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Author(s)	Yuen, M; Gysbers, NC; Chan, RMC; Lau, PSY; Shea, PMK
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Career and Talent Development

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Talent development, work habits, and career exploration of Chinese middle-school adolescents: Development of the *Career and Talent Development Self-Efficacy Scale*

Mantak Yuen

The University of Hong Kong, China

Norman C. Gysbers

University of Missouri-Columbia, USA

Raymond M.C. Chan

Hong Kong Baptist University, China

Patrick S.Y. Lau

The Chinese University of Hong Kong, China

Peter M. K. Shea

Hong Kong Council of the Church of Christ in China, China

Correspondence regarding this paper should be directed to Dr. Mantak Yuen at the

Faculty of Education, The University of Hong Kong, Pokfulam, Hong Kong China.

Fax: (852) 2858 5649. *E-mail address:* mtyuen@hkucc.hku.hk

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Talent development, work habits, and career exploration of Chinese middle-school adolescents: Development of the *Career and Talent Development Self-Efficacy Scale*

Abstract

This article describes the development of an instrument – the *Career and Talent Development Self-Efficacy Scale (CTD-SES)* – for assessing students’ self-efficacy in applying life skills essential for personal talent development, acquisition of positive work habits, and career exploration. In Study 1, data were obtained from a large sample of Chinese middle-school students ($N = 15,113$) in Grades 7 to 9 in Hong Kong. The *CTD-SES* is an 18-item questionnaire with subscales containing items that address students’ orientations toward developing their own talents, acquiring and applying positive work habits, and exploring their career possibilities. Evidence is provided for internal consistency, temporal stability, and factor structure of the *CTD-SES*. Goodness of fit statistics provided support for a three primary-factor-plus-higher -factor model, and this solution was used in the statistical analyses. The data also indicated that students with plans for university study reported significantly higher scores than those without on all three domains of career and talent development. In Study 2 ($N = 308$) Grade 10 high ability students’ scores in *CTD-SES* were correlated with scores in career decision self-efficacy and academic performance. The development and validation of *CTD-SES* is the first step toward investigating career exploration, work habits and talent development among Asian middle-school

adolescents.

Keywords: career development, talent development, work habits, self-efficacy,

assessment, Chinese, middle-school, adolescents, life skills, individual plan.

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Introduction

In recent years, educators have placed great importance on the principle that schools should equip students not only with knowledge and information, but also with life skills, strategies, and values that will enable them to become autonomous ‘lifelong learners’ who can fulfill their potential, enhance their quality of life, and contribute positively to society (Education Commission, 2000). In this connection, the term *career and talent development* denotes a positive approach to helping students strengthen and make optimum use of their abilities, with particular reference to (but not restricted to) preparation of specific expert skills (talents) necessary for working in a particular career field.

To achieve the goal of autonomy in learning, all students need to have confidence in their ability to learn, to solve problems, and to make decisions. Schools have a vital role to play in helping students develop these essential ‘life skills’ and values, and in fostering students’ positive beliefs in their own efficacy (Yuen, Gysbers, Hui, Leung, Lau, Chan & Shea, 2006). The progress that students make during the school years toward autonomy as learners – and in adult life – is influenced greatly by their beliefs concerning their self-efficacy (Bores-Rangel, Church, Szendre, & Reeves, 1990; Gainor, 2006).

During adolescence, three areas of life skills development (among others) are particularly important for autonomy, both in school and in later adult life – namely, the conscious development of ones' own talents, the acquisition of positive work habits and values, and an active involvement in making informed choices concerning career paths (Flouri & Buchanan, 2002). These areas of development are discussed here in more detail as they underpin the design of the instrument described in this paper.

Talent development

An important aspect of autonomy and competence embraces the ability of students to recognize and develop their talents and abilities to the full. Gagné (2003) described such talent development as a dynamic process in which natural abilities are transformed into aptitudes that are appropriate and necessary for particular occupations. Such transformation, Gagné says, comes about as a result of both instruction (training) and self-learning.

