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Development of a Scale to Measure Educators' Practice in Teaching Self-Determination

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Abstract: The purpose of this study was to develop a scale for assessing teachers' self-determination instruction and to test the validity and reliability of this tool. The subjects included 315 teachers recruited from elementary and junior high schools nationwide in Taiwan. The Teaching Self-Determination Scale (TSDS) developed in this study aimed at assessing the extent to which educators teach students knowledge and skills related to self-determination. The 24-item TSDS is comprised of four subscales including Self-Realization, Psychological Empowerment, Self-Regulation, and Autonomy. Data collected were analyzed using descriptive statistics, correlation analyses, t tests, and factor analyses. Findings showed that the TSDS has satisfactory psychometric properties. The internal consistency reliability coefficients (Cronbach's α) ranged from .76 to .93, while the test-retest coefficients ranged from .71 to .87. Findings of the exploratory factor analysis showed that the four TSDS subscale factors can be reasonably extracted, which can explain 59.7% of the total item variance. The confirmatory factor analysis results further indicated a good fit between the measurement model and the sample data (GFI = .96, AGFI = .91, RMSEA = .08, NFI = .97, RFI = .93, IFI = .98, TLI = .95, CFI = .98). Suggestions are provided for future research.

Keywords: *Scale development, self-determination, teachers, validity and reliability.*

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Introduction

For contemporary special education teachers, how to effectively help students with disabilities to improve their self-determination skills is an important educational responsibility. This is because self-determination skills are necessary for independent living and because being able to exercise self-determination is a basic human right. Over the past three decades, the topic of how to effectively improve the self-determination skills of students with disabilities has become an important issue within the field of special education (Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015). Wehmeyer (1999) has noted that self-determination is a multifaceted ability that includes choice making, decision making, problem-solving, goal setting and attainment, self-observation, self-reinforcement, self-advocacy and leadership, and positive attributions of efficacy and outcome expectancy. Although the development of knowledge and skills leading to self-determination emerge across the life span, it is suggested that instructional efforts should begin at the early learning stage for students with disabilities (Palmer & Wehmeyer, 2003). The emphasis on the self-determination of students with disabilities can be attributed to the generally insufficient self-determination skills of these students (Cameto, Levine, Wagner, & Marder, 2003; Kelly & Shogren, 2014; Shogren et al., 2007). Furthermore, compared with their classmates without disabilities, the level of self-determination of students with disabilities is significantly lower (Mithaug, Campeau, & Wolman, 2003; Wagner, Newman, Cameto, Garza, & Levine, 2005). Poor self-determination skills not only affect the quality of life of students with disabilities (Nota, Ferrari, Soresi, & Wehmeyer, 2007) but also increase the difficulty of future transition and employment for these students (Wehmeyer, Palmer, Soukup, Garner, & Lawrence, 2007). Nevertheless, there is a growing acknowledgement that self-determination skills can be seen as an educational outcome (e.g., Agran, Cavin, Wehmeyer, & Palmer, 2006; Denney & Daviso, 2012; Kelly & Shogren, 2014; Palmer & Wehmeyer, 2003). This fact reveals the importance of teachers in the process of teaching self-determination to students with disabilities.

According to the ecological theory of self-determination proposed by Abery and Stancliffe (2003), an individual's internal skills, knowledge, and motivational bases affect the level of self-determination, while their external environmental factors are the key to determining whether these skills can be developed. According to this theory, there

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are four types of environments affecting individuals' development of self-determination skills; listed from small to large, these include the microsystem, mesosystem, exosystem, and macrosystem. Microsystem refers to the most frequent ecological environment in which individuals interact with others and includes the home, school, and workplace. In these environments, individuals develop their self-determination skills through guidance by and imitation of others. The mesosystem refers to a kind of interactive situational context, for example, whether students are able to utilize skills learned at school within the home; this is helpful for individuals in developing sophisticated and solid self-determination skills. The exosystem attributes the acquisition of self-determination skills to the peripheral contexts of individuals' lives, such as participation in the community or public affairs. The macrosystem refers to individuals' most peripheral environment, such as social values or ideology. The development of the self-determination skills of students with disabilities is determined by the tolerance and support of society. According to the ecological theory, for students with disabilities who are in school, the school's learning environment can be seen as the factor with the greatest influence in the microsystem and mesosystem. After all, these students have not yet entered a working environment. With regard to family environments, these students' parents usually lack the professional knowledge for teaching self-determination skills that teachers possess (Zhang, Wehmeyer, & Chen, 2005). As such, one could argue that school education is the most important factor determining the smooth development and acquisition of self-determination skills for students with disabilities (Agran et al., 2006; Prater, Redman, Anderson, & Gibb, 2014; Rowe, Mazzotti, & Sinclair, 2015).

