

## **Psychometric Properties of the Career and Talent Development Self-Efficacy Scale When Used With University Students in China**

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In recent years, increasing importance has been placed on enhancing the knowledge, skills, attitudes, and competencies of university students in China related to career and talent development. There is therefore an increasing need for guidance activities and assessment tools for this purpose. In this study, we examined the validity, reliability (internal consistency) and factorial structure of the *Career and Talent Development Self-Efficacy Scale* (CTD-SES) using a sample of 466 university students in the Chinese mainland. Results from exploratory factor analyses suggested some necessary modifications to the original “three primary factors plus higher factor” model underpinning the CTD-SES. Goodness of fit was improved through specific path modifications to the original model, as assessed by confirmatory factor analyses. The present study supported the psychometric properties of the CTD-SES when

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used with a different age group and in a different Chinese community from that used in the original study in Hong Kong.

*Keywords:* career development; talent development; work habits; self-efficacy; validity; China; university students

Students' career development competencies comprise knowledge, skills and attitudes necessary for successful transition from university to work. Universities are believed to play a vital role in helping students develop career awareness and the relevant competencies, especially for students in their final stage before transitioning into the world of work (Fisher & Stafford, 1999; M. Yan, 2008). Along with the reform of higher education in China, career guidance programs and relevant service have been implemented since the beginning of the 21st century (Li, 2002). During the past decade, university enrollment has been expanding (State Council of China, 1999) while employment opportunities has been diminishing (Gao, 2009); so helping students acquire career-related competencies becomes a major contemporary challenge facing all universities in China. This has created a need for culture-specific guidance activities and assessment tools for local use in China (Sun & Yuen, 2012; Wu, 2008).

Researchers in Hong Kong created the term *career and talent development* to describe an approach to helping students strengthen and make optimum use of their abilities — in particular, with reference to preparing specific expert skills (talents) necessary for working in a particular vocational field (Yuen, Gysbers, Chan, Lau, & Shea, 2010). Within the career and talent development domain, three areas of life skills development are regarded as particularly important for autonomy in lifelong learning, namely personal development of talents, the acquisition of positive work habits and values, and an active involvement in career exploration (Flouri & Buchanan, 2002; Yuen,

Gysbers, Chan, Lau, & Shea, 2010). This highlights the need of universities to provide a comprehensive approach to career guidance that identifies a student's strengths and weaknesses while focusing on "whole person" development in the application of life skills.

### **Career and Talent Development for University Students in China**

According to Gagné (2003), talent development is a dynamic process in which natural aptitudes are transformed into necessary abilities that are adaptive to specific occupations. In the case of China, most academic tasks and assignments that are potentially pertinent to career and talent development occur in their secondary school years, but rely mainly on teacher-directed methods. While such methods may be effective for teaching curriculum content and preparing for examinations, they are often not very effective for encouraging self-management and initiative. Most middle schools focus on preparation for university entrance examination, and the career-related exploration (i.e., investigating possible future career pathways, or making study plans and decisions) is always left to the later stage of university life. For students in universities, there are much greater demands for autonomy and self-regulation (D. M. Zhao & Gou, 2010). Compared to secondary school life, university students need to work consistently without supervision, take full responsibility for completing tasks, manage time effectively, cooperate with peers, and assist classmates when necessary. This paves the way to acquisition of positive work values, habits, and attitudes for lifelong learning (Gibson, 2004). Career exploration becomes particularly important for university students to enhance their other career development competencies for successful transition from school to work.

After an extensive review of the literature on career and talent development, the authors observed two categories of relevant

instruments used in China. The first category aims to assess habits or behaviors related to talent development, such as the *Learning Habit Scale* (H. Y. Feng, 2002; Y. Q. Yan, 2011), the *Learning Adaptability Scale* (Ma, 2005) used with primary and secondary school students, and the *Learning Adjustments Scale* (T. Y. Feng, Su, Hu, & Li, 2006) designed for undergraduates. The second category of instruments aims to assess career-related self-efficacy, such as the *Career Decision-Making Self-Efficacy Scale — Short Form* (F. X. Zhao, 2005) and scales measuring career self-efficacy in traditional gender-role domains (e.g., Guo & Jiang, 2003). These scales mainly focus on assessing self-efficacy in vocational areas. None of the existing instruments developed in the Chinese mainland appeared to measure comprehensive factors involved in career and talent development as defined by Yuen, Gysbers, Chan, Lau, & Shea (2010).