According to Simonton (2001), the process of talent development is complex, and undergoes many changes during adolescence. Although the encouragement of talent must obviously begin in the early school years, it should become a major focus of teaching and learning activities in the secondary school years. By this age, students' individual strengths, weaknesses, interests, and preferences are most easily

identifiable. Feldhusen (2003) advocated that talent development programs should focus mainly on students' self-perceived competencies as a starting point for intervention.

Unfortunately, not all students are strongly committed or motivated to develop their abilities through self-learning (Patrick, Ryan, Alfred-Liro, Fredricks, Hrada & Eccles, 1999) and schools therefore have a responsibility to identify students who need more direct encouragement and ongoing support. To sustain and enhance development, some adolescents need motivation to work for higher standards of performance (Boykin, 2000). In particular, it is vital that students develop increasingly positive beliefs concerning their ability to build upon their particular strengths. Students' beliefs about their abilities may influence their motivation to work toward their career and talent development (Lent, Brown, & Hackett, 1994). For this reason, students' self-efficacy has become an important construct in the counseling and career development literature (Bandura, 1977; Betz & Luzzo, 1996).

Positive work habits and values

Another essential feature of preparation for autonomy in lifelong learning is the development of positive work habits and values such as working consistently without supervision, taking full responsibility for completing tasks, managing time effectively, and assisting co-workers when necessary. For optimum progress, it is important for

students to have confidence in their self-efficacy in relation to executing work routines. Lapan (2004) suggested that:

Individuals who have incorporated positive work habits into their day-to-day dealings with workplace contexts will be more successful (in terms of both academic achievement and employment). Students and workers who have a strong work ethic will be more motivated to thoroughly complete a task in a high-quality manner (whether working on their own, in a team situation, or under another's supervision) (p.148).

In recent years, most schools have adopted teaching approaches that encourage students to develop greater independence in learning. Methods such as problem-based learning, resource-based learning, computer-assisted learning, individual learning contracts, and collaborative project work are all valuable for fostering positive work habits and values among students (Westwood, 2006). However, under any method of teaching, some students still fail to acquire positive habits, and therefore experience very little success. This negative experience can be detrimental to their perceived self-efficacy in matters of independent learning. It is important to identify students who display diminished confidence in their ability to complete tasks effectively, and to help them rebuild their lost confidence.

Career choices and decisions

A third key component of autonomy and competence during adolescence is the proactive ability to investigate possible future career pathways, and to make study plans and decisions based on one's knowledge, interests, talents and capabilities. Blustein (1989) suggested that such career exploration encompasses all activities inside and outside school that are directed toward enhancing knowledge of the self and awareness of the work environment.

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, et al., 1994) provide useful concepts for understanding young people's career development in Western societies. As in Western societies, Hong Kong middle-school adolescents are in a tentative stage of exploration of interests, aptitudes, and capacities. They need to develop realistic self-concepts, recognize their talents, learn about occupational opportunities, and have an interest in and knowledge about a range of occupations (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).

Goals for career guidance programs for early adolescence should include attention to self-awareness of talents, strengths and weaknesses, educational awareness, decision-making, economic awareness, occupational awareness, and work

attitudes (Drummond & Ryan, 1995). Researchers have contended that career development strategies in adolescents are closely related both to talent development (Olszewski-Kubilius, & Lee, 2004) and to the acquisition of work values (Gibson, 2004; Lien, 2005). The possession of work-related attributes (e.g. being on time, being reliable) is positively associated with adolescents' career maturity (Flouri & Buchanan, 2002).

The Hong Kong context

In Hong Kong, 'learning for life' has been the major mission of recent education reforms (Education Commission, 2000). Alongside the academic curriculum it is expected that all schools will now provide a comprehensive developmental guidance program to support students' personal growth and to facilitate the acquisition of necessary life skills (Education Department, 2001). Talent development programs – embracing enrichment activities, moral and citizenship education, aesthetic activities, physical activities, community service, and career-related experiences – have been organized in many schools (Curriculum Development Council, 2001; Education Department, 2000). However, there is still a lack of resource materials and systematic guidelines to help program planning and to help identify students with inadequate life skills (Yuen, Shea, Leung, Hui, Lau, & Chan, 2003). To rectify this deficiency the authors, with support from the Quality Education Fund and the Research Grant