Since teacher instruction has a great influence on the acquisition of self-determination skills for students with disabilities, the question of how to objectively assess teachers' execution of self-determination instruction is an important one. In other words, it is necessary to develop an effective tool for assessing teacher instruction in this regard. However, it is appeared that an appropriate scale for assessing teachers' self-determination instruction has not yet been developed. Currently, related scales for this kind of measurement primarily assess the levels of self-determination possessed by students from the perspective of the teacher. For example, the AIR Self-Determination Scale was developed by Wolman, Campeau, DuBois, Mithaug, and Stolarski (1994). This scale was compiled according to the concept that self-determination is composed of three steps including *think*, *do*, and *adjust*. Wolman and colleagues aimed to develop an assessment tool for effectively understanding students' levels of self-determination, whose assessment results could serve as a basis for teacher instruction, such as by setting teaching objectives in students' individualized education programs (IEPs) according to these results. The AIR Self-Determination Scale is suitable for use with a broad range of subjects, including students with or without disabilities at the elementary school level, through to the university level. The AIR Self-Determination Scale includes three versions including the educator form, parent form, and student form. The educator form includes 30 questions which primarily assess students' levels of self-determination and students' self-determination characteristics. It also assesses the opportunities for self-determination provided by people with whom the student shares important relationships. In addition, Hoffman, Field, and Sawilowksy (1996) developed the Self-Determination Assessment Battery (SDAB). They argue that self-determination is a kind of behavioral development process based on learning, followed by execution. This process involves five steps including *know yourself*, *value yourself*, *plan*, *act*, and *experience outcomes and learn*. The SDAB can be applied to the assessment of the cognitive, behavioral, and affective traits associated with self-determination of students with or without disabilities from middle school to college. The SDAB consists of five instruments, including the Self-Determination Knowledge Scale (SDKS), Self-Determination Parent Perception Scale (PPS), Self-Determination Teacher Perception Scale (TPS), Self-Determination Observation Checklist (SDOC), and the Self-Determination Student Scale (SDSS). The TPS includes 30 questions and teachers assess the level of students' self-determination on a five-point Likert scale. Similarly, the assessment results of the TPS can be referred to by teachers when conducting instruction.

The aforementioned AIR Self-Determination Scale and SDAB both include teacher versions of self-determination scales, but the goals of both of these scales are to assess the level of self-determination of students from the perspective of the teacher, not to assess the conditions of teachers themselves delivering self-determination instruction. In view of the importance of teacher instruction in determining students' self-determination abilities, and the lack of an appropriate assessment tool, this study's primary objective is to develop a scale for assessing teachers' self-determination instruction and to test the validity and reliability of this tool. Because both general and special education teachers are responsible for teaching students with disabilities in Taiwan, these two types of teachers were recruited to participate in the present study.

Methodology

Participants

The participants included 315 special education teachers recruited from public elementary (n = 167) and junior high (n = 148) schools nationwide in Taiwan. Teachers' age ranged from 23 to 58 years with a mean of 39.31 years. Among the participants, 152 were general education teachers, while the others were special education teachers (n = 163) providing services in either resource rooms or self-contained classrooms. The majority of the teachers were female (n = 256, 81.3%), reflecting the national demographic features of educators working in elementary and secondary education phases. The participating teachers were fairly experienced, revealing that approximately 31%, 25% and 16% of the

teachers have been worked for 6-10, 11-15, and over 16 years, respectively. More than half of the participants reported to have a Bachelor's degree (n = 195, 61.9%), with the rest holding a graduate degree.