### **Self-efficacy: A Significant Factor Influencing Career and Talent Development**

At the individual level, a significant factor influencing career and talent development is self-efficacy — one’s beliefs about one’s own competencies and ability to succeed (Bandura, 1977, 1997; Betz & Hackett, 1983; Betz & Luzzo, 1996; Lapan, Gysbers, Multon, & Pike, 1997). University students’ beliefs about their own abilities may influence their motivation to focus constructively on their career and talent development (Lent, Brown, & Hackett, 1994). For this reason, students’ self-efficacy has become an important construct in counseling, and in the literature on career development (Bandura, 1977; Betz & Luzzo, 1996). Career development theories such as “social cognitive career theory” (Lent et al., 1994) provide useful concepts for understanding young people’s career development. For optimum effect, it is important for students to have confidence in their self-efficacy concerned with executing work-related routines (Yuen, Gysbers, Chan,

Lau, & Shea, 2010). In particular, for university students, it is vital to foster increasingly positive beliefs concerning their ability to build upon their particular strengths and overcome frustrations. However, often this factor is neglected by vocational psychologists and practitioners in China, who tend to focus their attention and assessments mostly on students' skills acquisition and aptitudes.

With these issues in mind, we selected the *Career and Talent Development Self-Efficacy Scale* (CTD-SES) (Yuen, Gysbers, Chan, Lau, & Shea, 2010) as the most appropriate instrument to explore career-related self-efficacy in the Chinese mainland context. The instrument is available in both Chinese and English languages. Its validity and reliability were first confirmed with a large sample of middle school students (aged 12 to 17) in Hong Kong. It is an instrument that could be used not only to identify students' strengths and deficiencies but also to measure the ongoing effectiveness of any intervention programs designed to improve students' confidence in the application of life skills.

### **Key Features of the CTD-SES**

The CTD-SES was developed based on the self-efficacy theory of career development (Bandura, 1977; Betz & Luzzo, 1996; Lent et al., 1994) and following the format of a prior self-efficacy scale for Chinese middle school students (e.g., Yuen, Gysbers, Chan, Lau, Leung, et al., 2005). The CTD-SES is an 18-item self-report measure with three subscales, namely *Talent Development*, *Work Habits and Values* (hereafter referred to as *Work Values*), and *Career Exploration*. Six items were allocated to each subscale (see Table 1 for details). Using a 6-point Likert scale, respondents are asked to rate their own confidence in various aspects of performance or behavior as described in each item.

In the Hong Kong study, a large sample of students from Grade 7 to Grade 9 (i.e., Secondary 1 to Secondary 3) ( $N = 15,113$ ) completed the questionnaires. The factor structure of the CTD-SES was then examined through confirmatory factor analyses (CFA). An underlying “three primary factors plus higher factor” model was confirmed, with the comparative fit index (CFI) = .92, standardized root-mean-square residual (SRMR) = .040, the root-mean-square error of approximation (RMSEA) = .076, and 90% confidence intervals (CI) was [.075, .078]. All 18 items had loadings higher than .62, and all three factors higher than .93. With this solution model, follow-up statistical analyses discovered that the inter-correlation scores for *Talent Development*, *Work Values*, and *Career Exploration* subscales were moderately correlated ( $r$  ranging from .72 to .82), internal consistencies of those subscales were adequate with Cronbach’s alphas ranging from .84 to .87, and the internal consistency of the total scale was very acceptable with  $\alpha = .94$ . Test-retest reliability for the scale over a 4-week period ranged from .54 to .69 for the subscales, and .78 for the total scale ( $p < .01$ ), representing fairly stable responses over time among that sample of students.

The construct validity of the CTD-SES was examined by correlations with the *Career Decision Self-Efficacy Scale — Short Form* (Betz, Klein, & Taylor, 1996; Yuen, 2002) and the *Self-Reported Academic Performance*. The CTD-SES scores were substantially related to career decision self-efficacy and positively correlated with academic performance.

