



Title	Developing a career development self-efficacy instrument for Chinese adolescents in Hong Kong
Author(s)	Yuen, M; Gysbers, NC; Chan, RMC; Lau, PSY; Leung, TKM; Hui, EKP; Shea, PMK
Citation	International Journal For Educational And Vocational Guidance, 2005, v. 5 n. 1, p. 57-73
Issued Date	2005
URL	http://hdl.handle.net/10722/54280
Rights	Creative Commons: Attribution 3.0 Hong Kong License

**Developing a Career Development Self-Efficacy Instrument for Chinese
Adolescents in Hong Kong**

MANTAK YUEN

The University of Hong Kong

NORMAN C. GYSBERS

University of Missouri-Columbia

RAYMOND M.C. CHAN

Hong Kong Baptist University

PATRICK S.Y. LAU

The Chinese University of Hong Kong

THOMAS K M. LEUNG

Ching Chung Hau Po Woon Secondary School, China

EADAOIN K.P. HUI

The University of Hong Kong

PETER M. K. SHEA

Hong Kong Council of the Church of Christ in China

**Submitted to International Journal for Educational and Vocational Guidance
(Kluwer Academic): August 30 2003**

**Revised and re-submitted to International Journal for Educational and
Vocational Guidance: June 15 2004**

Author Note

Mantak Yuen is an associate professor at the Faculty of Education, University of Hong Kong. Norman C. Gysbers is a professor at the Department of Educational, School, and Counseling Psychology, University of Missouri-Columbia. Raymond, M.C. Chan is an assistant professor at the Department of Education Studies, Hong Kong Baptist University. Patrick, S.Y. Lau is an associate professor at the Department of Educational Psychology, Chinese University of Hong Kong. Thomas K.M. Leung is a teacher at Ching Chung Hau Po Woon Secondary School, China. Eadaoin K. P. Hui is an associate professor at the Faculty of Education, University of Hong Kong. Peter M.K. Shea is an educational psychologist, Educational Psychology Services, the Hong Kong Council of the Church of Christ in China

Acknowledgement

This study was supported by the Faculty Research Fund Faculty of Education and the CRCG of the University of Hong Kong, the Quality Education Fund and the Hong Kong Research Grant Council. The authors would like to thank the members of the expert panel, teachers, principals, and students of the participant schools for their support to the project. Correspondence regarding this article should be sent to Dr. Mantak Yuen, Faculty of Education, University of Hong Kong, Pokfulam, Hong Kong, China. (E-mail: mtyuen@hkucc.hku.hk).

Developing a Career Development Self-Efficacy Instrument for Chinese

Adolescents in Hong Kong

Abstract

A 24-item measure, the Career Development Self-Efficacy Inventory (CD-SEI), was developed to assess career development self-efficacy among adolescents in Hong Kong. The CD-SEI covered six domains: Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, and Career Goal Setting, representing competencies needed by high school students transiting from school to work in the Hong Kong. The Confirmatory factor analyses of the responses from 6776 Grades 10-13 students showed that the six primary factors with one higher order factor model was the best fit to the data, though the one general factor model yielded an adequate fitting. Reliability analyses showed that the total scale and subscales were internally consistent. The data suggested that Hong Kong adolescents had some but not strong confidence in their career development. Students with plans to study at a university had more confidence in their career development than those that did not have such plans. This is the first study to develop and validate a career development self-efficacy measure for Chinese adolescents. Issues related to comprehensive guidance programming and assessment instrument development from a cross-cultural perspective were discussed.

Key words: Career Development; Self-Efficacy; Adolescents; Assessment;

Chinese; Hong Kong

Developing a Career Development Self-Efficacy Instrument for Chinese Adolescents in Hong Kong

The assessment of students' career self-efficacy has been hindered by a lack of psychometrically sound instruments even though career development has been a focus of school guidance programs in many parts of the world (Gysbers & Henderson, 2000; Prideaux, Patton, & Creed, 2002). Gysbers and Henderson (2000) pointed out that one of the key components of a comprehensive guidance program is a student competency based guidance curriculum that includes competencies in educational development, personal social development, and career development. Students' career development competencies are defined as skills necessary for successful transition from school to work. To evaluate how guidance curriculum activities impact students' career development competencies, it is necessary to develop assessment instruments to measure students' career development self-efficacy competencies (Lapan, Gysbers, Multon, & Pike, 1997).

Conceptualization of Career Development

A number of career development theories such as Super's (1957) life-span, life-space approach, Gottfredson's (1981) theory of occupational aspirations, and social cognitive career theory (Lent, Brown, & Hackett, 1994) provide useful concepts for understanding young people's career development in Western societies

(Sciarra, 1999). In applying these theories to Hong Kong Chinese adolescents' career development, researchers and practitioners need to consider the cultural relevancy of these concepts (Leung, 1999; 2002). As in Western societies, Hong Kong secondary school students need to develop realistic self-concepts, learn about occupational opportunities, have an interest in and knowledge about occupations, and get started in a chosen field (Super, 1990). They must understand vocational aspirations in terms of social class, gender role, and the self as well as how to compromise vocational interests with the availability of jobs (Gottfredson, 1981).

