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Development and Initial Validation of the Personal and Social Responsibility Scale in Physical Education Settings

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ABSTRACT

This study aims to develop a valid instrument measuring personal and social responsibility in physical education settings that is suitable for Chinese high school students age 14 and above. This instrument consists of eight aspects, which builds upon the levels of responsibility in Hellison's (2011)[9] Teaching Personal and Social Responsibility Model (TPSR). The eight aspects in the measurement include goal, responsibility, respecting the rights and feelings of others, participation and effort, self-direction, caring, and value. The validation of the measurement was conducted based on the responses from 1091 high school students in Macau, China. The convergent and discriminant validity tests and a maximum likelihood confirmation factor analysis were performed using AMOS 21. The Bollen-Stine bootstrapping model was applied to adjust nonnormality data. Results supported a good validity and reliability of the items in the instrument.

1. Introduction

The use of physical education to educate and cultivate social skills and responsible behaviors has been promoted in K-12 education for decades. Hellison's Teaching Personal and Social Responsibility Model (TPSR), aiming to promote positive youth development through physical education, has been widely applied in teaching and research of K-12 physical education (Hellison, 1985,[8] 1991,[10] 2003,[12] 2011)[9].There has been a growing body of research supporting the practical effectiveness and immediate positive outcomes associated with TPSR-based programs (Cutforth & Puckett, 1999;[4] DeBusk & Hellison, 1989;[5] Hellison & Wright, 2003;[12] Martinek, Schilling, & Johnson, 2001;[16] Schilling, 2001;[20] Wright, White, & GaeblerSpira, 2004).[26]

2. Hellison's Teaching Personal and Social Responsibility Model (TPSR)

Created by Hellison, the Teaching Personal and Social Responsibility Model (TPSR), consists of five levels of responsibilities, including (1) respecting the rights and feelings of others, (2) effort, (3) self-direction, (4) caring and helping, and (5) transfer "outside the gym." These

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five levels of responsibility are aimed to promote positive youth development through physical education (Hellison, 1985,[8] 1991,[10] 2003,[12] 2011)[9].

The first level of responsibility - respecting the rights and feelings of others - suggests that students should control their behaviors in order not to disturb other students or teachers. Besides, they should address conflicts peacefully and accept other students as their partners (Payton, Wardlaw, Graczyk, Bloodworth, Tompsett, & Weissberg, 2000).[18] Effort means, in school physical education, students actively participate in all kinds of activities to improve their internal driving force. They are also expected to prepare for and practice before class. When faced with difficulties, they can also demonstrate the courage and perseverance to overcome difficulties, and the courage to face new challenges (Volet, 1997;[23] Salili, Chiu, & Lai, 2001)[19]. Self-direction requires students to independently carry out and complete the sports activities and tasks, and develop sports learning goals as well as plans. At the same time, they are expected not to be affected by others and adjust the pressure from their peers (Tough, 1979;[22] Csikszentmihalyi, 2014)[3].

Hellison's TPSR's model emphasizes self-conscious behavior of self-intrinsic motivation to expand responsibility, thus the fourth level responsibility calls for caring and helping (Andre, 1986;[1] Lanckneus, 2016)[14]. The fifth level, also the highest, is transfer "outside the gym," referring to the transferability of first four levels of responsibility in other aspects of life, and showing the same responsible attitude. This level is most challenging as it requires students to apply the four levels of responsibilities in other settings (Hellison & Walsh, 2002).[11]

To assess the effectiveness of TPSR model and to examine what impact that teaching personal and social responsibility has on students' positive development, a number of scholars in this field have conducted empirical studies to evaluate students' personal and social responsibility in physical education using TPSR (Schilling, 2001;[20] Watson, Newton, & Kim, 2003;[24] Guan, McBride, & Xiang, 2006;[7] Li, Wright, & Pickering, 2008;[15] Wright & Craig, 2011)[25]. Schilling (2001)[20] conducted a research on underserved youths' concepts about commitment to an after-school program that applied Hellison's TPSR Model. The result showed that program organization, personal characteristics, development of interpersonal relationships and environments are main factors that lead to commitment to personal and social responsibility.

Since the invention of Hellison's TPSR Model, several questionnaires have been developed based on the TPSR model for educators to guide planning, teaching, and assessing of personal and social responsibility in the context of physical education. Examples include Contextual Self-Responsibility Questionnaire - CSRQ (Dewald-Kaufmann, Bruin, Smits, Bjh, Oort, & Meijer, 2018),[6] Personal and Social Responsibility Questionnaire - PSRQ (Martins, Rosado, Ferreira, & Biscaia, 2015),[17] and Students' Responsibility in Physical Education Scale - SRIPES (Hsu, Pan, Chou, & Lu, 2014).[13]

Since most of the scales developed by Western scholars are based on the beliefs, faith, and attitudes rooted in the Western culture, it is unclear if these instruments hold the same validity and reliability values among Asian high school students. The purpose of this study, therefore, is to develop and test the validity and reliability of an instrument that measures Chinese high school students' level of personal and social responsibility in physical education.

