

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

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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 representing competencies needed by high school students transiting from school to work in 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 fit. 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 who 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.

Résumé. Construction d'un instrument de mesure de l'auto-efficacité du développement vocationnel pour adolescents chinois de Hong Kong. On a construit une échelle de 24 items, appelée *Career Development Self-Efficacy Inventory (CD-SEI)* (Inventaire de l'Auto-efficacité de Développement Vocationnel (IAE-DV)) pour évaluer l'auto-efficacité du développement vocationnel chez des adolescents chinois de Hong Kong. La CD-SEI couvre six domaines, qui représentent les compétences dont ont besoin les étudiants des hautes écoles qui sortent de l'école pour entrer sur le marché du travail à Hong Kong. Les analyses factorielles confirmatoires des réponses de 6776 étudiants des niveaux 10–13 montrent que c'est un modèle à six facteurs primaires avec un facteur de premier ordre qui s'ajuste le mieux aux données, bien qu'un modèle à un seul facteur général procure un ajustement satisfaisant. Les analyses de fidélité attestent de la consistance interne de l'échelle totale et des sous-échelles. Les données suggèrent que les adolescents de Hong Kong n'ont qu'une confiance relative dans leurs possibilités de développement vocationnel. Les étudiants qui ont décidé d'étudier à l'université ont d'avantage confiance en leur développement vocationnel que ceux qui n'ont de tels desseins. Cette étude est la première tentative pour développer et valider une mesure de l'auto-efficacité du développement vocationnel chez des adolescents chinois. On discute les problèmes liés à un programme général d'orientation et à l'élaboration d'un instrument de mesure dans une perspective interculturelle.

Zusammenfassung. Entwicklung eines Instruments zur Selbsteinschätzung eigener Kompetenzen zur Laufbahnplanung für chinesische Jugendliche in Hongkong. In Hongkong wurde der „Fragebogen zur Selbsteinschätzung eigener Kompetenzen für die Laufbahnplanung (Career Development Self-Efficacy Inventory – CD-SEI)“ eine Bewertungsskala mit 24 Kriterien entwickelt, mit der

Jugendliche die eigenen Kompetenzen für die Laufbahnentwicklung bewerten können. Der Fragebogen deckt 6 Bereiche ab: Laufbahnplanung, geschlechtsspezifische Aspekte der Berufswahl, Wahl der Ausbildung, Bewerbung, Methoden der Arbeitsuche, Entwicklung von beruflichen Zielen; damit werden diejenigen Kompetenzen erfasst, die in Hongkong von AbsolventInnen des Gymnasiums (High School) am Übergang in das Beschäftigungssystem benötigt werden. Die Validitätsanalyse auf der Grundlage der Antworten von 6776 SchülerInnen der Klassen 10–13 ergab, dass sich die genauesten Ergebnisse bei Anwendung eines Modells ergaben, dass alle 6 Bereiche unter Betonung eines dieser Faktoren einbezog, wobei allerdings ein Validitätsmodell, das nur diesen einen herausragenden Faktor einbezog, bereits angemessene Näherungswerte ergab. Die Reliabilitätsanalyse ergab, dass der Gesamtfragebogen und die Teilfragebögen in sich konsistent sind. Die Ergebnisse führen zu der Vermutung, dass Jugendliche zwar ein gewisses, aber kein sehr ausgeprägtes Selbstvertrauen im Hinblick auf ihre Laufbahnentwicklung haben. Jugendliche, die ein Hochschulstudium planten, zeigten ein ausgeprägteres Selbstvertrauen als die anderen Jugendlichen, die kein Studium planten. Dies ist die erste Untersuchung mit dem Ziel, einen derartigen Selbsteinschätzungsfragebogen für chinesische Jugendliche zu entwickeln und zu evaluieren. Der Artikel diskutiert ebenfalls Aspekte einer interkulturellen Perspektive im Zusammenhang mit der Entwicklung von umfassenden Beratungsprogrammen sowie von Beurteilungsinstrumenten.