In addition, students' beliefs about their abilities may influence their motivation to work toward their careers (Lent, Brown, & Hackett, 1994). For Hong Kong adolescents, restricted freedom, limited choices in educational and occupational opportunities in the socio-economic context, as well as expected loyalty to family and social groups in the Chinese cultural context are something they have to live with (Leung, 2002). Based on these concepts, and in particular, the self-efficacy theory of career development (Bandura, 1977; Betz, & Luzzo, 1996; Krumboltz, 1994; Lent, Brown, & Hackett, 1994) and the Hong Kong social context, the authors undertook the development of an instrument to assess Chinese students' career development self-efficacy.

Career Development Self-Efficacy Measure

Students' self-efficacy has recently become an important construct in counseling and career development literature (Bandura, 1977; Betz & Hackett, 1983; Betz & Luzzo, 1996; Lapan, Gysbers, Multon, & Pike, 1997). For example, based on Bandura's self-efficacy theory (1977, 1986), Taylor & Betz (1983) developed the Career Decision-Making Self-Efficacy Scale (CDMSE) for college students in the U.S. More recently, a 25-item short form has been developed from the CDMSE.

Studies have been conducted using the CDMSE on career decision-making self-efficacy among college and high school students (Betz & Luzzo, 1996; Betz, Klein, & Taylor, 1996). The CDMSE postulates that career decision-making includes five kinds of behaviors: appraising self, gathering occupational information, selecting goal, planning, and problem-solving. Both the CDMSE and its short form have adequate internal consistency reliability coefficients (Nilsson, Schmidt, & Meek, 2002). Concurrent validity of the CDMSE was demonstrated by its positive association with career adjustment (Betz & Luzzo, 1996), career decision-making attitudes and skills (Luzzo, 1996), and negative associations with career indecision (Betz & Luzzo, 1996). However, factor analyses supported a two-factor structure of the CDMSE, i.e. the Decision-Making factor and Information Gathering factor rather than the original proposed five-factor structure (Betz, Klein, & Taylor, 1996; Betz & Taylor, 2001).

After an extensive literature review, the current researchers observed that none of the career decision-making measures developed in the West (Levinson, Ohler, Caswell, & Kiewra, 1998) have been validated with Chinese adolescents. In a recent review of psychological assessment in Asia, Sue & Chang (2003) pointed out that it would not be easy to use western derived assessment instruments to achieve equivalence in translation, validity, measurement unit and full score comparability. Thus, career development researchers in Hong Kong are faced with the challenge to either to modify Western derived instruments or develop culture-specific instruments for local use (Leong & Hartung, 2000).

The Hong Kong Context

In Hong Kong, learning for life has been the major mission of recent education reform (Education Commission, 2000). A whole school approach to guidance through a comprehensive developmental guidance program is expected in all schools. However, a recent thorough literature review indicated that in relation to students' personal-social, educational, and career development, there is a lack of systematic identification, assessment, program planning, and resource materials in Hong Kong schools (Yuen, Shea, Leung, Hui, Lau, & Chan, 2003). Hence, with the support of the Quality Education Fund, the researchers have recently developed a comprehensive, developmental, and systematic guidance curriculum and activity resource materials

for Grades 10-13 students in Hong Kong. The guidance curriculum covers the areas of Career Development, Academic Development, and Personal-Social Development (Yuen, Gysbers, Hui, Leung, Lau, Chan, & Shea, 2002). Although these areas are similar to the areas covered in guidance materials developed in the West, the specific content of the Western curriculum are not directly applicable to Hong Kong schools. For instance, in the Missouri Guidance Competency Evaluation Survey (MGCES; Gysbers, Lapan, Multon, & Lukin, 1996) the items of Career Development were categorized into Planning and Developing Career, Understanding How Being Male or Female Relates to Jobs/Career, Learning How to Use Leisure Time Now and In the Future, Planning High School Classes, and Making Decisions about College. The last two categories are probably irrelevant to most Hong Kong adolescents because of the limited choice of subjects in the curriculum and less than 20% of young people aged between 17-20 were offered places in university degree programs in government-funded tertiary institutes. Most high school students in Hong Kong need competencies in selecting vocational training, hunting for jobs, and setting their career goals (Yuen et al., 2003).

This article reports the development, structure, and internal consistency of an instrument to assess the career development self-efficacy of Chinese adolescents in Hong Kong. It also examines possible gender and other status group differences in the

career development of Hong Kong adolescents.

Method

Participants

The student sample was drawn from 28 secondary schools located in different parts of Hong Kong. It represented the full range of student ability across schools. In total, 6776 students completed the survey questionnaire (3056 boys; 3652 girls; 68 did not specify gender). Students came from Grade 10 (38.7%), Grade 11 (24.5%), Grade 12 (22.4%) and Grade 13 (14.21%) (mean age: 16.61, SD=1.42).