Instrument

The Teaching Self-Determination Scale (TSDS) developed in this study aimed at assessing the extent to which special education teachers teach students knowledge and skills associated with self-determination. The conceptual framework of the TSDS is based on the causal agency theory and a functional model of self-determination proposed by Wehmeyer (Wehmeyer, 1999, 2004). In addition, items on the AIR Self-Determination Scale-Educator Form (Wolman et al., 1994) and the SDAB's Teacher Perception Scale (Hoffman et al., 1996) are also employed as reference resources. The TSDS containing a total of 24 items is comprised of four subscales including Self-Realization (SR), Psychological Empowerment (PE), Self-Regulation (SG), and Autonomy (AT). Teachers' responses are rated on a 5-point Likert-type scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). The Full Scale score ranges from 24 to 120. A higher score refers to a greater level/frequency of instruction in knowledge and skills associated with self-determination. The SR subscale is used to measure the degree to which teachers provide instruction in self-observation, self-awareness, and self-knowledge. Items are categorized into two indicators including *Physical and Emotional Traits* (PT ; Q1, Q2) and *Interests and Strengths* (IS ; Q3, Q4, Q5). The PE subscale is aimed at measuring the extent to which teachers educate or empower students to have a positive belief regarding own ability, locus of control, and expectation of success. Items can also be divided into two indicators including *Life Beliefs* (LB ; Q6, Q7, Q11) and *Educational Beliefs* (EB ; Q8, Q9, Q10). The SG subscale is used to evaluate the extent to which educators teach students goal setting and problem-solving skills. Items are classified into two indicators including *Life Goals* (LG ; Q12, Q13, Q16) and *Learning Adjustment* (LA ; Q14, Q15). The AT subscale is aimed at measuring the extent to which teachers provide instruction in personal care, self-management, and independent living skills. Items are divided into two indicators including *Living Skills* (LS ; Q17, Q19, Q20, Q21, Q22) and *Independency and Leisure* (IL ; Q18, Q23, Q24).

Procedures

The process for compiling the TSDS included two stages: the planning stage and the development stage. The planning stage primarily involved an exploration of the relevant literature and theories, which are used to summarize appropriate item content. The development stage primarily involved the development of specific scale content and the assessment of statistical properties. Overall, the process of this study included eight steps including recruiting research subjects, conducting a literature review, drafting TSDS items, inviting experts to conduct a logical analysis of the TSDS draft, administering the TSDS to participating teachers, conducting item analysis, reliability and validity testing, and finally, the formation of the official TSDS scale.

Data Analysis

The study first used a series of item analysis methods including descriptive statistics, item-total correlations, and item discrimination indexes calculated based on t-test results to assess the appropriateness of each item on the TSDS. The internal consistency reliability of the TSDS was then estimated. Namely, the Cronbach's alpha and test-retest reliability coefficients of the TSDS Full Scale and subscales were calculated. In addition, the construct validity of the TSDS was assessed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Specifically, the dimensionality of the TSDS was analyzed using EFA with maximum likelihood estimation method. Based on the scree plot and the a priori hypothesis, the number of interpretable factors yielded were rotated using the Varimax rotation procedure. Furthermore, CFA was performed to further confirm the validity of the TSDS construct.

Results

Item Analysis Results

The sample's descriptive statistics with regard to the TSDS are shown in Table 1. It showed that the means for the TSDS items ranged from 2.90 to 4.02, whereas the standard deviations were between .75 and 1.12. The skewness values ranged from -.72 to .08. The scores for some items were relatively low or high, such as Q7 and Q9, which have mean values greater than 4.0, and Q16 and Q22, whose mean scores are less than 3.0. In addition, the standard deviation for Q22 is relatively high. Overall, however, the mean, standard deviation, and skewness values for each item were within a reasonable range.

With respect to the analysis of item-total correlation, the results indicated that the Cronbach's α for the Full Scale was .93, whereas subscales' α coefficients were between .76 and .89 (see Table 1). Furthermore, the corrected item-total correlation coefficients for each item and the total score of its respective scales were between .43 and .79, all of which are greater than the criterion of .30. Because the deletion of each item did not result in an increase in the relevant scale's Cronbach's α, every item can be retained.

To assess the test-retest reliability of the TSDS, a random sample of 96 teachers from the participating teachers was selected to participate in reliability assessments separated by four-week intervals. The sample included 45 elementary

and 51 junior high school teachers. The results showed that the TSDS Full Scale's test-retest coefficient was .87. The coefficients for the SR, PE, SG, and AT subscales were .79, .81, .71, and .85, respectively.