Subgroup differences in career and talent development focused on gender, grade level, and educational aspiration. The overall results of multivariate analysis of variance (MANOVA) indicated significant main effects for grade level, gender, and educational aspiration. Further results, using univariate analysis of variance (ANOVA), showed that

girls scored higher than boys in *Work Values* and *Career Exploration* domains. In particular, their work values scores were statistically significantly higher than those of boys. It was also noted that student self-efficacy declined with grade level, and this trend was significant in the three subscales. Participants with plans for university study produced significantly higher scores than those without such plans in all three domains.

It should be noted that the inter-correlations among the subscales in the initial studies were moderate to high, which is often regarded as undesirable in an instrument of this type. This association among the subscales of the CTD-SES may occur because the subscales, although assessing self-efficacy in three domains, shared related career competencies. Yuen, Gysbers, Chan, Lau, & Shea (2010) pointed out that it might be due to a single second-order factor accounting for the covariance among the three first-order factors.

In an article examining psychometric properties of instruments, Su, Li, and Cheng (2009) suggested that internal consistencies might vary within a certain range along with the variations within the sample. They also suggested that Cronbach's alphas for an instrument should not be too high (e.g.,  $> .90$ ) because that may reflect a degree of repetition or commonality of content across some items. This viewpoint may apply to the CTD-SES, where the total scale alpha was as high as .94 in the initial study.

### **Validation of the CTD-SES in China**

To establish the usefulness of any research instrument, it is essential to explore its application with specific populations and for different purposes (American Educational Research Association, 1999). We considered that the CTD-SES had potential value for use in the Chinese mainland, but required further validation due to different socio-economic

context and some basic cultural differences between the Chinese mainland and Hong Kong. The present survey was designed to examine the psychometric properties of the CTD-SES with university students (aged 18 to 22) in the Chinese mainland.

Specifically, exploratory factor analyses (EFA) using SPSS 17.0 and CFA using LISREL 8.70 (Hau, Wen, & Cheng, 2004) were both used to support the internal consistency and factor structure. Wen and Ye (2011) have suggested that the internal consistency of an instrument would support the validity more strongly through combination of factor analyses. This was partly conducted through CFA in the initial study.

Based on the findings of the initial study in Hong Kong, we expected to replicate the scale's "three primary factors plus higher factor" structure in the present sample. Meanwhile, as the CTD-SES revealed moderate-to-high inter-correlations among the subscales in the initial studies (Yuen, Gysbers, Chan, Lau, & Shea, 2010), path loading modifications would be done to rationalize any overlapping relationships between items and subscales. It was also possible to investigate differences in career and talent development self-efficacy across grade level of the students, as suggested by some researchers in China (e.g., M. Yan, 2008).

## **Method**

### ***Participants and Procedures***

This validation study was conducted in Sun Yat-sen University, a comprehensive university in South China. It has a full range of disciplines, and its intake of students has a balanced gender ratio, thus allowing us to consider participants' gender and major study field when analyzing results. To examine the difference between students who were just enrolled in the university and those who were about to graduate, the



sample students were mainly focused on freshmen (Year 1) and seniors (Year 4).

Data collection was conducted through cooperating with career guidance courses in the sample university. Students in eight classes of career guidance courses in each grade were selected. These classes covered different fields of major study (Science, Liberal Arts, Medicine, and Business). Students were recruited to complete the online surveys as part of their assignments for the course. They completed the survey at their leisure by receiving the link to the Web-based survey via e-mail. All senior students completed the online questionnaire in this way. Some freshmen who could not access the Internet conveniently completed a paper version of the same questionnaire. Eventually, 105 completed paper questionnaires were returned to the authors by this means.

In total, 466 completed surveys were received (males = 216, females = 250; freshmen = 209, seniors = 257), with a response rate of 96.53%. Data indicated that the sample included students from different major study fields (Science, 24.9%; Liberal Arts, 24.5%; Medicine, 23.8%; Business, 26.8%).