Instrumentation Development

The 24-item questionnaire used in this study was developed by the present researchers. The items were adapted from an item pool contributed by four focus groups of 27 high school students from 27 secondary schools in Hong Kong. The items were rated for relevance and then selected and categorized by an expert panel of school guidance professionals and personnel trainers from the government and business sectors. The items covered 24 student competencies related to career development of senior secondary students (see Table 1) under 6 headings: Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, Career Goal-Setting (Yuen et al., 2003), with 4 items in each category. Respondents were asked to rate their confidence in completing the tasks using a 6-point Likert Scale, with 1 representing *extremely not confident* to 6 representing *extremely confident*.

The draft questionnaire was piloted on a group of Grade 9 and 11 students ($n=1106$). Based on the students' feedback and reliability analysis, the wordings of some of the items were further refined. The final revised instrument along with other

self-reported measures were administered to the students in groups and were completed within 35 minutes. The instrument is available upon request from the first author of this paper.

Insert Table 1 about here

Procedure

The survey questionnaires were administered during class periods by classroom teachers to students in Grades 10 to 13 across 28 participant secondary schools.

Statistical analysis

To test whether the 24 items of Career Development Self-Efficacy Inventory adequately represent the six primary factors and one higher order factor model of career development self-efficacy as proposed by the expert panel, four models were constructed.

Model 1. An Omnibus General Career Development Self-Efficacy Factor

This model postulates that all 24 items of the Career Development Self-Efficacy Inventory reflect an omnibus common factor in which all items are equally indicative of general career development self-efficacy with no extraneous correlation among the items due to unspecified factors.

Model 2. Six Distinguishable Factors (Career Planning, Gender Issues in

Career, Training Selection, Job Hunt Preparation, Job Hunting, Career Goal Setting)

Based on the expert panel's judgment, the items were classified into six categories of the Career Development Self-Efficacy Inventory. It was hypothesized that six specific factors are distinguishable: *Career Planning (1, 7, 13, 19), Gender Issues in Career (2, 8, 14, 20), Training Selection (3, 9, 15, 21), Job Hunt Preparation (4,10, 16, 22), Job Hunting (5, 11,17, 23), and Career Goal Setting (6,12, 18, 24).*

Model 3. Six Distinguishable Factors (Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, Career Goal Setting) with one higher order model (General Career Development)

It was hypothesized that six specific factors are distinguishable: *Career Planning (1, 7, 13, 19), Gender Issues in Career (2, 8, 14, 20), Training Selection (3, 9, 15, 21), Job Hunt Preparation (4,10, 16, 22), Job Hunting (5, 11,17, 23), and Career Goal Setting (6,12, 18, 24).* In addition, a single second-order factor (*General Career Development*) was hypothesized to account for the covariances among the six first-order factors.

Model 4. Null Model

The Career Development Self-Efficacy Inventory items were hypothesized to be unrelated, with no common factor underlying them.

Goodness-of-Fit Indices

Based on statistical grounds and suggestions by previous researchers, the indices employed in this study included the chi-square value (Wheaton, 1987), the chi-square / degrees of freedom ratio (Wheaton, 1987), the Bentler-Bonett nonnormal fit index (NNFI; Bentler, 1989), the comparative fit index (CFI; Bentler, 1989), the Akaike's Information Criterion (AIC; Akaike, 1987), the adjusted goodness-of-fit index (AGFI; Joreskog & Sorbom, 1985), the root mean square residual (RMSR; MacCallum, Browne, & Sugawara, 1996), and the root mean square error of approximation (RMSEA; MacCallum et al., 1996). The root mean square residual and the root mean square error of approximation are given higher priority to other indices as they are recommended as the most straightforward and intuitive approach to understanding the fit of a model (Quintana & Maxwell, 1999).

Supposing the six latent variables underlying the response to the Career Development Self-Efficacy Inventory are subsumed under a six dimensional factor and one higher order factor construct of career development self-efficacy, Model 3 would yield the most parsimonious fit to the data. In addition, the desirability of Model 3 would be assessed in terms of its convergent validity (i.e. the extent to which the specified items converge on a particular factor in terms of the magnitude of the item loadings).

Results

The models on the factor structure of the Career Development Self-Efficacy Inventory were tested by the EQS confirmatory factor analysis approach (Bentler & Wu, 1995). The identical confirmatory factor analyses were carried in the total sample and two sub-samples. Sub-sample 1 were girls ($n = 3627$). Sub-sample 2 were boys ($n = 3034$). The goodness-of-fit indicators for Models 1 to 4 are summarized in Table 2. Across several indices, the six-factor and one higher order factor model (Model 3) appeared the best fit compared with the competing models, primarily because it had the following lowest statistics (e.g. for the total sample, $\chi^2 = 8801.626$, $AIC=8311.626$, $RMSR = .040$, and $RMSEA = .073$; for the girls' sample, $\chi^2 = 5755.308$, $AIC=5265.308$; $RMSR = .040$, and $RMSEA = .080$; for the boys' sample, $\chi^2 = 3635.568$, $AIC=3145.568$, $RMSR = .043$, and $RMSEA = .069$). For the total sample and the girls' sample, although their NNFI and CFI were slightly lower than expected (.90) (Byrne, 1994), their RMSR and RMSEA indicated a fair fit of data (MacCallum et al., 1996; Quintana & Maxwell, 1999).