In terms of the calculation of item discrimination indexes, comparisons of extreme groups were based on the sample's TSDS Full Scale score. That is, the 27% of the sample with the highest scores was defined as the High-Score group (n = 86, scores between 93 and117), whereas the 27% of the sample with the lowest score was regarded as the Low-Score group (n = 86, scores between 40 and 81). The mean differences between groups are shown in Table 2. Results of the t tests indicated that the critical ratio (CR) values for TSDS items ranged from 8.08-14.75, all of which are higher than the criterion of 3.0. Means for each item in the High-Score group were significantly higher than those for the Low-Score group. In other words, each item had a good degree of discrimination.

Table 1. Item Analysis Results (N = 315)

Item (I teach students to/that…)	*M*	*SD*	s	r	α	*t*
Self-Realization (Cronbach's α = .81)						
1 Know his/her physical and mental qualities	3.70	.75	-.19	.56	.79	9.83**
2 Understand reasons affecting personal mood	3.56	.78	-.27	.64	.76	12.48**
3 Explore personal interests	3.56	.82	-.22	.61	.77	13.47**
4 Understand personal learning strengths/weaknesses	3.51	.78	-.24	.61	.77	10.21**
5 Make appropriate choices and decisions	3.66	.82	-.43	.58	.78	12.17**
Psychological Empowerment (Cronbach's α = .89)						
6 Be confident in themselves	3.94	.83	-.68	.72	.86	12.75**
7 Value his/her life	4.02	.87	-.72	.66	.87	13.51**
8 Understand the notion of no gains without pain	3.98	.88	-.72	.73	.86	13.64*
9 Persevere regardless of past failures	4.01	.81	-.56	.79	.85	13.09**
10 Encourage students to be hard-working people	3.74	.89	-.53	.68	.87	9.47**
11 Know that they are cherished by their parents	3.67	.89	-.52	.62	.88	11.74**
Self-Regulation (Cronbach's α = .76)						
12 Develop goal setting and attainment strategies	3.38	.91	-.18	.62	.69	12.24**
13 Set attainable career goals	3.19	.98	.02	.63	.68	11.97**
14 Set learning goals	3.77	.88	-.27	.46	.74	10.43**
15 Behave properly in various occasions	3.33	.94	-.22	.52	.72	8.59**
16 Plan a summer vacation	2.90	.91	.01	.43	.75	10.20**
Autonomy (Cronbach's α = .87)						
17 Resolve arguments with classmates	3.96	.80	-.56	.48	.87	10.51**
18 Eliminate bad lifestyle habits	3.36	.92	-.21	.60	.86	12.67**
19 Keep good personal hygiene	3.98	.85	-.58	.69	.85	14.75**
20 Basic self-care knowledge and skills	3.87	.86	-.47	.71	.85	12.69**
21 Concepts of money and shopping skills	3.71	.91	-.30	.58	.86	10.70**
22 Use public transportation	2.94	1.12	.08	.60	.86	8.08**
23 Engage in leisure activities	3.23	.91	.04	.69	.85	11.73**
24 Participate in the family and do housework	3.74	.97	-.37	.71	.85	14.15**

Note: s denotes skewness value; r refers to corrected item-total correlation; α refers to Cronbach's α if item deleted.

Exploratory Factor Analysis Results

Results showed that the KMO value is .92 and that the Bartlett's Test is significant ($\chi^2_{(276)}$= 4063.80, p < .001), indicating that a common factor exists between items and therefore it is appropriate to conduct factor analysis. The results of the scree test showed that four factors (i.e., SR, PE, SG, AT) can be reasonably extracted by the TSDS, which can explain 59.72% of the total item variance. The EFA using maximum likelihood estimation method and the Varimax rotation procedure revealed that each item has the highest factor loading (λ) for the factor to which the items are attributed and that these values are all larger than .32 (see Table 2). Specifically, the λ of Self-Realization were between .43 and .73, between .50 and .75 for Psychological Empowerment, between .41 and .74 for Self-Regulation, and between .38 and .78 for Autonomy. Communality ranged from .40 to .73.