### ***Instruments***

The CTD-SES (Yuen, Gysbers, Chan, Lau, & Shea, 2010) was used for assessing respondents' career and talent development self-efficacy. As explained above, the CTD-SES is an 18-item questionnaire with 3 subscales. Responses can range from 1 (extremely lacking confidence) to 6 (extremely confident). Permission for use of the CTD-SES (Chinese version) was received from the third author of this article.

Demographic items, including gender, grade, and major study field, were collected on a personal data form.

## Results

### *Psychometric Properties*

Before merging the data derived from online survey ( $n = 104$ ) and paper questionnaire ( $n = 105$ ) into the total sample of freshmen, Independent-Samples T Test analysis was performed to examine whether there was any significant difference in item score between the two samples in each item of the CTD-SES. Results supported the equivalence of item scores between these two versions and thus they were combined for follow-up analysis.

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 score above 4.0 can be taken as an indication of a reasonable level of confidence in self-efficacy, and a mean score above 5.0 suggests a high level of confidence. Results revealed that all mean rating scores of the 18 items were above 4.0, and the mean score for the total scale reached 4.56. This suggests that in general this sample of students expressed a reasonable level of confidence in their self-efficacy across all three domains.

### *EFA for the CTD-SES*

According to Yuen, Gysbers, Chan, Lau, & Shea (2010), the subscales in the CTD-SES were classified into three domains, which were also hypothesized to be distinguishable. They were *Talent Development* (items 1, 4, 7, 10, 13, 16), *Work 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.

**Table 1. Item Means, Standard Deviations and Item-Total Correlations (ITR) for the CTD-SES (N = 466)**

Subscale and Item: <i>I am confident that I can ...</i>	Item mean	Item SD	Scale ITR	Subscale ITR
<b>Talent Development</b>				
1. Explore my capabilities in academic subjects.	4.58	1.09	.62	.70
4. Recognize my potential strengths in extra-curricular activities.	4.56	1.03	.68	.76
7. Achieve the academic goals I set myself.	4.58	.97	.62	.62
10. Choose recreational activities in which I am interested.	5.02	.92	.52	.61
13. Actively participate in different kinds of activities and contests to enrich my experience.	4.44	1.10	.67	.74
16. Achieve the goals set in extra-curricular activities.	4.30	.97	.70	.75
<b>Work Values</b>				
2. Work autonomously.	4.47	1.14	.63	.76
5. Have the courage to take on responsible tasks.	5.08	.89	.58	.66
8. Work systematically on allocated tasks.	4.54	.98	.61	.73
11. Finish allocated work on time.	4.82	.87	.59	.71
14. Take the initiative to help others.	4.94	.88	.53	.55
17. Allocate time appropriately for studying, playing and taking rest.	4.28	1.08	.65	.71
<b>Career Exploration</b>				
3. Explore my career path and goal.	4.36	1.09	.72	.76
6. Cultivate my interests according to the career I choose.	4.67	.92	.66	.72
9. Understand the prerequisites of different jobs.	4.17	1.06	.53	.64
12. Understand the relationship between subjects that I am studying and my career path.	4.39	1.11	.57	.72
15. Understand the relationship between the present campus life, further study and future career.	4.36	1.00	.66	.78
18. Inform others of the job that I would like and have confidence in.	4.61	1.01	.68	.71

To examine the hypothesis of Yuen, Gysbers, Chan, Lau, & Shea (2010) with this mainland sample, EFA were firstly carried out. Kaiser-Meyer-Olkin (KMO) & Bartlett's Test (see Table 2) showed that the CTD-SES was very suitable for EFA (KMO > 0.9) (Yu & He, 2003).

**Table 2. Results of EFA on the CTD-SES: Kaiser-Meyer-Olkin (KMO) & Bartlett's Test (N = 466)**

The degree of sampling enough KMO measure	Bartlett spherical degrees inspection		
	Chi-squared approximations	df	Sig.
0.917	3325.396	153	.000

Principal Component Analysis indicated that there were 3 factors extracted, which together accounted for 54.60% of the total variance.