Insert Table 2 about here

Further examination of the structure coefficients for the items of the Career Development Self-Efficacy Inventory showed that all items converged with relevance on the respective factors hypothesized in this model. The six primary factors converged with relevance to the second order factor. Table 3 summarizes findings of the total sample and the sub-samples of boys and girls. All 24 items had loadings higher than .60. All the six factors had loadings higher than .87.

Insert Table 3 about here

Insert Table 4 about here

Inter-correlations and reliabilities of the CD-SEI

Table 4 shows the inter-correlations, means, standard deviations, and reliabilities (alpha) of the subscales scores and the total scale score. The scores of Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, and Career Goal Setting subscales were highly correlated (r ranged from .71 to .82). The

internal consistencies of the Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, and Career Goal Setting subscales were adequate (total sample, alphas ranged from .77 to .82; girls, .76 to .82; boys, .77 to .83). The internal consistency of the total scale was good (total sample, alpha = .95; girls, .95; boys, .95).

Differences of Career Development between the Subgroups

To examine the impact of gender, grade, and educational aspiration on adolescents' career development self-efficacy, a 2x2x2 (Gender x Grade x Educational aspiration) MANOVA was performed using the six domains of career development subscale scores as dependent variables and gender(boy, n=2694 vs. girl, n=3386), grade (Grade 10&11, n=3800 vs. Grade 12 &13, n=2280), educational aspiration (plan for university, n=4653 vs. no plan for university, n=1427) as the independent variables. The MANOVA was conducted on the data of 6080 adolescents. The overall MANOVA results indicated a significant overall main effect of gender (Wiks' Lamda = .99, $F(6, 6067)=14.33$, $p < .001$), grade (Wiks' Lamda = .99, $F(6, 6067) = 4.36$, $p < .001$), and educational aspiration (Wiks' Lamda = .97, $F(6, 6067) = 30.20$, $p < .001$); all interaction effects were non significant.

Follow-up univariate tests for each of the main effects were then conducted on each of the six career development domain scores. For the Gender main effect, the

results indicated that boys reported significantly higher scores than girls on Gender Issues, $F(1, 6072) = 8.73, p < .01$; On Grade main effect, Grade 12 & 13 students reported significantly higher scores than Grade 10 & 11 students on Job Hunt, $F(1, 6072) = 4.22, p < .05$; on Educational Aspiration effect, students with plans for university study reported significantly higher scores than those without on all six domains of career development - Career Planning, $F(1, 6072) = 67.56, p < .001$; Gender Issues in Career, $F(1, 6072) = 23.55, p < .001$; Training Selection, $F(1, 6072) = 67.18, p < .001$; Job Hunt Preparation, $F(1, 6072) = 63.27, p < .001$; Job Hunting, $F(1, 6072) = 46.85, p < .001$; Career Goal Setting, $F(1, 6072) = 80.44, p < .001$. The significant differences suggest that boys are more confident in handling gender issues in job; grade 12 & 13 students are more confident than grade 10 & 11 students in job hunting; and students who aspire to go to university have more confidence in various career development domains than those who do not.

Discussion

In Hong Kong secondary schools, career guidance and counseling have been limited to mainly large scale information dissemination programs such as talks and visits (Leung, 2002). Classroom career guidance and individual career planning and appraisal activities for senior secondary students are rare (Gysbers, 2000; Leung, 2002). Recently, scholars have pointed to the need for comprehensive guidance programs to prepare students for success in their career development (Yuen et al.,

2003).

The results of the present study indicate that the 24-item Career Development Self Efficacy Inventory (CD-SEI) has adequate psychometric properties. Internal consistencies were moderate to high for the subscales and the total scale. The confirmatory factor analysis indicated that there were six primary factors (Career Planning, Gender Issues in Career, Training Selection, Job Preparation, Job Hunting, and Career Goal Setting) and one higher order factor (Career Development). As a result, this short inventory could be used to assess career development self-efficacy and pinpoint the career development needs among Hong Kong adolescents. The six career development domains identified could be further refined and expanded, for example, to include self-exploration in relation to career development. The six domains and their related items could also provide the much needed foundation for career education program development.

From a cross-cultural perspective, the CD-SEI has important implications in social learning theory for career assessment instrument development within Chinese culture. Self-efficacy is a psychological construct developed in the West (Bandura, 1977; Betz, 2000). The assumptions of the social learning perspective in career development are very similar to the Confucian tradition (Hong, Morris, Chiu, & Benet-Martinez, 2000). Career development for adolescents involves learning

processes related to understanding one's own interests and abilities and interacting in the world of work over time. The six primary factors and one higher order factor model of career development self-efficacy suggests that Chinese adolescents have a holistic view of career development competencies that involves the interaction of interests, abilities and the world of work, even though they may perceive individual tasks as components of the transition from school to work. The higher order factor of General Career Development could represent the students' self-awareness in relation to the world of work. It should be noted that Gender Issues emerged as a highly correlated but independent factor from other factors in career development. This could mean that students considered gender issues to be important in their career development in the Hong Kong Chinese context.