Table 2. Exploratory Factor Analysis Results

Item	Factor				Communality (h^2)
	SR (E = 9.78)	PE (E = 2.11)	SG (E = 1.33)	AT (E = 1.12)	
1	.73	.07	.41	.38	.64
2	.65	.32	.22	.12	.59
4	.63	.20	.43	.04	.63
3	.57	.19	.43	.15	.57
5	.43	.23	.39	.35	.53
9	.30	.75	.24	.18	.73
10	.15	.75	.31	.03	.68
6	.29	.63	.29	.28	.65
8	.35	.61	.44	.10	.70
7	.41	.57	.11	.29	.59
11	.44	.50	.05	.36	.58
12	.19	.22	.74	.14	.65
13	.29	.08	.74	.17	.66
14	-.13	.36	.61	.15	.54
15	.13	.24	.55	.20	.42
16	.29	.07	.41	.36	.40
22	.08	-.14	.17	.78	.67
23	.12	-.03	.31	.76	.70
20	.08	.39	.00	.73	.69
24	.26	.18	.10	.73	.65
19	.27	.30	.12	66	.61
21	-.07	.39	.23	.60	.57
18	.22	.34	.17	.55	.50
17	.23	.31	.32	.38	.40

Note: E refers to eigenvalue.

Confirmatory Factor Analysis Results

With regard to internal correlation in the scale, the correlation matrix for each subscale and the Full Scale is shown in Table 3. The correlation between reflective indicators and the Full Scale is shown in Table 4. The data in these two tables showed that the correlation coefficients for subscales and the Full Scale are between .56 and .87, and that the correlations between indicators and the Full Scale are between .38 and .83. All correlation coefficients were significant ($p < .01$). Furthermore, the CFA results showed that the measurement model proposed in this study has good fit with the sample data (see Figure 1). With regard to overall model fit, the standard for fit is met both using absolute fit measures (GFI=.96, AGFI=.91, SRMR=.03, RMSEA=.08) and comparative fit measures (NFI=.97, RFI=.93, IFI=.98, TLI/NNFI=.95, CFI=.98).

Table 3. Correlation Matrix for the TSDS Subscales and Full Scale

Variable	SR	PE	SG	AT
SR	--			
PE	.71**	--		
SG	.64**	.63**	--	
AT	.56**	.60**	.56**	--
Full Scale	.83**	.87**	.82**	.85**

**$p < .01$

Table 4. Correlation Matrix for the TSDS Reflective Indicators and Full Scale

Variable	PT	IS	LB	EB	LG	LA	LS	IL
PT	--							
IS	.66**	--						
LB	.66**	.58**	--					
EB	.57**	.58**	.69**	--				
LG	.51**	.60**	.51**	.51**	--			
LA	.50**	.52**	.49**	.58**	.61**	--		
LS	.58**	.42**	.66**	.52**	.44**	.55**	--	
IL	.49**	.39**	.53**	.38**	.40**	.51**	.71**	--
Full Scale	.79**	.72**	.83**	.77**	.71**	.76**	.83**	.77**