Council, have recently developed a comprehensive guidance curriculum and materials for Grades 10-13, 7-9, and 4-6. The new curriculum covers the areas of Career and Talent Development, Academic Development, Personal Development and Social Development (Yuen et al., 2006). Although these areas are similar to those covered in guidance materials developed in the West (e.g. *Missouri Guidance Competency Evaluation Survey Grades 6-9*: Gysbers, Lapan, Multon, & Lukin, 1996), the specific content of Western curricula are often not directly applicable to Hong Kong schools or culture.

Assessing students' career and talent development

Even though career information and talent development programs have been implemented in schools in many parts of the world (e.g. Feldhusen, 2003, Gysbers, 2005; Prideaux, Patton, & Creed, 2002; Watts & Sultans, 2004), assessment of middle-school adolescents' self-efficacy in applying life skills for career and talent development has been hindered by a lack of psychometrically sound instruments.

After an extensive review of the pertinent literature the authors observed that none of the career development measures devised in the West (e.g. Guay, 2005; Levinson, Ohler, Caswell, & Kiewra, 1998) have been validated with Chinese middle-school adolescents. In addition, Sue and Chang (2003) pointed out that the use of Western assessment instruments with Asian populations raises serious issues concerning

equivalence in translation, validity, measurement units, and full-score comparability.

Even if the Western instruments were translated appropriately, they may not map well with the educational experiences of middle-school adolescents in Asia. Thus, career development researchers in Asia are faced with the challenge of either modifying Western derived instruments or developing culture-specific instruments for local use (Leong & Hartung, 2000).

With this in mind, it was considered important to develop a new instrument to evaluate Hong Kong students' perceptions of their self-efficacy in the life skill domains of talent development, work habits, and career exploration. Such an instrument could be used not only to identify students' strengths and deficiencies but also to assess the ongoing effectiveness of any intervention programs designed to enhance students' confidence in the application of life skills. Based on these concepts, and in particular, the self-efficacy theory of career development (Bandura, 1977; Betz, & Luzzo, 1996; Lent, et al., 1994) and the format of prior self-efficacy scale for Chinese high school students (e.g. Yuen, Gysbers, Chan, Lau, Leung, Hui, & Shea, 2005), the authors developed the new instrument described here to suit the Chinese middle-school context.

Study 1: Scale Construction, Confirmatory Factor Analysis

During the process of constructing and testing the instrument with a sample of

middle-school students in Hong Kong, it was also our aim to seek answers to the following questions: 1) what are the psychometric properties of the newly developed *Career and Talent Development Self-Efficacy Scale*? 2) Are there any gender differences in talent and career self-efficacy in this age group? and 3) Is there any difference in the scores in self-efficacy in applying career and talent development for those students with further education plans in mind and those without such plans?

Method

Participants

Ninety-six schools were systematically selected from the Education and Manpower Bureau's list of 470 secondary schools in various regions of Hong Kong. Eighty-seven schools returned completed questionnaires (response rate of 90.63%). In each school, classes of students were systematically selected from various Grade 7 to Grade 9 classes to participate in the survey. In total, 15,113 students completed the questionnaire (boys = 7,507; girls = 7,392; gender data missing on 214 students). Data indicated that the sample included students from Grade 7 (42.1%), Grade 8 (30.0%), and Grade 9 (27.0%) (mean age: 13.82, SD=1.30). Of the 15,113 students involved in the survey, 11,271 (74.6%) were born in Hong Kong.

Instrument Development

Career and Talent Development Self-Efficacy Scale (CTD-SES). The

questionnaire used in this study was specifically developed from an item pool contributed from an extensive review of local guidance curriculum materials used in middle schools and by three focus groups comprising 18 adolescents from 3 middle schools in Hong Kong. The items were rated for relevance to adolescents' career development, work values, and talent development and categorized by an expert panel of school guidance professionals. The 18-item questionnaire covered student competencies related to talent development, work habits and values, and career exploration with 6 items in each category (Yuen et al., 2006). Respondents were asked to rate their confidence in completing the tasks using a 6-point Likert scale, with 1 representing *extremely lacking in confidence* to 6 representing *extremely confident* (see Table 1). Personal particulars including gender, age, and grade were also collected from a personal data form. Additionally, using a yes/no format, respondents were asked whether they planned to go to a university. The instrument is available upon request from the first named author of this paper.