The CD-SEI has practical implications for comprehensive guidance programming, student assessment, program evaluation, and guidance personnel training in schools in Hong Kong and other parts of the world (Gysbers, 2000; Watkins, 2001). First, the present findings indicated that Hong Kong adolescents have some but not strong confidence in career development. Students without plans for university study had less confidence in career development than those with such plans. The present findings are comparable to those of minority and female students in the U.S. (Mau & Bikos, 2000). This suggests that systematic comprehensive guidance

programs should be provided in schools to enhance students' competencies and beliefs in their abilities in career development (Helwig, 2004). Career development practitioners in Hong Kong and other Confucian societies should not rely on ready-made guidance materials and career interventions developed in the West (Leung, 2002). Instead, they need to consider students' background and develop tailored school-based programs within specific cultural and socio-economic contexts. With regard to developing a guidance curriculum, the CD-SEI could help assess students' self-efficacy in career development (Yuen, et al., 2003). It could provide guidance personnel with a profile of students' strengths and areas needing improvement across various grades, classes, and gender in the school. In addition, the CD-SEI could be used to assess how students' self-efficacy in career development changes over a certain period of time, say before and after exposures to comprehensive guidance program activities providing useful feedback for outcome evaluation and improvement of the comprehensive guidance program.

Moreover, the confirmed multi-dimensional construct of career development self-efficacy suggests that guidance personnel need to be knowledgeable about various facets of students' career development including career planning, gender issues, selection of career training, preparation for finding a job, skills of finding a job, and career goal setting. Training for guidance personnel in these aspects could be

strengthened so that comprehensive guidance programs could be better designed and implemented in schools (Patton & Burton, 1997). Furthermore, the CD-SEI could help students understand and monitor the self-perceptions of their capabilities in managing various career tasks. They could further consult guidance personnel in ways to enhance these career skills.

Nevertheless, there are limitations in the present study. First, the samples of secondary school students in the present studies were from voluntarily participating schools. These schools tend to put more efforts in implementing comprehensive guidance programs. Future research should administer the CD-SEI to samples of students in schools where comprehensive guidance programs are less fully implemented. Also, the multicollinearity among the subscales of the CD-SEI could be a limitation. The moderate to high correlations among the subscales are expected as the CD-SEI subscales shared method and related career competencies. However, the independent variance accounted for by each subscale enables the CD-SEI to be used to assess strengths and weaknesses in students' career development (O'Brian, Heppner, Flores, & Bikos, 1997). The results of confirmatory factor analysis and adequate internal consistency suggest that both the total scale scores and subscale scores provide useful information on students' career development efficacy.

The present study is an important step toward better understanding the construct

of career development self-efficacy in the Hong Kong Chinese context. In future research, it would be important to establish the concurrent validity of the CD-SEI with other established career assessment instruments in Chinese communities (e.g. the Search Directed Search; Leung, & Hou, 2001). It would be interesting to use the instrument to critically examine the relationship between perceived career development self-efficacy and actual performance in career tasks. A longitudinal research study would be required so as to establish the predictive validity of the CD-SEI. The possible curvilinear relationship between perceived self-efficacy and actual performance should also be tested (Lent, Brown, & Hackett, 1994; O'Brian et al., 1997). Furthermore, a longitudinal study of the impact of comprehensive guidance programs in schools will be required to test the expected changes of career development efficacy among students when such programs are implemented in schools. In addition, cross-cultural studies would help to validate the newly developed Chinese version of CD-SEI among student samples in various Chinese communities. It would also be interesting to translate, validate and use the CD-SEI to compare career development self-efficacy in different cultures.

References

- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52, 317-332.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-125.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy. *Journal of Social and Clinical Psychology, 4*(3), 359-373.

Bentler, P.M. (1989). *EQS structural equations program manual*. Encino, CA: Multivariate Software Inc.

Bentler, P.M. & Wu, E.J. C. (1995). *EQS for Windows user's guide*. Encino, CA: Multivariate Software Inc.

Betz, N.E. (2000). Self-efficacy theory as a basis for career assessment. *Journal of Career Assessment, 8*,3, 205-314.

Betz, N.E., & Hackett, G. (1983). The relationship of mathematics self-efficacy expectations to the selection of science-based college majors. *Journal of Vocational Behavior, 23*, 329-345.

Betz, N.E., Klein, K., & Taylor, K.M. (1996). Evaluation of a short form of the career decision making self-efficacy scale. *Journal of Career Assessment, 4*, 47-57.

Betz, N.E., & Luzzo, D. A. (1996). Career assessment and the Career Decision-Making Self-Efficacy Scale. *Journal of Career Assessment, 4*, 413-428.