Rotating orthogonal factor with Kaiser Normalization Method, the rotated component matrix (Table 3) reported that items 1, 4, 10, 13, 16 belonged to factor 1 (*Talent Development*), items 2, 8, 11, 17 belonged to factor 2 (*Work Values*), items 3, 6, 9, 12, 15, 18 belonged to factor 3 (*Career Exploration*). This was consistent with the original hypothesis of Yuen, Gysbers, Chan, Lau, & Shea (2010), but items 5, 7 and 14 were not based on the assumed conditions. These three items would be examined through path modification in CFA later on.

### ***CFA for the CTD-SES***

Based on the hypothesis of Yuen, Gysbers, Chan, Lau, & Shea (2010) and the results of EFA for the CTD-SES, two potential principal models of factor structure for the CTD-SES were derived. Model 1 was based on the original hypothesis, namely three first-order factors and one second-order factor. Model 2 was a model consistent with rotating orthogonal factor in EFA. These two models, and a possible related

**Table 3. Results of EFA on the CTD-SES: Rotated Component Matrix**

	Component		
	1	2	3
Item 1	.598		
Item 4	.773		
Item 7	.157	.673	
Item 10	.526		
Item 13	.792		
Item 16	.419		
Item 2		.936	
Item 5	.509	.255	
Item 8		.728	
Item 11		.410	
Item 14	.556	.020	
Item 17		.727	
Item 3			.492
Item 6			.420
Item 9			.600
Item 12			.894
Item 15			.798
Item 18			.413

model (Model 3), were investigated through CFA for the total sample. Goodness of fit statistics provided comparisons of the three models (see Table 4). Model 1 was acceptable in most indices except the RMSEA (.099) as the CFI should be greater than .90 (Quintana & Maxwell, 1999), the value of the RMSEA in the fair fit range of .05–.08 (Hu & Bentler, 1999), and the SRMR less than .10 (Hu & Bentler, 1999). Based on Model 1 and the modification index, in Model 2 a path was added from item 7 to the subscale *Work Values*; and item 14 was linked to the subscale *Talent Development*. Model 2 showed a slightly better fit for the data (RMSEA < .084, close to an acceptable value). In order to find a still better model, path modification of item 5 was linked to subscale *Talent Development* (i.e., Model 3), but the modification turned out to be of little effect. The rationale for these path modifications will be explained later.

**Table 4. Results of CFA on the CTD-SES: Fit Indices for the Respective Models (N = 466)**

Model	$\chi^2$	df	CFI	SRMR	RMSEA	CI
1	637.59	132	.95	.063	.099	.092– .11
2	545.24	130	.96	.060	.084	.077– .091
3	546.59	132	.95	.060	.084	.077– .091

- Notes: 1. Model 1 — factor structure in line with the original hypothesis of Yuen, Gysbers, Chan, Lau, & Shea (2010);
2. Model 2 — based on Model 1, a path was added from item 7 (belonged to the subscale *Talent Development*) to the subscale *Work Values*, and item 14 (belonged to the subscale *Work Values*) was linked to the subscale *Talent Development*;
3. Model 3 — based on Model 2, item 5 was linked to the subscale *Talent Development*;
4.  $\chi^2$  = chi-squared; df = degree of freedom; CFI = comparative fit index; SRMR = standardized root-mean-square residual; RMSEA = root-mean-square error of approximation; CI = 95% confident interval.

According to Lu (2008), cross-loadings were acceptable and they were important features for model structure, so Model 2 (two cross-loadings paths were added based on the “three primary factors plus higher factor” model) was selected for use in later analysis. It is both consistent with the expert panel’s original proposed structure of the CTD-SES, and with the data analysis on the sample in this survey.