Procedure

Students in Grades 7 to 9 completed the questionnaires during class periods. Parents' consent was obtained for students' participation in the survey study. The classroom teachers in the 87 schools were responsible for the administration. It took students on average approximately 35 minutes to complete the questionnaire. The

students were all asked to indicate on the forms whether or not they had plans to go to a university after the end of their formal schooling.

Statistical analysis

The factor structure of the *CTD-SES* was investigated using the AMOS confirmatory factor analysis approach (Arbuckle & Wothke, 1999). Identical confirmatory factor analyses were carried out for the total sample and for two sub-samples. Sub-sample 1 comprised girls ($n = 7392$); sub-sample 2 contained boys ($n = 7507$). Based on the expert panel's judgment, the items in *CTD-SES* were classified into three categories and it was hypothesized that three specific factors would be distinguishable, namely *Talent Development* (items 1, 4, 7, 10, 13, 16), *Work Habits and Values* (items 2, 5, 8, 11, 14, 17), and *Career Exploration* (items 3, 6, 9, 12, 15, 18). In addition, a single second-order factor (*Career and Talent Development*) was hypothesized to account for the covariance among the three first-order factors. Inter-correlations, means, standard deviations, and reliabilities (internal consistency and test-retest) of the subscales scores and the total scale score were calculated.

A review of the empirical literature suggested that boys tended to be more confident than girls in self-realization (Yuen, Shea, Leung, Hui, Lau, & Chan, 2003); older students tended to score higher in career maturity than younger students (Kornspan & Etzel, 2001); and students with higher educational aspiration tender to

score higher in career self-efficacy than those with lower educational aspiration (Yuen, Gysbers, Chan, Lau, Leung, Hui, & Shea, 2005). To examine the impact of gender, grade, and educational aspiration on adolescents' career development self-efficacy, multivariate analysis of variance was applied using a 2 x 3 x 2 design (boy, n = 5626 vs. girl, n = 5937; Grades 7, n = 4873 vs Grade 8, n = 3475 vs Grade 9, n = 3215; plan for university, n = 8499 vs no plan for university, n = 3064), with talent development, work habits and values, and career exploration self-efficacy ratings as dependent variables. The MANOVA was conducted on the data from 11,552 adolescents.

Results and Discussion

Psychometric Properties

Table 1 summarizes the item means, standard deviations, and item-total correlations for the *CTD-SES*, based on data from the whole sample. It is noted that on a 6-point rating scale a mean above 4.0 can be taken as an indication of a reasonable level of confidence in self-efficacy. A mean score above 5.0 suggests a high level of confidence. Of the 18 items only one mean rating score was below 4.0, indicating that in general this sample of students had reasonable confidence in their self-efficacy across all three domains. No mean ratings above 5.0 were recorded; but the standard deviations reported in Table 1 indicate that some 16% of students probably did score above 5.0, expressing a high degree of confidence.

INSERT TABLE 1 ABOUT HERE

The factor analysis confirmed the existence of three factors corresponding to the three domains represented by the subscales, together with a second-order general factor that loaded on all three domains. This model provided a satisfactory fit for the data (the comparative fit index, CFI=.92; the standardized root-mean-square residual, SRMR=.040, and the root-mean-square error of approximation, RMSEA=.076; 90% confidence intervals, CI was .075 -.078), as the CFI is greater than .90 (Quintana & Maxwell, 1999), the value of the RMSEA in the fair fit range of .05 to .08 (Hu & Bentler, 1999), and the SRMR is less than .10 (Hu & Bentler, 1999). Table 2 shows that the three-factor model provided the slightly better fit for the data; but in fact the models were all fairly similar. Goodness of fit statistics also provided satisfactory but slightly less support for a one general factor model. Finally, the three primary factors with one higher-order factor model was selected for use in later analysis as it is the most consistent with the expert panel's original proposed structure of the *CTD-SES*. Figure 1 shows the standardized coefficients for the three factors and one higher-order factor in *CTD-SES* based on data from the whole sample. The three primary factors converged with relevance to the second order factor. All 18 items had loadings higher than .62. All the three factors had loadings higher than .93.