Betz, N.E., & Taylor, K.M. (2001). *Manual for the career decision self-efficacy scale and CDMSE-short form*. Columbia, OH: Department of Psychology, Ohio State University.

Byrne, B.M. (1994). Burnout: testing for validity, replication, and invariance of causal structure across elementary, intermediate, and secondary teachers. *American Educational Research Journal, 31*(3), 645-673.

Education Commission (2000). *Review of education system: reform proposals*. Hong Kong: HKSAR Government.

Gottfredson, L.S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations (Monograph). *Journal of Counseling Psychology,*

28, 545-579.

Gysbers, N.C. (2000). Implementing a whole school approach to guidance through a comprehensive guidance program. *Asian Journal of Counselling*, 7(2), 5-17.

Gysbers, N.C. & Henderson, P. (2000). *Developing and managing your school guidance program*. Alexandria, VA: American Counseling Association.

Gysbers, N. C., Lapan, R., Multon, K., & Lukin, L. (1996). *Missouri guidance competency evaluation surveys: examiner's manual and guide to interpretation and use*. Jefferson City, MO: Missouri Department of Elementary and Secondary Education.

Helwig, A.A. (2004). A ten-year longitudinal study of the career development of students: Summary findings. *Journal of Counseling & Development*, 82, 49-55.

Hong, Y.Y., Morris, M.W., Chiu, C.Y., & Benet-Martinez, V. (2000). Multi-cultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist*, 55, 709-720.

Joreskog, K.G., & Sorbom, D. (1985). *LISREL VI: An analysis of linear structural relationships by the method of maximum likelihood*. Mooresville, IN: Scientific Software.

Krumboltz, J.D. (1994). Improving career development theory from a social learning perspective. In M.L. Savikas, & R.W. Lent (eds.), *Convergence in career development theories: Implications for science and practice*. (pp. 9-31). Palo Alto, CA: CCP books.

Lapan, R. T., Gysbers, N. C., Multon, K. D., & Pike, G.R. (1997). Developing guidance competency self-efficacy scales for high school and middle school students. *Measurement and Evaluation in Counseling and Development*, 30, 4-31.

Lent, R.W., Brown, S.D., & Hackett, G. (1994). Toward a unifying social

cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45, 79-122.

Leong, F.T.L. & Hartung, P.J. (2000). Cross-cultural career assessment: Review and prospects for the new millennium. *Journal of Career Assessment*, 8, 4, 391-401.

Leung, S.A. (1999). *Quality education: A career development and self-concept approach*. Hong Kong : The Chinese University of Hong Kong.

Leung, S.A. (2002). Career counseling in Hong Kong: meeting the social challenges. *Career Development Quarterly*, 50, 3, 237-246.

Leung, S.A. & Hou, Z.J. (2001). Concurrent validity of the 1994 Self-Directed Search for school students in Hong Kong. *Journal of Career Assessment*, 9, 283-296.

Levinson, E.M., Ohler, D.L., Caswell, S., & Kiewra, K. (1998). Six approaches to the assessment of career maturity. *Journal of Counseling & Development*, 76, 475-482.

Luzzo, D.A. (1996). Exploring the relationship between the perception of occupational barriers and career development. *Journal of Career Development*, 22, 239-248.

MacCallum, R.C., Browne, M., & Sugawara, H. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, 1, 130-149.

Mau, W.C., & Bikos, L.H. (2000). Educational and vocational aspirations of minority and female students: A longitudinal study. *Journal of Counseling & Development*, 78, 186-194.

Nilsson, J. E., Schmidt, C.K., & Meek, W. D. (2002). Reliability generalization: An examination of the career decision-making self-efficacy scale. *Educational and Psychological Measurement*, 62, 4, 647-658.

O'Brian, K. M., Happner, M. J., Flores, L. Y., & Bikos, L. H. (1997). The career counseling self-efficacy scale: Instrument development and training applications. *Journal of Counseling Psychology, 44*, 1, 20-31.

Patton, W., & Burton, T. (1997). Training needs of career guidance personnel in Australia and Hong Kong: A comparative study. *International Journal for the Advancement of Counseling, 19*, 361-372.

Prideaux, L.A., Patton, W., & Creed, P. (2002). Development of a theoretically derived school career program: An Australian endeavour. *International Journal for Educational and Vocational Guidance, 2*, 115-130.

Quintana, S.M., & Maxwell, S.E. (1999). Implications of recent developments in structural equation modeling for counseling psychology. *Counseling Psychologist, 27*, 4, 485-527.

Sciarra, D.T. (1999). *Multiculturalism in counseling*. Itasca, Ill.: F.E. Peacock.

Sue, S. & Chang, J. (2003). The state of psychological assessment in Asia. *Psychological Assessment, 15*, 3, 306-310.

Super, D.E. (1957). *The psychology of careers*. New York: Harper & Row.

Super, D.E. (1990). A life-span, life-space approach to career development. In D. Brown, L. Brooks, & associates (Eds.), *Career choice and development* (2nd ed.). San Francisco: Jossey-Bass.

