bevestigende faktorontledings het ondersteuning gebied vir die konstruksgeldigheid van die twee vraelys as meetinstrumente van onderskeidelik loopbaanvolwassenheid en loopbaanbesluitneming-selfdoeltreffendheid. In ooreenstemming met dit wat op grond van teorie voorspel kon word, is daar ’n redelike mate van oorvleueling van die twee konstrukte waargeneem. Dit blyk dat ’n algemene faktor, wat Algemene Loopbaanbesluitneming genoem word, respond vir die twee vraelyste onderli. Benewens die algemene faktor, meet die Loopbaanbesluitneming-selfdoeltreffendheidskaal ook selfdoeltreffendheidsverwagtings ten opsigte van besluitneming.
willingness of women to consider non-traditional careers (Foss & Slaney, 1986). It would therefore appear that the Career Decision-Making Self-Efficacy Scale relates to a variety of career-related constructs in a meaningful manner.

The view of Taylor and Betz (1983) on self-efficacy expectations with regard to career decision-making is based on two theories, namely Crites’ (1969) theory of career maturity and Bandura's (1986) theory of self-efficacy expectations. The items of the Career Decision-Making Self-Efficacy Scale represent career decision-making tasks that were derived from the Career Maturity Inventory of Crites (1978). The individual must continually indicate to which degree he or she has the self-observed ability to complete the tasks successfully. The Career Decision-Making Self-Efficacy Scale consists of five sub-scales, namely (a) accurate self-evaluation, (b) the gathering of career information, (c) goal selection, (d) formulation of future plans, and (e) problem solving. Each of the sub-scales of the Career Decision-Making Self-Efficacy Scale corresponds with an aspect of Crites’ model of career maturity. The career maturity construct will consequently be discussed in greater detail.

Career maturity refers to the readiness of an individual to make a career decision. Each development phase through which an individual moves has specific career development tasks and career maturity can also be described as the degree to which an individual has succeeded in mastering the career development tasks that are relevant for his or her development phase. Individuals who have greater career maturity would have completed more of the relevant career development tasks successfully than individuals who have a lesser degree of career maturity. The concept of career maturity was introduced by Super (1957), who emphasised the developmental nature of the career decision-making process. His work served as a stimulus for the thinking and theorising of Crites (1969) on career maturity, which was operationalised in the widely-used Career Maturity Inventory (Crites, 1978). Crites (1978) distinguished between cognitive and affective aspects of career maturity. The former pertains to specific skills that are related to career decision-making and the latter pertains to the attitude of an individual with regard to the career decision-making process. High scores on the Career Maturity Inventory are accompanied by career decision-making skills that are better developed and attitudes with regard to the career decision-making process that are more positive. The Career Maturity Inventory has been used in a number of South African studies to assess the career maturity of South African groups during the 1980s (e.g. Morris, 1985; Newman, 1982; Reid-van Niekerk & Van Niekerk, 1990; Watson & Van Aarde, 1986). However, Langley (1989) recognised the need for an indigenous measuring instrument to assess career maturity and developed the Career Development Questionnaire (Langley, du Toit & Herbst, 1992). The Career Development Questionnaire is based on the career maturity models of Super (1983), Crites (1978) and Westbrook (1983) and therefore is heavily influenced by the thinking of American theorists. The questionnaire consists of five sub-scales, namely Self Knowledge, Decision-making, Career Information, Integration of Self Knowledge and Career Information, and Career Planning.

The Career Development Questionnaire has been standardised for high school and college students with English, Afrikaans or an African language as first language. However, little research has been done to demonstrate the validity of the questionnaire for the different ethnic and cultural groups in South Africa. Several studies during the 1980s and early 1990s indicated that black and coloured South Africans generally achieved lower scores than their white counterparts on measuring instruments such as the Career Maturity Inventory and the Career Development Questionnaire (Alexander, 1990; Beekman, 1989; Hickson & White, 1989; Reid-van Niekerk & Van Niekerk, 1990; Watson & Van Aarde, 1986). A recent study by Baloyi (1996) indicates that these differences can be ascribed to socio-economic factors. Baloyi (1996) found in this regard that there were no differences in the levels of career maturity of black and white high school pupils at private schools.