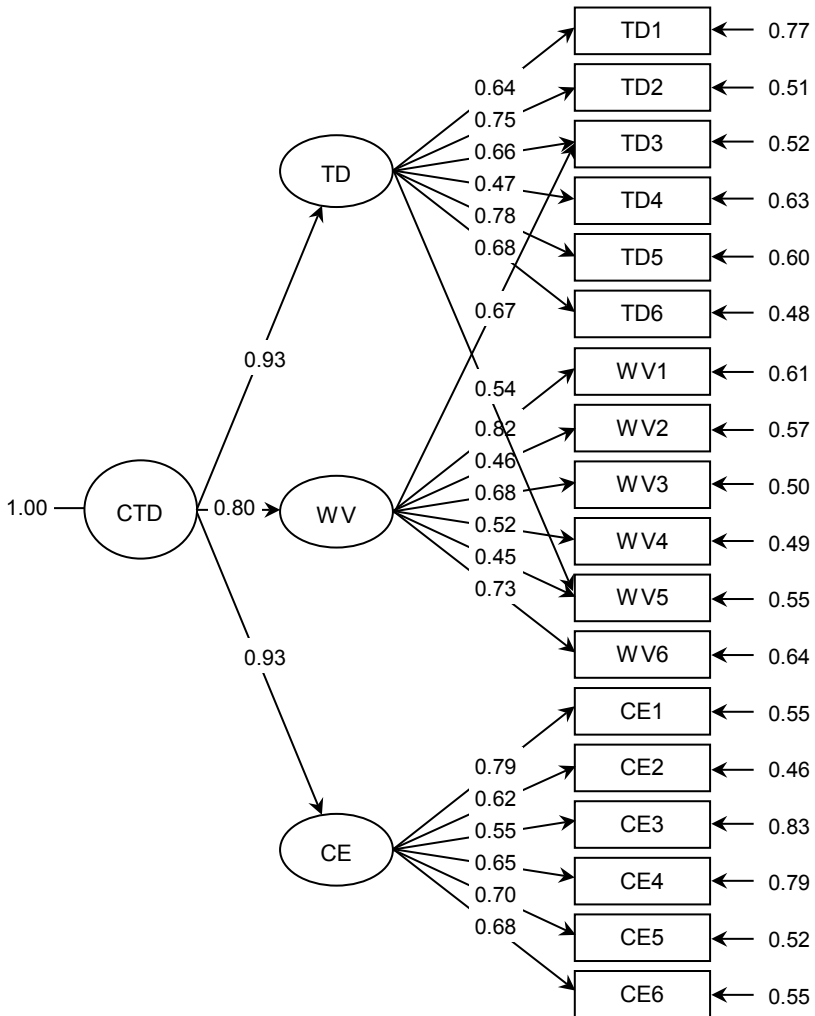
Figure 1 shows the factorial structure and standardized coefficients for Model 2 of the CTD-SES, based on data from the whole sample. The three primary factors converged with relevance to the second-order factor. All 18 items had loadings higher than .45. All three factors had loadings higher than .80.

***Inter-correlations and Internal Consistencies for Subscales and the Total Scale***

Table 5 reported the inter-correlations, means, standard deviations, and reliabilities (alphas) of the subscale scores and the total scale score.

The scores for *Talent Development*, *Work Values*, and *Career Exploration* subscales were only moderately correlated ( $r$  ranging from .62 to .72), lower than similar  $r$ 's in the original Hong Kong study.

**Figure 1. The Measurement Model of the CTD-SES: Model 2**



Notes: CTD = Career and Talent Development; TD = Talent Development; WV = Work Values; CE = Career Exploration.

**Table 5. Subscale Inter-correlations and Summary Statistics for the Three Subscales and Total Scale of the CTD-SES (N = 466)**

Subscale	1	2	3	Coefficient alpha	Item mean (Scale SD)
1. Talent Development				.790	4.58 (.71)
2. Work Values	.703**			.777	4.69 (.67)
3. Career Exploration	.716**	.620**		.812	4.43 (.74)
4. Total scale	.910**	.866**	.885**	.907	4.56 (.63)

\*\*  $p < .01$  (1-tailed)

The internal consistencies of the *Talent Development*, *Work Values*, and *Career Exploration* subscales were quite adequate (alphas ranging from .78 to .81). The internal consistency of the total scale was very acceptable (alpha = .91).

### ***Difference Between Grade Level Groups***

In Table 6, it is interesting to note that freshmen had higher self-efficacy than seniors in this sample, and the difference reached a significant level in relation to the total scale ( $p < .05$ ). Of the three subscales, *Talent Development* ( $p < .02$ ) and *Work Values* ( $p \leq .005$ ) showed significant differences, but the difference for *Career Exploration* ( $p = .819$ ) was non-significant.