Taylor, K.M., & Betz, N.E. (1983). Applications of self-efficacy theory to the understanding and treatment of career indecision. *Journal of Vocational Behavior, 22*, 63-81.

Watkins, C. (2001). Comprehensive guidance programs in an international context. *Professional School Counseling, 4*(4), 262-271.

Wheaton, B. (1987). Assessment of fit overidentified models with latent variables.

Sociological Methods and Research, 16, 118-154.

Yuen, M., Gysbers, N.C., Hui, E. P. K., Leung, T. K.M., Lau, P.S.Y., Chan, R. M.C., & Shea, P. M. K. (2002). Life skills development and comprehensive guidance program. Available from the World Wide Web <http://www.hku.hk/life>.

Yuen, M., Shea, P.M.K., Leung, T.K.M., Hui, E.K.P., Lau, P. S.Y., & Chan, R. M.C. (2003). Enhancing students' life skills development. In M.,Yuen, P. S.Y. Lau, T.K.M. Leung, P.M.K. Shea, R.M.C. Chan, E.K.P. Hui, & N.C. Gysbers (eds.), *Life skills development and comprehensive guidance program: theories and practices*. Hong Kong: Life Skills Development Project, Faculty of Education, The University of Hong Kong.

Table 1.

*Item Means, Standard Deviations, and Item-Total Correlations for the CD-SEI**(n=6776)*

Subscale and Items	Item Means	Item SDs	Scale ITRs*	Sub-Scale ITRs*
<i>Career Planning</i>				
C01 Strike a balance between interest and future prospect.	4.11	1.03	.61	.55
C07 Explore different careers within my interest.	4.36	.95	.66	.59
C13 Understand my abilities so as to help myself choose a career.	4.35	.91	.73	.65
C19 Choose tertiary institution courses rightly to prepare myself for my future career.	4.03	1.00	.70	.56
<i>Gender Issues in Career</i>				
C02 Understand the relationship between my gender and choosing a career.	4.40	.94	.64	.52
C08 Get along well with the opposite sex at work.	4.57	.92	.58	.59
C14 Make use of the good points of being a male/female at work.	4.40	.94	.66	.63
C20 Handle others' objection, criticism and opposing views when I choose a career which is mostly performed by the opposite sex.	4.01	1.04	.59	.53
<i>Training selection</i>				
C03 Understand a vocational training program before I enroll in it.	4.27	.94	.64	.63
C09 Collect information such as admission criteria and course selection procedure of vocational training schools.	4.10	.98	.65	.62
C15 Think over the relationship between my choice of subject and career prospect.	4.40	1.03	.66	.59
C21 Select and enroll in some suitable courses to prepare myself for different economic situations and labor demand.	4.19	.94	.69	.60
<i>Job Hunt Preparation</i>				
C04 Master general interview techniques (e.g. appearance, ways of speaking, etc.)	4.22	1.04	.66	.56
C10 Fill in job application forms accurately.	4.54	1.01	.62	.57
C16 Produce a resume for myself.	3.99	1.07	.65	.66
C22 Produce a job application letter for myself.	4.07	1.05	.66	.69
<i>Job Hunting</i>				
C05 Still have the stamina to look for different job opportunities when there are difficulties in job hunting.	4.34	1.00	.66	.55
C11 Look for suitable jobs according to my interest and ability.	4.43	.98	.69	.60
C17 Get help from some institutions and connections to help me find a job.	4.01	1.00	.65	.54
C23 Find a suitable job successfully.	4.01	1.10	.66	.59
<i>Career Goal Setting</i>				
C06 Assess and modify my career goals according to the change in external situation.	4.17	.92	.69	.62
C12 Solve the problems I encounter in the process of achieving my career goal.	4.08	.92	.71	.66
C18 Master the strategy to achieve my career goal.	3.95	.96	.72	.67
C24 Constantly improve my study and career plan to work toward my career goal.	4.18	1.03	.70	.64

* ITR=Item Total Correlation

Table 2.

Comparison of Alternative Factor Models on the CD-SEI

Model specification	Goodness-of-fit indices							
	X ²	X ² /df	NNFI	CFI	AIC	AGFI	RMSR	RMSEA
<i>Total sample (N=6776)</i>								
Model 1: One general factor	10359.326*	41.108	.873	.884	9855.326	.839	.042	.078
Model 2: Six primary factors	11952.192*	50.65	.843	.866	11480.191	.828	.121	.087
Model 3: Six primary factors with one higher order factor	8801.626*	35.925	.890	.902	8311.626	.855	.040	.073
Model 4: Null model	87735.533*	317.882	.000	.000	87183.533	.096	.431	.221
<i>Sub-sample 1 (girls; n=3652)</i>								
Model 1: One general factor	6724.421*	26.684	.853	.866	6220.421	.815	.041	.085
Model 2: Six primary factors	7480.152*	31.70	.825	.850	7008.153	.804	.110	.093
Model 3: Six primary factors with one higher order factor	5755.308*	23.491	.872	.886	5265.308	.831	.040	.080
Model 4: Null model	48634.713*	176.213	.000	.000	48082.713	.096	.390	.223
<i>Sub-sample 2 (boys; n=3056)</i>								
Model 1: One general factor	4220.035*	16.746	.887	.896	3716.035	.850	.045	.073
Model 2: Six primary factors	4975.346*	21.08	.855	.876	4503.346	.839	.133	.083
Model 3: Six primary factors with one higher order factor	3635.568*	14.839	.900	.912	3145.568	.864	.043	.069
Model 4: Null model	38593.977*	139.833	.000	.000	38041.977	.098	.475	.218