**$p < .01$

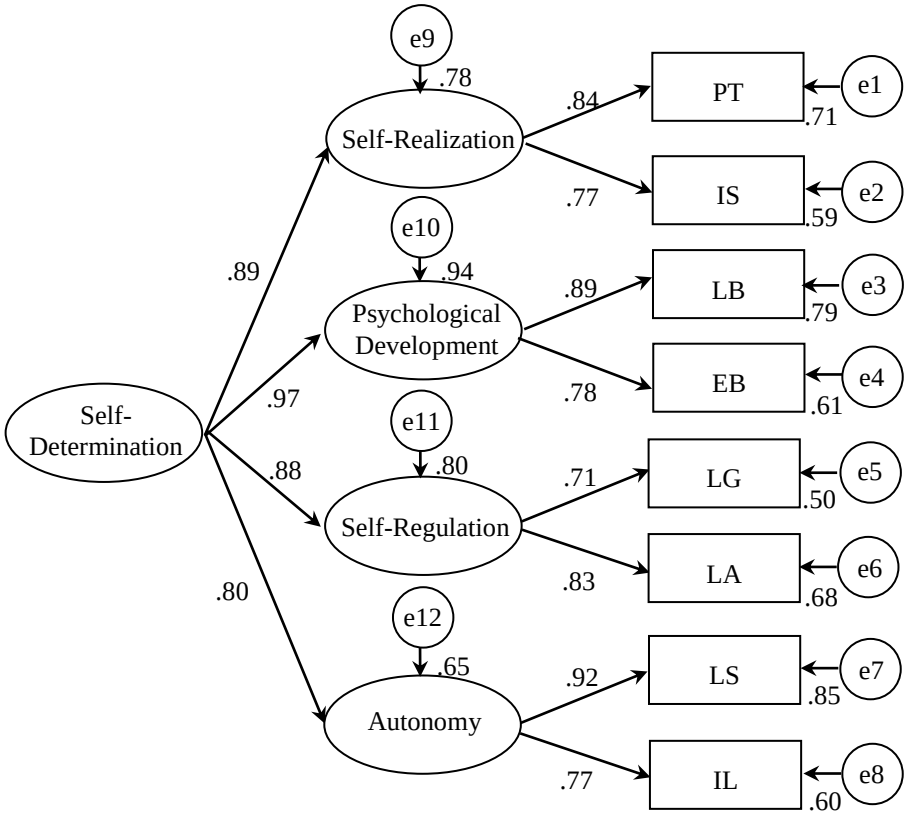

Figure 1. The second-order CFA path diagram and standardized estimates of the Teaching Self-Determination Scale (*N* = 315)

Discussion

Results of the item analysis showed that all values yielded meet the statistical requirements, and therefore the 24 items originally compiled in the TSDS are retained. This study argues that such result can be attributed to the solid theoretical basis of the functional model of self-determination proposed by Wehmeyer (1999) that the TSDS scale consulted. The most basic argument in this theory is that the function/objective of individuals' behaviors primarily determines whether they are considered self-determined behaviors. If an individual's behavior has a certain kind of function/objective, then this individual can be viewed as a self-determiner. More specifically, factors affecting individuals' self-determination are capacity, opportunity, and supports. Capacity refers to abilities, such as choice making, decision-making, self-knowledge, problem-solving, and self-advocacy. These abilities are primarily affected by individuals' physical and psychological development and their educational circumstances. Opportunity and supports respectively refer to the number of decision-making opportunities that individuals receive and the level of support for individuals' decision-making behaviors. These two factors are affected by the environment and personal experience. When an individual satisfies the above three criteria, they can be considered self-determiners possessing the four features of self-realization, psychological empowerment, self-regulation, and autonomy that represent the subscales of the TSDS. Although this theory describes self-determination from the perspective of the individual/student, the results of this study verify that this concept can also be applied to the assessment of the degree of teacher instruction of self-determination.

Furthermore, the descriptive statistics for item analysis results also reflect the state of teachers' self-determination instruction in Taiwanese elementary and junior high schools. With regard to instructional content assessed by the TSDS, the degree of instruction for most skills is between *sometimes (3.0)* and *often (4.0)*. The self-determination skills most frequently taught by teachers were "*value his/her life*" and "*persevere regardless of past failures.*" The mean values for these items were 4.02 and 4.01, respectively. In other words, the degrees of instruction for these skills are between *often* and *always (5.0)*. These two skills fall under the psychological-empowerment-oriented items, and these results illustrate that Taiwanese elementary and junior high school teachers especially emphasize students' self-confidence and the establishment of positive values. The study posits that because students at the elementary and middle school level remain at the initial exploratory phase of physical and psychological development and character establishment, and because students may encounter unexpected setbacks or failures during the exploratory processes, teachers especially emphasize the establishment of psychological empowerment skills. Furthermore, although in the past decade, Taiwan has implemented a series of educational reforms aimed at reducing the educational pressures faced by

students including those with disabilities, students have not experienced any distinct reduction in pressures. After all, traditional concepts of parenting are deeply rooted in many families, and so it is important to address questions of how to help students to establish positive psychological characteristics in order to face pressures that they face in school, society, and at home. As such, teachers especially emphasize students' self-reinforcement skills.

In contrast, the skills that teachers instruct at the lowest degrees are "*plan a summer vacation*" and "*use public transportation.*" The mean values for these two items were 2.90 and 2.94, respectively. In other words, their degree of instruction for these two skills is between *rarely (2.0)* and *sometimes*. This study argues that the reason that the degree of instruction for "*plan a summer vacation"* is relatively low may be because ethnic Chinese people have a tradition of emphasizing study while placing relatively little importance on leisure. As a result, teachers will not generally encourage students to use their summer holidays to engage in behaviors related to "self-determination." Conversely, all of Taiwan's current elementary and junior high schools still observe traditional methods and require that students complete a good deal of school work over their summer holidays. This school work is typically related to specific subject content, such as Chinese, English, Math, or Science. With respect to *"use public transportation,"* teachers may rarely teach this skill because most elementary and junior high school students typically walk, ride bicycles, or travel with their parents to and from school, and parents usually do not encourage their children to independently use public transportation out of consideration for their safety. This may explain the relatively low degrees of instruction for these skills.