Insert Table 2 about here

Insert Figure 1 about here

Inter-correlations and internal reliability of the CTD-SES

Table 3 reports the inter-correlations, means, standard deviations, and reliabilities (alpha) of the subscales scores and the total scale score. The scores for Talent Development, Work Habits and Values, and Career Exploration subscales were moderately correlated (r ranged from .72 to .82). The internal consistencies of the Talent Development, Work Habits and Values, and Career Exploration subscales were adequate (alphas ranged from .84 to .87). The internal consistency of the total scale was very acceptable (alpha = .94).

INSERT TABLE 3 ABOUT HERE

Test-retest Reliability

Test-retest reliability was calculated to examine the stability for the three subscales of the *CTD-SES* over time. Data were obtained with prior consent from a class of Grade 7 students ($n = 37$; 22 boys, 15 girls; Mean age = 12.69; $SD = .57$).

Group administration of the questionnaire was completed twice within a 4-week period. Correlation analyses of the pre-test and post-test scores were conducted. The subscale scores and total score evidenced 4-week test-retest reliabilities (r ranged from .54 to .69 for the subscales; $r = .78$ for the total scale, $p < .01$). This suggested that using the *CTD-SES*, the three subscale scores and the total scores are fairly stable among the present sample of students.

Differences in Career and Talent Development between the Subgroups

MANOVA was conducted on the data from 11,552 adolescents. The overall results indicated significant main effects for Grade Level (Wilks' Lamda = .99, $F(6, 23098) = 22.71$, $p < .001$, Partial Eta Squared = .006), Gender (Wilks' Lamda = .99, $F(3, 11549) = 33.21$, $p < .001$, Partial Eta Squared = .009), and Educational Aspiration (Wilks' Lamda = .95, $F(3, 11549) = 203.13$, $p < .001$, Partial Eta Squared = .050). The eta squared values suggest that almost none of the variance was accounted for by grade level or gender. All interaction effects were non-significant.

To follow up with the significant main effect, univariate ANOVA was conducted on each of the life skills self-efficacy subscales with Gender, Grade Level and Education Aspiration as independent variables respectively. Using the Bonferroni procedure to adjust for multiple tests, each ANOVA was evaluated at the .0166 (i.e. $.05/3$ level). The results indicated that girls reported higher levels of self-efficacy

than boys in the work habits and values domain ($F(1, 14593) = 44.23, p < .001$, Partial Eta Squared = .003; boys' mean = 25.24, SD = 5.22; girls' mean = 25.79, SD = 4.82) and tended to be non-significantly higher in career exploration efficacy ($F(1, 14547) = 4.273, p = .03$, Partial Eta Squared = .000; boys' mean = 25.72, SD = 5.35; girls' mean = 25.90, SD = 4.98). There was no statistically significant difference between boys and girls in relation to the talent development subscale ($F(1, 14560) = .25, p > .0166$, Partial Eta Squared = .000).

It is interesting to note that student self-efficacy seems to decline a little with grade level. This trend is significant in the total score reported for the Career Exploration Subscale ($F(2, 14606) = 21.38, p > .001$, Partial Eta Squared = .003), Work Habits and Values Subscale ($F(2, 13920) = 51.37, p > .001$, Partial Eta Squared = .007), and Talent Development Subscale ($F(2, 14615) = 86.05, p > .0167$, Partial Eta Squared = .012). *Post hoc* Scheffe test results indicated that Grade 7 students scored higher than Grade 8 and Grade 9 students in talent development, work habits, and career exploration efficacy ($p < .05$).