Since the Career Decision-Making Self-Efficacy Scale, as mentioned earlier, is to a great extent based on the career maturity construct, one can accept that there should be a significantly positive correlation between scores for the Career Decision-Making Self-Efficacy Scale and scores for career maturity questionnaires such as the Career Maturity Inventory and the Career Development Questionnaire. In this regard, Luzzo (1993) emphasises that the more positive an individual is about her or his ability to take successful career decisions, the greater the chance that the individual will display positive attitudes towards career decision-making in general. In correspondence with this hypothesis, Luzzo (1993) indicated that scores for the Career Decision-Making Self-Efficacy Scale correlated positively with scores for the attitude component of Crites’ (1978) Career Maturity Inventory ($r = .41$). This finding supports the theoretical connection between the individual's confidence in her or his ability to make a career decision and the feelings and subjective reactions of an individual regarding the career decision-making process (Luzzo, 1993). However, Luzzo (1993) could not succeed in indicating a significant relationship between the Career Decision-Making Self-Efficacy Scale and career decision-making skills such as measured by the Career Decision-making self-scale of the Career Development Inventory (Super, Thompson, Lindeman, Jordaan & Myers, 1981). From this it can be deduced that the Career Decision-Making Self-Efficacy Scale primarily has a bearing on the effective, rather than the cognitive, aspects of the career decision-making process.

The objective of the present study is to investigate the construct validity of the Career Decision-Making Self-Efficacy Scale and the Career Development Questionnaire for Grade 12 students from a community that was discriminated against under apartheid. The validity of the two instruments will be investigated on the basis of a series of confirmatory factor analyses. Various South African researchers, among whom de Bruin and Nel (1996) and Stead and Watson (1998), have emphasised that constructs that were developed in the United States of America, such as career maturity and career decision-making self-efficacy, will not necessarily be valid for the South African context. Similarly, research findings in the United States of America cannot necessarily be generalised to contexts that differ radically from the context in which the research was originally done. In this regard it is important to empirically evaluate the validity of measuring instruments and the relationships between constructs in the new context.

METHOD

Participants
The participants were 202 Grade 12 students from Eldorado Park, Johannesburg. This area is characterised by poverty, unemployment and a high crime rate and can be described as a so-called historically disadvantaged community. The residents of the area and the participants in the study can predominantly be described as coloured, although there are also black and Asian residents in the area. Eighty of the participants were males and 122 were females. The average age of the men was 18.05 and of the women was 17.60. The participants were predominantly Afrikaans speaking (72.50% of the males and 79.50% of the females) and to a lesser degree English speaking (17.5% of the men and 10.66% of the women). The remaining participants reported an African language as their mother tongue.

Procedure
All the data was collected by the second author in school time during the guidance period. The participants took part in the study voluntarily.
Measuring instruments

Career Development Questionnaire

As explained in the preceding paragraphs, the questionnaire consists of five sub-scales, namely Self Knowledge, Decision-making, Career Information, Integration of Self Knowledge and Career Information, and Career Planning. The internal consistency reliability coefficients reported in the manual for the five 20-item sub-scales range between .66 and .83 (Langley et al., 1992). These coefficients can be regarded as satisfactory for research purposes. The manual does not contain much information on the validity of the Career Development Questionnaire. Langley et al. (1992) report that the intercorrelations of the five sub-scales are moderately high, suggesting that they have a general factor in common. Watson and Stead (1997) demonstrated that the total score of the Career Development Questionnaire is positively related to vocational planning and exploration as measured by the Commitment to Career Choices Scale (Blustein, Ellis & Devenis, 1989). The Career Development Questionnaire is available in Afrikaans and English. Participants completed the questionnaire in their language of choice.