### **Discussion**

The present study provides support for the psychometric properties of the CTD-SES, a recently developed measure to assess students' self-efficacy in career and talent development. Modifications made to cross-loading paths in this study improved the factorial model underpinning the CTD-SES, and CFA results supported the model across samples (three primary factors — *Talent Development*, *Work Values*, and *Career Exploration*, and one higher-order factor — *Career*



**Table 6. Results of Independent-Samples T Test on the CTD-SES (Grade as Independent Variable)**

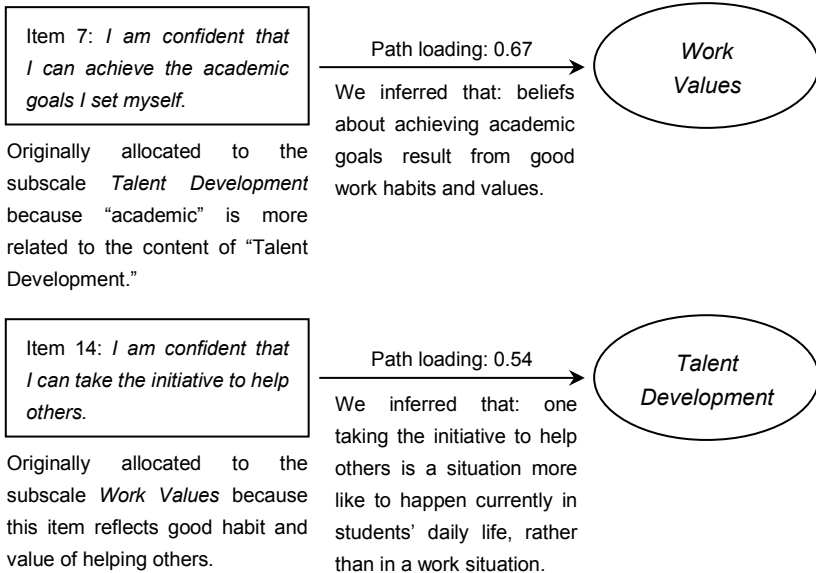
	Grade	<i>N</i>	Mean	<i>SD</i>	<i>t</i>	<i>p</i>
CTD	Freshmen	209	4.63	.58	2.03	.043
	Seniors	257	4.51	.66		
TD	Freshmen	209	4.67	.65	2.49	.013
	Seniors	257	4.51	.74		
WV	Freshmen	209	4.78	.62	2.82	.005
	Seniors	257	4.61	.70		
CE	Freshmen	209	4.44	.72	.23	.819
	Seniors	257	4.42	.76		

Notes: CTD = Career and Talent Development; TD = Talent Development; WV = Work Values; CE = Career Exploration.

and Talent Development). Additionally, internal consistencies showed the reliability of the measure.

The rationale for modifying the paths (see Figure 2) was as follows. We originally classified the 18 items of the CTD-SES into 3 subscales. After careful semantic analysis of the 18 items, especially two items that were modified for path loadings (Item 7: “*I am confident that I can achieve the academic goals I set myself*” and Item 14: “*I am confident that I can take the initiative to help others*”), we inferred that beliefs about achieving academic goals result from good work habits and values — thus making item 7 more logically related to the subscale *Work Values*. Similarly, the item on believing that one would take the initiative to help others is a situation more likely to happen currently in students’ daily life, rather than in a work situation. For that reason, item 14 was considered to be more closely related in this sample to the *Talent Development* subscale, where items include recognizing ones’ potential strengths.

**Figure 2. The Schematic Diagram for Modifying the Paths of the CTD-SES: Model 2**



The results of inter-correlations between the subscales (moderately correlated) were more acceptable compared with the results (moderate-to-high inter-correlations) in the initial study with younger subjects in Hong Kong, supporting the reliability of the CTD-SES.

With respect to item loadings in CFA, most loadings were lower than those in the initial study of Yuen, Gysbers, Chan, Lau, & Shea (2010). This may be caused by the conditions under which the questionnaires were completed. In the present study, the questionnaires were completed without any supervision, but in the initial study, teachers in the schools supervised the administration. The respondents in the present study might score the items randomly, which would decrease the item discrimination (Ren & Guan, 2010).