In view of reliability and validity analysis results for the TSDS scale, findings of the study showed that the TSDS has satisfactory psychological testing characteristics. Reliability analysis results showed that the Cronbach's α coefficients for each subscale are between .76 and .89. According to Cronbach's α coefficients in the ranges of .60-.65, .65-.70, .70-.80, and .80-.90, these can be viewed as poor, acceptable, good, and excellent, respectively (DeVellis, 2016). As such, the scores for the items in the four TSDS subscales have a fairly high degree of consistency. Furthermore, with regard to test-retest reliability of the TSDS, the reliability coefficients for each subscale are between .71 and .85, with the coefficient for the Full Scale being .87. Correlation coefficients between the ranges of .10-.39, .40-.60, and .70 and above indicate low, moderate, and high degrees of correlation (Green & Salkind, 2011). As such, the TSDS has a fairly high degree of stability, meaning that the re-test scores obtained for samples after a period of four weeks do not suffer a great deal of error resulting from this interval.

Regarding the validity of the TSDS, because the item content for the TSDS is designed with reference to related theories and scales of self-determination, the content validity is appropriate. From the perspective of empirical analysis, the TSDS also has good construct validity. CFA results allowed us to conclude that the causal relationship between variables in the TSDS is reasonable. Both the overall model fit and the fit of internal structure of the model were ideal. This is especially so for the model's factor loadings, which are all within the standards set for social science research, that is, $\lambda \geqq .55$ (Tabachnick & Fidell, 2006). Furthermore, the explanatory power of self-determination for each subscale is ranked from high to low as follows: psychological empowerment, self-realization, self-regulation, and autonomy. The study posits that the superiority of predicted superiorities of factors are related to Taiwan's education system, social culture, and individual teachers' educational beliefs and knowledge of self-determination. Future research can continue studying these aspects. In summary, the TSDS was developed with rigorous procedures and large-scale sample data were used to test its psychometric characteristics. Results revealed that the TSDS is a scale with satisfactory reliability and validity. Future researchers can use this scale as a tool to assess elementary and junior high school teachers' instruction of self-determination, or as a tool for teachers to check their own instruction of self-determination.

This study contains several research limitations worth noting. First, the sample for this study does not include teachers at the high school level (i.e., 10^{th}-12^{th} grade). Because the majority of Taiwanese junior school students go on to study in high school, it is important to assess teacher instruction of self-determination at the high school level. However, the results of this study are not suitable for making assumptions about teachers at this level. In addition, because the TSDS is a self-reported style scale, the data collected only reflects teachers' subjective judgements and beliefs. In the absence of confirmation by objective information (such as teacher or parent assessments), readers should be cautious while interpreting the results of this study. Furthermore, without any appropriate external standards, this study cannot assess the criterion-related validity of the TSDS and therefore readers should treat the assessment results of TSDS validity with caution.

The present study suggests that future studies broaden their samples to include general and special education teachers at the high school level in order to help prospective researchers or policymakers to assess the degrees of teacher instruction of self-determination at the high school level. To more objectively assess the degrees of teacher instruction of self-determination, it is suggested that future studies compile versions of scales for administrators, parents, or students to assess teacher instruction of self-determination from the perspectives of school administrators, parents, and students. In this way, disadvantages in the self-reported style scale can be alleviated since teachers' assessments of their instruction of self-determination may differ from reality. Furthermore, although there is not yet any appropriate scale for use in assessing the criterion-related validity of the TSDS, it is suggested that future researchers use the real self-determination performance of students as an external standard to assess the criterion validity of the TSDS.

References

Abery, B. H., & Stancliffe, R. J. (2003). An ecological theory of self-determination: Theoretical foundations. In M. L. Wehmeyer, B. H. Abery, D. E. Mithaug, & R. J. Stancliffe (Eds.), *Theory in self-determination: Foundations for educational practice* (pp. 25-42). Springfield, IL: Charles C. Thomas.