Career Decision-Making Self-Efficacy Scale

The Career Decision-Making Self-Efficacy Scale was developed by Taylor and Popma (1990). The purpose of the instrument is to assess the self-efficacy expectations of individuals with regard to their ability to make effective career decisions. The sub-scales of the Career Decision-Making Self-Efficacy Scale are derived from Crits’ (1978) theory of career maturity. The five sub-scales are the following: Goal Selection, Occupational Information, Problem Solving, Planning, and Self-Appraisal. Each sub-scale consists of 10 items, giving a total of 50 items. Although the measuring model of the Career Decision-Making Self-Efficacy Scale specifies that five separate dimensions underlie the items, factor-analytical and other evidence indicates that it is more appropriate to focus on the total scores of the Career Decision-Making Self-Efficacy Scale than on the scores for the sub-scales (Taylor & Popma, 1990). In this regard it is appropriate to use the five sub-scales as indicators of general self-efficacy expectations with regard to career decision-making. However, it does not appear to be appropriate to regard the five sub-scales as representative of independent dimensions of self-efficacy expectations (Robbins, 1985). In the present study, the five sub-scales are used only as indicators of a general self-efficacy factor. Betz and Taylor (1983) reported a very satisfactory internal consistency reliability coefficient for the total scale (=.97). The internal consistency reliability coefficients of the five sub-scales range between .86 and .89 and can also be described as satisfactory. All the participants completed the CDMESS in English.

Data analysis

The data was analysed by means of a series of maximum likelihood confirmatory factor analysis. This technique requires of the researcher to specify a theoretical model that will explain the covariances between observable and latent variables in advance. The observable variables in the present case are the sub-scale scores of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale. The latent variables in a confirmatory factor analysis are the postulated constructs or factors that underlie the scores for the observable variables.

Confirmatory factor analysis allows the researcher to evaluate the fit between the postulated model and the observed data. In this regard the researcher relies on a series of fit indexes. The following indexes are used in the study in question: the chi-square statistic, the Root Mean Square Error of Approximation (RMSEA; Steiger & Lind, 1980), the Goodness of Fit Index (GFI; Jöreskog & Sörbom, 1989), the Normed Fit Index (NFI; Bentler & Bonnet, 1980) and the Comparative Fit Index (CFI; Bentler, 1990). With regard to the chi-square statistic, a non-significant chi-square indicates that the model shows a good fit with the data and that the difference between the original covariance matrix and the covariance matrix that is reconstructed on the basis of the postulated model, is insignificantly small. However, Browne and Cudeck (1993) have pointed out that the chi-square is often too strict a test, as it is unreasonable to expect that any reconstructed covariance matrix will display a perfect fit with the original covariance matrix. In addition to this, a further undesirable characteristic of the chi-square is that it is influenced to a great extent by the size of the sample. The RMSEA is influenced by the size of the test sample to a lesser extent. This index also takes into consideration the complexity of a postulated model and generally gives preference to simpler models that make use of fewer parameters to explain the covariances between the variables. Browne and Cudeck (1993) have formulated the general guideline that RMSEA values of .05 and smaller indicate a close fit between the postulated model and the observed data. Values of .08 and smaller indicate a reasonable fit and values of greater than .08 indicate an unsatisfactory fit. One of the strongest points of the RMSEA is that confidence intervals can be constructed around the point estimations.

Model 1 specifies that a single factor underlies the five sub-scales of the Career Development Questionnaire. In correspondence with the theory on which the Career Development Questionnaire is based, this factor is called Career Maturity. Model 1 specifies further that there is also only one factor underlying the five sub-scales of the Career Decision-Making Self-Efficacy Scale. In correspondence with the theory on which the Career Decision-Making Self-Efficacy Scale is based, this factor is called Self-Efficacy. In accordance with theoretical expectations, the model specifies that the two factors are correlated with one another. The variances of the two factors are fixed in order to identify the model. The factor pattern coefficients of the two factors on the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale sub-scales are estimated freely from the observed data.

Model 2 specifies that a General Career Decision-Making factor underlies the sub-scales of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale. This factor represents that which the sub-scales of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale have in common. The model specifies further that a Career Decision-making factor can be abstracted from the shared residual variance of the Career Development Questionnaire sub-scales and that a Self-Efficacy factor can be abstracted from the shared residual variance of the Career Decision-Making Self-Efficacy Scale sub-scales. As in Models 1 and 2, the variances of the three factors are fixed to unity and all factor pattern coefficients are freely estimated from the observed data.