Note: X² = Chi-square value; X²/df = Chi square / degrees-of-freedom ratio;
AIC= Model Akaike's Information Criterion; AGFI = Adjusted goodness-of-fit index;
RMSR = Root mean square residual; NNFI = Bentler-Bonett nonnormal fit Index;
CFI = Comparative fit index; RMSEA = Root mean square error of approximation;

*p < .001

Table 3. *Factor Item Loadings for the CD-SEI (Model 2) among Total Sample and Sub-Samples*

Item no.	Total sample (N=6776)	Sub-sample 1 (Girls, n=3652)	Sub-sample 2 (Boys, n=3056)
Factor 1	Career Planning		
1	.63	.63	.64
7	.69	.69	.68
13	.76	.77	.74
19	.72	.74	.70
Factor 2	Gender Issues		
2	.68	.68	.67
8	.65	.63	.67
14	.74	.74	.73
20	.64	.64	.65
Factor 3	Training Selection		
3	.70	.70	.69
9	.70	.70	.70
15	.71	.72	.69
21	.73	.73	.73
Factor 4	Job Hunt Preparation		
4	.69	.69	.69
10	.67	.67	.67
16	.75	.77	.72
22	.76	.78	.75
Factor 5	Job Hunting		
5	.68	.67	.67
11	.72	.72	.72
17	.67	.66	.68
23	.68	.68	.69
Factor 6	Career Goal-setting		
6	.72	.71	.72
12	.75	.75	.74
18	.75	.74	.76
24	.73	.73	.74
<u>Loading of first-order factors on the second-order factor</u>			
Factor 1	1.000	1.000	1.000
Factor 2	.914	.922	.905
Factor 3	.938	.934	.945
Factor 4	.893	.872	.912
Factor 5	1.000	1.000	1.000
Factor 6	.991	.991	.992

Note. Factor 1: Career Planning; Factor 2: Gender Awareness; Factor 3: Selection of Training; Factor 4: Job Hunt Preparation; Factor 5: Job Hunting; Factor 6: Career Goal-Setting.

Table 4.

Subscale Intercorrelations and Summary Statistics for the Six Subscales and Total Scale of the CD-SEI Based on Model 2 among the Total Sample and Sub-Samples

Subscales	1	2	3	4	5	6	Coefficient Alpha	Item Means Mean (Scale S.D.)
Total sample 1(N=6708)								
1 Career Planning	-						.78	4.21 (3.02)
2. Gender Issues	.73*	-					.77	4.34 (2.95)
3. Training Selection	.77*	.68*	-				.80	4.24 (3.07)
4. Job Hunt Preparation	.69*	.65*	.71*	-			.80	4.21 (3.31)
5. Job Hunting	.79*	.72*	.72*	.75*	-		.77	4.20 (3.14)
6. Career Goal Setting	.81*	.71*	.74*	.72*	.82*	-	.82	4.10 (3.10)
7. Total Scale	.91*	.85*	.87*	.86*	.91*	.91*	.95	4.22 (16.41)
Sub-sample 1 (Girls, n=3617)								
1 Career Planning	-						.79	4.22 (2.91)
2. Gender Issues	.74*	-					.76	4.31 (2.78)
3. Training Selection	.78*	.69*	-				.80	4.27 (2.90)
4. Job Hunt Preparation	.68*	.65*	.69*	-			.81	4.23 (3.19)
5. Job Hunting	.79*	.71*	.71*	.74*	-		.77	4.19 (3.01)
6. Career Goal Setting	.82*	.71*	.74*	.72*	.81*	-	.82	4.07 (2.96)
7. Total Scale	.91*	.85*	.87*	.85*	.90*	.91*	.95	4.22 (15.60)
Sub-sample 2 (Boys, n=3026)								
1 Career Planning	-						.77	4.21 (3.14)

2.	Gender Issues	.72*	-				.77	4.38 (3.12)
3.	Training Selection	.77*	.68*	-			.79	4.21 (3.25)
4.	Job Hunt Preparation	.70*	.65*	.71*	-		.80	4.18 (3.44)
5.	Job Hunting	.79*	.72*	.73*	.77*	-	.77	4.22 (3.28)
6.	Career Goal Setting	.81*	.71*	.75*	.73*	.83*	-	.83 4.14 (3.25)
7.	Total Scale	.90*	.84*	.88*	.87*	.91*	.91*	.95 4.22 (17.23)

Note. * $p < .01$ (2-tailed).