Agran, M., Cavin, M., Wehmeyer, M. L., & Palmer, S. B. (2006). Participation of students with moderate to severe disabilities in the general curriculum: The effects of the self-determination learning model of instruction. *Research and Practice for Persons with Severe Disabilities, 31*(3), 230-241.

Cameto, R., Levine, P., Wagner, M., & Marder, C. (2003). The emerging independence of youth with disabilities. In M. Wagner et al. (Eds.), *The achievements of youth with disabilities during secondary school* (pp. 6.1-6.22). Menlo Park, CA: SRI International.

Carter, E. W., Lane, K. L., Pierson, M. R., & Glaeser, B. (2006). Self-determination skills and opportunities of transition-age youth with emotional disturbance and learning disabilities. *Exceptional Children, 72,* 333- 346.

Denney, S. C., & Daviso, A. W. (2012). Self-determination: A critical component of education. *American Secondary Journal, 40*(2), 43-51.

DeVellis, R. F. (2016). *Scale development: Theory and applications (4th ed.)*. London: SAGE.

Green, S. B., & Salkind, N. J. (2011). *Using SPSS for Windows and Macintosh: Analyzing and understanding data (6th ed.).* Upper Saddle River, NJ: Prentice Hall.

Hoffman, A., Field, S., & Sawilowksy, S. (1996). *Self-determination assessment battery user's guide.* Detroit, MI: Wayne State University.

Kelly, J. R., & Shogren, K. A. (2014). The impact of teaching self-determination skills on the on-task and off-task behaviors of students with emotional and behavioral disorders. *Journal of Emotional and Behavioral Disorders, 22*(1), 27-40.

Mithaug, D. E., Campeau, P. L., & Wolman, J. M. (2003). Assessing self-determination prospects among students with and without disabilities. In D. E. Mithaug, D. Mithaug, M. Agran, J. Martin, & M. L. Wehmeyer (Eds.), *Self-determined learning theory: Construction, verification, and evaluation* (pp. 61-76). Mahwah, NJ: Lawrence Erlbaum.

Nota, L., Ferrari, L., Soresi, S., & Wehmeyer, M. (2007). Self-determination, social abilities and the quality of life of people with intellectual disability. *Journal of Intellectual Disability Research, 51,* 850-865.

Palmer, S. B., & Wehmeyer, M. L. (2003). Promoting self-determination in early elementary school: Teaching self-regulated problem-solving and goal-setting skills. *Remedial and Special Education, 24,* 115- 126.

Prater, M. A., Redman, A. S., Anderson, D., & Gibb, G. S. (2014). Teaching adolescent students with learning disabilities to self-advocate for accommodations. *Intervention in School and Clinic, 49*(5), 298-305.

Rowe, D. A., Mazzotti, V. L., & Sinclair, J. (2015). Strategies for teaching self- determination skills in conjunction with the common core. *Intervention in School and Clinic, 50*(3), 131-141.

Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Soukup, J. H., Little, T. D., Garner, N., & Lawrence, M. (2007). Examining individual and ecological predictors of the self-determination of students with disabilities. *Exceptional Children, 73*, 488-509.

Shogren, K. A., Wehmeyer, M. L., Palmer, S. B., Rifenbark, G. G., & Little, T D. (2015). Relationships between self-determination and postschool outcomes for youth with disabilities. *The Journal of Special Education, 48*(4), 256-267.

Tabachnick, B. G., & Fidell, L. S. (2006). *Using multivariate statistics (5th ed.).* Needham Heights, MA: Allyn & Bacon.

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A* first look at the post-school experiences of youth with disabilities. A report from the *National Longitudinal Transition Study-2 (NLTS2)*. Available from the National Longitudinal Transition Study-2 Website at http://www.nlts2.org/reports/2005_04 /nlts2_report_2005_04 _complete.pdf

Wehmeyer, M. L. (1999). A functional model of self-determination: Describing development and implementing instruction. *Focus on Autism and Other Developmental Disabilities, 14,* 53-61.

Wolman, J. M., Campeau, P. L., DuBois, P. A., Mithaug, D. E., & Stolarski, V. S. (1994). *AIR Self-Determination Scale and User Guide.* Palo Alto, CA: American Institutes for Research.