On 'Educational Aspiration' effect, students with plans for university study reported significantly higher scores than those without on all three domains of career and talent development – Talent Development, $F(1, 11997) = 653.98, p < .001$, Partial Eta squared = .052; Work Habits and Values, $F(1, 12035) = 545.82, p < .001$, Partial

Eta squared= .043; Career Exploration, $F(1, 11991) = 528.07, p < .001$, Partial Eta squared= .042. The significant differences identified in these analyses suggest that girls are more confident concerning their work habits and values, grade 7 students are more confident than grade 8 & 9 students in talent development, work habits, and career exploration, and students who aspire to go to university have more confidence within the various career and talent development domains than those who do not.

Study 2: Construct and Criterion-related Validation

Based on the literature review, previous empirical findings suggested self-efficacy in career exploration, work habits, and talent development were positively associated with career decision self-efficacy and academic achievement (e.g. Betz & Luzzo, 1996). To examine the construct validity of the new instrument, the *Career Decision Self-efficacy Scale-Short Form* (CDSSES-SF; Betz, Klein, & Taylor, 1996; Yuen, 2002) was utilized because it had been used in previous studies with Chinese high school students (Hampton, 2006). With the kind permission of Professor Nancy Betz, the Chinese version of the 25 item CDSSES-SF was administered. Respondents reported their confidence in completing career decision tasks in self-appraisal, occupational information, goal selection, planning and problem-solving using a 5-point Likert scale that ranged from (1) *no confidence at all* to (5) *complete confidence*. The coefficient alpha ranged from .78 to .87 for the

subscales and .93 for the total scale (Betz, Hammond, & Multon, 2005). The total score derived from the measure was used in the present study. Higher total scores represent higher career decision self-efficacy. The alpha in the present sample was .93.

Use was also made of the students' Self-reported Academic Performance. Students were asked to indicate their grades in Chinese, English and Maths in recent school examinations from (5) A to (1) E or below. The scores in the Chinese, English and Maths were added up to give a total score of the students' Self-Reported Academic Performance. Cronbach's coefficient alpha for the academic performance score was .83 in the present sample.

Method

Four secondary schools with intake of high-ability student were invited to participate in Study 2. In each school, two Grade 10 classes were randomly selected to participate in the survey. In total, 308 students completed the questionnaire (boys = 99; girls = 204; gender data missing on 5 students; mean age: 15.55, SD=.80).

Results and Discussion

The correlations between the total and subscale scores of the *CDT-SES* and the scores of the *CDESES-SF* and *Self-Reported Academic Performance* were calculated. All intercorrelations were significant at $p < .001$. The *CTD-SES* scores were substantially related to career decision self-efficacy by *CDESES-SF* (r ranged from .54 to .73). The *CTD-SES* scores were correlated with academic performance (r ranged

from .16 to .29). The pattern of intercorrelations was consistent with expectations.

Career exploration self-efficacy is strongly correlated with career decision self-efficacy ($r = .73$). Academic performance is moderately associated with talent development self-efficacy ($r = .29$) and work habit self-efficacy ($r = .19$) but only slightly associated with career exploration self-efficacy ($r = .16$).

General Discussion

We believe our findings further the research on middle-school adolescents' career and talent development, particularly as measured by the multidimensional *CTD-SES*. The data collected in this study suggest that the *CTD-SES* could be used to assess students' self-efficacy in career and talent development and to identify the career and talent development needs among Hong Kong middle-school adolescents (Nunnally & Bernstein, 1994). The confirmatory factor analysis indicated that there were three primary factors (Talent Development, Work Habits and Values, and Career Exploration) and one higher-order factor (Career and Talent Development). The three domains and their related items could also provide the much-needed foundation for career education program development in schools.

Regarding research question 1, the results of the present study indicated that the 18-item scale has adequate-to-strong psychometric properties. Internal consistencies were more than .80 for the subscales and .90 for the total scale. The 4-week test-retest

reliabilities for the total scale were more than .75. Evident for construct validity was offered in the present study by finding the predicted associations with measure of career decision self-efficacy (CDSES-SF; Betz, Klein, & Taylor, 1996) and academic performance.

The *CTD-SES* has practical implications for comprehensive counseling and 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). The present findings indicated that most Hong Kong adolescents have reasonable confidence in career and talent development, although the level of self-confidence reduces slightly as students get older.