RESULTS

The fit indexes of the two models are given in Table 1. It should be noted that not one of the models displays a good fit with the observed data from a statistical point of view, since the chi-square
The correlation between the Career Maturity and Self-Efficacy factors is .49 (p < .05). From this it can be drawn that the two instruments largely provide the same information. In this regard it should be noted that approximately 76% of the variance of the constructs does not overlap (this estimate also includes that variance that can be ascribed to measurement error).

The point estimate of the RMSEA for Model 2 is .06 with 90% confidence intervals of .03 and .09. According to the guidelines of Browne and Cudeck (1992), the point estimate can be regarded as indicative of a satisfactory fit. The GFI (.96), NFI (.94) and CFI (.97) also indicate that the fit between the model and the observed data can be regarded as satisfactory. The standardised estimated factor pattern coefficients of Model 2 are given in Table 3. Closer inspection of this table indicates that all five sub-scales of the Career Development Questionnaire are strong indicators of the general factor that underlies the sub-scales of the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale.

The point estimate of the RMSEA for Model 1 is .08 with 90% confidence intervals of .06 and .10. The point estimate indicates that the postulated model displays a reasonable fit with the observed data according to the guidelines of Browne and Cudeck (1992). The GFI (.93), NFI (.91) and the CFI (.95) indicate that the model displays a satisfactory fit with the observed data in practical terms. The standardised factor pattern coefficients for Model 1 are reflected in Table 2. Inspection of the factor pattern coefficients indicates that the five sub-scales of the Career Development Questionnaire and the five sub-scales of the Career Decision-Making Self-Efficacy Scale are good indicators of the Career Maturity and Self-Efficacy factors respectively. All ten standardised factor pattern coefficients are statistically significant (p < .05). The factor pattern coefficients for the Career Maturity factor vary between .50 (Self Knowledge) and .83 (Planning). The factor pattern coefficients for the Self-Efficacy factor vary between .69 (Self-Appraisal) and .79 (Occupational Information). All the sub-scales of the Career Decision-Making Self-Efficacy Scale therefore appear to be satisfactory indicators of the Self-Efficacy factor.

The correlation between the two factors is .49. From this it appears that there is an overlap of approximately 24% of the variance of the two constructs. Such an overlap is expected on theoretical grounds, since both constructs have a bearing on career decision-making and the Career Decision-Making Self-Efficacy Scale is based on a model of career maturity, namely that of Crites (1978). The degree of overlap, however, is not so large that the conclusion can be drawn that the two instruments largely provide the same information. In this regard it should be noted that approximately 76% of the variance of the constructs does not overlap (this estimate also includes that variance that can be ascribed to measurement error).
Constructs with coloured South African adolescents and youths. Scale hold promise as indicators of the two theoretical Questionnaire and the Career Decision-Making Self-Efficacy of America, retain their meaning for coloured South African youths who come from a socio-political, economical and of career maturity and career decision-making self-efficacy because, unlike the Career Maturity Inventory – Attitude Scale, the Career Decision-Making Self-Efficacy Scale. This correlation is similar to the correlation obtained in the present study between the Career Development Questionnaire and the Career Decision-Making Self-Efficacy Scale (r = .49). The latter correlation provides strong support for the hypothesised positive relationship between career maturity and career decision-making self-efficacy because, unlike the Career Maturity Inventory – Attitude Scale, the Career Development Questionnaire does not share content with the Career Decision-Making Self-Efficacy Scale. This would suggest that the individual has all the necessary information and is ready to make a career decision, but he or she lacks the confidence to make decisions. In such cases the aim of career counselling intervention in such a case could be to raise the motivation of the individual with regard to career decision-making and/or the removal of stumbling blocks in the path of the career decision-making of the individual.

In such a case it probably indicates that the individual has the necessary self-confidence to complete the development tasks that are related to career decision-making, but that he or she is not motivated to finish off the tasks or that there are one or more stumbling blocks that prevent the individual from completing the tasks. The target of the career counselling intervention in such a case could be to raise the motivation of the individual with regard to career decision-making and/or the removal of stumbling blocks in the path of the career decision-making of the individual.

Note
1. The “racial” categories used in this paper are in accordance with the use of these categories by the present and previous South African governments. Our use of these categories does not imply that we accept that they have status as any more than legal labels in South Africa.

REFERENCES