Resumen. Elaboración de un Instrumento de Auto-Eficacia en el Desarrollo de la Carrera de Adolescentes Chinos en Hong Kong. Se ha desarrollado un instrumento de medida con 24 ítems, el Inventario de Auto-Eficacia en el Desarrollo de la Carrera (IAE-DC), para evaluar la auto-eficacia en el desarrollo de la carrera entre adolescentes de Hong Kong. El IAE-DC abarca seis dimensiones que representan las competencias que los alumnos de secundaria necesitan en su tránsito de la escuela al mundo del trabajo en Hong Kong. Los análisis factoriales realizados a partir de las respuestas de 6776 estudiantes de los cursos 10^o–13^o demostraron que lo que mejor se ajustaba a los datos eran seis factores primarios con un modelo factorial de orden superior, aunque sólo este modelo factorial general también se ajustaba adecuadamente. Los análisis de fiabilidad confirmaron la consistencia interna de las escalas y subescalas. Los resultados sugirieron que los adolescentes de Hong Kong sentían cierta seguridad, aunque no demasiada, respecto al desarrollo de su carrera. Los estudiantes que tienen decidido ir a la universidad mostraban mayor confianza en su desarrollo profesional que aquellos que no han planificado nada. Este es el primer estudio en el que se ha elaborado y validado un instrumento de medida de la auto-eficacia en el desarrollo de la carrera para adolescentes chinos. Se discuten aspectos relacionados con los programas comprensivos de orientación y con el desarrollo de instrumentos de diagnóstico desde una perspectiva cross-cultural.

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 programmes 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 programme 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).

A number of career development theories such as Super's (1990) 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, understand vocational aspirations and realize how their beliefs about their abilities may influence their motivation to work toward their careers. 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; Krumboltz, 1994; Lent et al., 1994) and the Hong Kong social context, the authors undertook the development of an instrument to assess Chinese students' career development self-efficacy.

Students' self-efficacy has recently become an important construct in counselling and career development literature (Bandura, 1977; Betz & Hackett, 1983; Betz & Luzzo, 1996; Lapan et al., 1997). For example, based on Bandura's self-efficacy theory (1977, 1986), Taylor and 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 behaviour: 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 et al., 1996; Betz & Taylor, 2001).

After an extensive literature review, the authors 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 and 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).

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 programme 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, programme planning, and resource materials in Hong Kong schools (Yuen, Shea, Leung, Hui, Lau, & Chan, 2003).

With the support of the Quality Education Fund, a comprehensive, developmental, and systematic guidance curriculum and activity resource materials for Grades 10–13 students in Hong Kong has recently been developed (Yuen, Gysbers, Hui, Leung, Lau, Chan, & Shea, 2002). This guidance curriculum covers the areas of Career Development, Academic Development, and Personal-Social Development. 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 and 20 were offered places in university degree programmes. 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, $SD = 1.42$).

Instrument

The 24-item Career Development Self-Efficacy Instrument questionnaire was developed after two pilot studies. In the first pilot study, an item pool was created by four focus groups of 27 high school students from 27 secondary schools in Hong Kong. These items were rated for relevance, selected and categorised by an expert panel of school guidance professionals and personnel trainers. The selected items covered 24 student competencies divided into 6 categories of 4 items: Career Planning, Gender Issues in Career, Training Selection, Job Hunt Preparation, Job Hunting, Career Goal-Setting (see Table 1) (Yuen et al., 2003).

In a second pilot study the draft questionnaire was administered to a group of Grade 9 and 11 students ($n = 1106$). Respondents rated their confidence in completing the mentioned tasks on a 6-point scale ranging from 1 (*extremely not confident*) to 6 (*extremely confident*). Based on the students' feedback and reliability analysis, the wordings of some of the items were further refined into a final version of the questionnaire.

Procedure

Classroom teachers to students in Grades 10–13 administered the final revised instrument along with a personal data form on demographic variables, such as Gender, Age, Grade, and Educational Aspiration, during class periods across 28 secondary schools. The questionnaires were completed within 35 min.