In relation to research question 3, the findings showed that students who aspire to go to university have more confidence in applying career and talent development life skills than those who do not. This suggested that having a growth plan with some long-term career or study goals is important for students, in particular for talented students (Feldhusen & Wood, 1997). Students without plans for university study later exhibited less confidence in career and talent development than those students with such plans. In addition, students' connectedness to teachers and peers is substantially linked to their confidence in career and talent development. Schools obviously have a role to play in helping students formulate career and study goals as well as enhancing

positive interactions among teachers and students. Systematic comprehensive guidance programs and talent development opportunities should be provided in schools to enhance students' competencies and beliefs in their own abilities in career and talent development (Helwig, 2004). This is worthy of additional study, in particular, on the influences of individual student planning on student development.

Career and talent 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 three primary factors and one higher-order factor model of career and talent development self-efficacy suggest that Chinese adolescents have a holistic view of career and talent development competencies that involves the interaction of interests, abilities and the world of work. The higher order factor of Career and Talent Development could represent the students' self-awareness in relation to their talents and the world of work. It should be noted that Work Habits and Values emerged as a highly correlated but independent factor from the factors in talent development and career development. This could mean that students considered positive work habits to be important in their career and talent development in the Hong Kong Chinese context.

Qualitative investigations that examine adolescents' perceptions might provide additional insight into the role of work habits, attitudes and values on adolescents'

career and talent development. Career and talent development practitioners in Hong Kong and other Confucian societies should not rely wholly 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.

The confirmed multi-dimensional construct of career and talent development self-efficacy suggests that guidance personnel need to be knowledgeable about various facets of students' career and talent development. 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). With regard to developing a guidance curriculum, the *CTD-SES* could be used to assess students' self-efficacy in career and talent development (Yuen, et al., 2006). This information could provide guidance personnel with a profile of students' strengths and areas needing improvement across various grades, classes, and gender in the school.

Furthermore, the *CTD-SES* could help students themselves understand and monitor their own confidence in managing various career and talent development tasks. They could consult guidance personnel on ways to enhance their life skills, career and talent development; and they could nominate themselves to participate in

appropriate talent development opportunities (Olszewski-Kubilius & Lee, 2005). In addition, the *CTD-SES* could be used to assess how students' self-efficacy in career and talent development changes over a certain period of time, for example before and after exposure to a comprehensive guidance program, talent development activities, or career-related experiences. The data collected could provide useful feedback for outcome evaluation and improvement of the student development program.

Limitations in the study and future research

Although the present work is an important step toward better understanding of Chinese adolescents' talent development, work habits, and career exploration in the Asian context, it must be acknowledged that there are limitations in this study. First, the sample of middle-school adolescents in the present study was from voluntarily participating schools. These schools where staff showed interest in this topic of research may also be the schools that tend to put more effort into implementing comprehensive guidance and talent development programs. Future research should administer the *CTD-SES* to check self-efficacy beliefs in samples of students from schools where comprehensive guidance programs are absent or less fully implemented. Another research direction would be to investigate longitudinally the students' *CTD-SES* scores and academic achievements as comprehensive guidance programs are more fully implemented in Hong Kong schools.

Second, the moderate-to-high inter-correlations among the subscales, often regarded as undesirable in an instrument of this sort, may occur here because the *CTD-SES* subscales share method and related career competencies. Having said that, the results of confirmatory factor analysis and adequate internal consistency suggest that both the total scale scores and subscale scores do provide useful information on students' career development self-efficacy.

In future research, it would be important to show the criterion-related validity and its nomological network of the *CTD-SES* by comparing it 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 examine the relationship between perceived career and talent development self-efficacy and actual performance in career-related tasks. Furthermore, a longitudinal study of the impact of career interventions in schools will be required to detect any changes of career and talent development efficacy among adolescents as a result of such interventions. In addition, further studies would help to validate the newly developed Chinese version of *CTD-SES* among middle, early and older adolescent samples in various Chinese communities and from various social classes. It would also be interesting to translate, validate and use the *CTD-SES* to compare career and talent development self-efficacy in other cultural groups.