Through this survey, we also discovered an interesting trend in the variation of students' self-efficacy in career and talent development with age. University students' level of self-confidence reduces significantly as they progress from freshmen to seniors, especially in *Talent Development* and *Work Values*. This may occur because seniors are facing more anxiety than freshmen concerning career decisions and the pressure of job-hunting. Another reason for the decrease in confidence with age may be that younger students have fewer or less demanding academic assignments and curricula. If they have not been fully challenged and have not met with obstacles to overcome, their beliefs about their own efficacy may be unrealistically high.

The CTD-SES appears to have potential value in comprehensive counseling, guidance, and student assessment for career and talent development in universities in the Chinese mainland. Practitioners and researchers in vocational fields in these universities should not rely wholly on guidance materials and career interventions developed in the West (Sun & Yuen, 2012). Instead, they need to consider students' background, such as gender, year level, and specific contexts of university to provide individual counseling, and to design and implement career guidance programs. In particular, the confirmed multi-dimensional construct of career and talent development self-efficacy suggests that guidance personnel in university need to be knowledgeable about various facets of students' career and talent development, and to take "whole person" issues into account when providing all forms of career guidance and talent development programs and services (Yuen, Gysbers, Chan, Lau, & Shea, 2010).

### **Limitations and Future Directions**

There are several limitations of this study. First, as the CTD-SES is a self-report measure and completed without supervision, participants may have selected socially desirable responses, or may simply have

responded in a random manner. Future studies could use a suitable scale (e.g., *Balanced Inventory of Desirable Responding*) alongside the CTD-SES to assess any tendency to give socially desirable responses (Paulhus & Reid, 1991).

Second, Sun Yat-sen University is ranked in the top 5% of universities in China, so it might not fully represent conditions in other universities. As universities in China are divided into three classes, future potential validation studies targeted to university students should ensure that students from all three classes are included in the sample.

Third, two different data collection methods (i.e., online survey vs. paper questionnaire) were used in this study, which may increase the risk of bias sampling. Although Independent-Samples T Test analysis supported the equivalence of item scores in the two samples, different data collection methods should be avoided in future.

Fourth, goodness of fit statistics showed that Model 2 was basically acceptable (RMSEA < .084, close to the required value). It would be useful to examine the factor model with a larger sample (Lu, 2008; MacCallum, Browne, & Sugawara, 1996; Marsh & Hau, 1999). Besides, future psychometric research with the CTD-SES should include other forms of reliability (e.g., test-retest) and validity (e.g., construct validity and criterion validity).

Fifth, more differences between subgroups within the mainland sample (e.g., by gender, major study field, place of residence [urban vs. rural] before attending university and any prior career-related experience) should be investigated in any follow-up survey, as suggested by some researchers in China (J. L. Wang & Wu, 2006; Z. Wang, Shi, & Gao, 2005; M. Yan, 2008).

In addition, with regard to developing a guidance program which aims at enhancing students' efficacy in career and talent development, the CTD-SES could be used as a measure to assess the outcome of the program. For example, before and after exposure to a comprehensive guidance program, students' change in self-efficacy over a certain period of time could be determined (Yuen, Gysbers, Chan, Lau, & Shea, 2011). The data collected could provide useful feedback for outcome evaluation and improvement of the student development program. The study of designing and implementing such efficacy-oriented programs (combined with valid outcome evaluation) could provide significant implications for career guidance in universities in China and other parts of the world.

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事業及才能發展自我效能量表：  
應用於中國內地大學生時量表的心理計量特性

近年，中國內地大學愈來愈重視提升其學生在事業和才能發展方面的知識、技能、態度和能力。為此，對輔導活動和評估工具的需求亦日益增加。本研究以 466 名中國內地大學生為樣本，探討「事業及才能發展自我效能量表」的效度、信度（內部一致性）和因素結構。探索性因素分析的結果顯示，需要修訂該量表原初的「三基本因素加一高階因素」的模型。從驗證性因素分析可見，修訂了原初模型的路徑後，量表的適配度提高了。本研究把該量表應用於與原初香港研究不同的年齡組群和不同的華人社區，結果仍是支持該量表的心理計量特性。

關鍵詞： 事業發展；才能發展；工作習慣；自我效能；效度；中國；大學生