Statistical analysis

To test whether the 24 items of Career Development Self-Efficacy Inventory adequately (CD-SEI) represent the 6 primary factors and one higher order factor model of career development self-efficacy as proposed by the expert panel, four models were constructed.

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

TABLE 1 (Continued)

Subscale and items	Item means	Item SDs	Scale ITRs*	Sub-scale ITRs*
<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.

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

This model postulates that all 24 items of the CD-SEI 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 CD-SEI (see Table 1). It was hypothesized that six specific factors are distinguishable.

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 with, in addition, a single second-order factor (*General Career Development*) to account for the covariance among the six first-order factors.

Model 4. Null Model

The CD-SEI 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 non-normal 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 CD-SEI 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 CD-SEI 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).

Further examination of the structure coefficients for the items of the CD-SEI 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.

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

TABLE 2
Comparison of alternative factor models on the CD-SEI

Model specification	Goodness-of-fit indices							
	χ^2	χ^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: 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; * $p < .001$.

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, α 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).

Test-retest reliabilities

The test-retest reliability was calculated to examine the stability of the CD-SEI. Data were obtained from two samples. For sample 1, with prior consent, two

TABLE 3
Factor item loadings for the CD-SEI (Model 2) among total sample and sub-samples

Item number	Total sample (<i>N</i> = 6776)	Sub-sample 1 (girls, <i>n</i> = 3652)	Sub-sample 2 (boys, <i>n</i> = 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
Loading of first-order factors on the second-order factor			
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.

classes of students from a girls' school were invited to participate in the study (Grade 10, *n* = 38; Grade 12, *n* = 29; Age mean = 16.38, S.D. = 1.44). The questionnaires were administered in groups twice within a 6-week period. For sample 2, with prior consent, 42 boys and 20 girls in a co-educational school were invited to participate in the study (Grade 11, *n* = 36; Grade 12, *n* = 26;

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.)
<i>Total sample 1 (N = 6708)</i>								
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)
<i>Sub-sample 1 (girls, n = 3617)</i>								
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)
<i>Sub-sample 2 (boys, n = 3026)</i>								
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).

Age mean = 16.76, S.D. = .76). The questionnaires were administered in groups twice within an 8-week period. Correlation analyses of the pre-test and post-test scores were conducted. For sample 1, the category scores evidenced 6-week test–retest reliabilities (r ranged from .48 to .63 for the subscales; $r = .63$ for the total scale; $p < .01$). For sample 2, the category scores also evidenced 8-week test–retest reliabilities (r ranged from .34 to .60 for the subscales; $r = .60$, for the total scale, $p < .01$). This suggested that using the CD-SEI, the seven category scores and the total scores are fairly stable among the present samples of students.

Differences of career development between the subgroups

To examine the impact of gender, grade, and educational aspiration on adolescents' career development self-efficacy, a $2 \times 2 \times 2$ (Gender \times Grade \times

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 (Wilks' Lambda = .99, $F(6, 6067) = 14.33$, $p < .001$), grade (Wilks' Lambda = .99, $F(6, 6067) = 4.36$, $p < .001$), and educational aspiration (Wilks' Lambda = .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 and 13 students reported significantly higher scores than Grade 10 and 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 and 13 students are more confident than Grade 10 and 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

The results of the present study indicate that the 24-item 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 programme 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). 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, programme evaluation, and guidance personnel training in schools in Hong Kong and other parts of the world (Gysbers, 2000; Watkins, 2001). Hong Kong adolescents have average but not strong confidence in career development. In addition, the results of the analyses of the group differences show that students without plans for university study had less confidence in career development than those with such plans. These findings are consistent with the findings on educational and vocational aspirations of minority and female students in the U.S.A. (Mau & Bikos, 2000). This suggests that systematic comprehensive guidance programmes 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 programmes 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 programme activities providing useful feedback for outcome evaluation and improvement of the comprehensive guidance programme.

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 programmes 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 programmes. 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.

Conclusion

The present study is a 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 et al., 1994; O'Brian et al., 1997). In addition, cross-cultural studies would help to validate the newly developed Chinese version of CD-SEI among student samples in various Chinese communities.

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