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Table 1

*Item Means, Standard Deviations, and Item-Total Correlations for the CTD-SES**(n=15,113)*

Subscale and Items	Item Means	Item SD	Scale ITRs*	Sub-Scale ITRs*
<i>I am confident that I can</i>				
<i>Talent Development</i>				
1. Explore my capabilities in academic subjects.	4.25	1.13	.66	.63
4. Recognize my potential strengths in extra-curricular activities.	4.38	1.15	.61	.74
7. Achieve the academic goals I set myself.	4.18	1.11	.56	.62
10. Choose recreational activities in which I am interested.	4.78	1.03	.60	.58
13. Actively participate in different kinds of activities and contests to enrich my experience.	4.30	1.19	.67	.68
16. Achieve the goals set in extra-curricular activities.	4.26	1.12	.72	.71
<i>Work Habits and Values</i>				
2. Work autonomously.	4.13	1.12	.67	.69
5. Have the courage to take on responsible tasks.	4.51	1.01	.62	.59
8. Work systematically on allocated tasks.	4.14	1.10	.69	.70
11. Finish allocated work on time.	4.30	1.11	.65	.66
14. Take the initiative to help others.	4.50	1.07	.61	.54
17. Allocate time appropriately for studying, playing and taking rest.	3.96	1.26	.61	.60
<i>Career Exploration</i>				
3. Explore my career path and goal.	4.22	1.17	.70	.69
6. Cultivate my interests according to the career I choose.	4.41	1.11	.70	.70
9. Understand the pre-requisites of different jobs.	4.29	1.09	.65	.64
12. Understand the relationship between subjects that I am studying and my career path.	4.23	1.07	.70	.69
15. Understand the relationship between the present campus life, further study and future career.	4.27	1.08	.68	.67
18. Inform others of the job that I would like and have confidence in.	4.40	1.15	.65	.59

ITR = Item Total Correlation

Table 2

Results of Confirmatory Factor Analyses on the CTD-SES: Fit Indices for the Respective Models

Model	χ^2	<i>df</i>	CFI	SRMR	RMSEA	CI		Change χ^2	Change <i>df</i>
1.	12076.130	134	.918	.040	.077	.076-.078			
2.	11662.114	132	.921	.039	.076	.075-.077	1vs2	414.016*	2
3.	15274.026	135	.896	.043	.086	.085-.087	1vs3	3197.896*	1

Note. Models: 1=three factors with one higher order factor; 2=three factors; 3=one factor. χ^2 =Chi-squared; CFI=Comparative Fit Index; SRMR=standardized root mean square residual; RMSEA= root mean square error of approximation; CI=95% Confident Interval; N=15149

* $p < .05$

Table 3

Subscale Inter-correlations and Summary Statistics for the Three Subscales and Total Scale of the CTD-SES

Subscales	1	2	3	Coefficient Alpha	Item Means Mean (Scale SD)
<i>Total sample (N= 15113)</i>					
1 Talent Development	-			.86	4.36 (5.21)
2 Work Habits & Values	.77**	-		.85	4.25 (5.03)
3 Career Exploration	.82**	.75**	-	.87	4.30 (5.18)
4 Total Scale	.94**	.91**	.93**	.94	4.31 (14.25)
<i>Female sample (n= 7392)</i>					
1 Talent Development	-			.87	4.35 (5.00)
2 Work Habits and Values	.76**	-		.85	4.30 (4.82)
3 Career Exploration	.81**	.72**	-	.87	4.32 (4.98)
4 Total Scale	.93**	.90**	.92**	.94	4.33 (13.56)
<i>Male sample (n= 7507)</i>					
1 Talent Development	-			.86	4.37 (5.39)
2 Work Habits and Values	.78**	-		.84	4.21 (5.22)
3 Career Exploration	.83**	.78**	-	.87	4.29 (5.35)
4 Total Scale	.94**	.92**	.94**	.94	4.29 (14.88)

**Correlation is significant at the 0.01 level (1-tailed).

Figure 1. The measurement model of CTD-SES: whole sample