3. Research Method

3.1 Participants

Participants were 1185 high school students (male: female = 52.7%:47.3%; M_{age}=16.78 [SD= 1.29]) enrolled in Grade 10 to 12 in 15 schools in Macau. In this study, 1091 valid responses were included for further analysis. To enhance samples' representativeness, this study adopts the stratified proportion sampling method, taking the school type as the first stratification, the grade as the second stratification, and the number of students in a grade as the third stratification. Participants were invited from a total of 39 classes from two public schools, and 13 private schools, with the following number, gender, and age breakdown - Grade 10, Grade 11 and Grade 12 were 365 (33.5%,M_{age}=15.95, male: female = 55.89%:44.11%, [SD= 1.13]), 498(45.6%, M_{age}=16.92, male: female = 50.40%:49.60%, [SD= 1.11]) and 228 (20.9%, M_{age}=17.84, male: female = 52.63%:47.37%, [SD= .99]).

3.2 Item Generation

The core values stated by Macau Education and Youth Affairs Bureau include goal, responsibility, respecting the rights and feelings of others, participation and effort, self-direction, caring, leadership, and value, which overlap to a great degree with the five levels of responsibility in Hellison's Teaching Personal and Social Responsibility Model (TPSR). Building upon both, the instrument consists of eight aspects: goal, responsibility, respecting the rights and feelings of others, participation and effort, self-direction, caring, leadership, and value.

The development of the specific measurement items in this study follows three principles. First, the questions are based on the eight aspects of the scale structure. Second, the items mainly focus on students' behaviors in physical

education class, such as speech, attitude, action, expression. Third, responsibility behaviors include those that are obviously observed in physical education classes. In addition, elements of leadership and achievement goals are also incorporated into the development of the items, considering the requirements of high school moral education, civic education, and the outcomes of high school sport and leisure programs, required by Macau Education and Youth Affairs Bureau.

A convenience sample of 113 students' responses were collected and analyzed for the construct validity by using Exploratory Factor Analysis (EFA) and confirmatory factor analysis (CFA); Cronbach› α was used to test the construction reliability. Measurement items revision (i.e., deduction, addition, revision) was performed for several rounds. As a result, the measurement consists of 118 items in eight aspects.

3.3 Data Collection

A survey, titled Personal, Social Responsibility Scale for Physical Education (PSRSPE), along with a demographics section, was sent to 1185 high school students in two public schools and 13 private schools in Macau, China. Informed Consent was obtained before they fill in demographic Information such as gender and age. The instrument consisted of 77 items, which measure eight aspects of responsible behaviors in physical education classes. It used 11-point Likert scale, ranging from 0- "Almost never" to 10- "Always." Participants were asked to select the one that fits into a real situation in most of the time. The scores of both scale and subscales were calculated for the means of the rating items. Higher scores on PSRSPE indicate better and more positive responsibility behaviors in physical education setting.

3.4 Data Analysis

Statistical analyses involved in the scale validation started with exploratory factor analysis - EFA (Worthington & Whittaker, 2006), [41]. Maximum Likelihood Analysis (MLA) for with-item relation was also used to exam the correlation matrix (Tabachnick & Fidell, 2007).[21] Barlett's test, the Kaiser-Meyer-Olkin, and the square multiple correlation coefficients (R^2) were used to examine the structure underlying the items. Cronbach's alpha (Tabachnick & Fidell, 2007)[21] was applied to the construction of reliability. Second round Confirmatory factor analysis (CFA) was conducted for further analysis. The decision to accept or reject the model was informed by using Root-Mean, Square Error of Approximation (RMSEA), and the Comparative Fit Index (CFI).

4. Results & Discussion

4.1 Item selection

PSRSPE instrument consists of eight subscales of responsibility aspects - goal, responsibility, respecting the rights and feelings of others, participation and effort, self-direction, caring, leadership, and value. There were 7 to 14 items in each subscale and participants rated the statements on a point Likert scale of 11 which fits into the real situation, ranging from 0 "Almost never" to 10 "Always". These eight aspects were included to measure and investigate the responsibility behaviors in high school physical education classes in Macau.

Goal. There are 9 items in this subscale. Sample items include "I don't know why I should attend PE classes", "I think PE classes are boring and I soon feel tired of it" and "Even if I need to take PE tests or exams, I don't work hard to get a good grade".

Responsibility. There are 8 items in this subscale. Sample items include "When I am not listening to the teacher carefully, I wish other students to do the same", "I always cannot finish the task appointed by the teacher" and "Even if I have some questions, I don't turn to the teacher or other students".

Respecting the rights and feelings of others. There are 7 items in this subscale. Sample items include "I concentrate myself on the class and follow the classroom routine and order", "I can control my emotion and forgive others' mistakes" and "When conflict happens during activities or contests, I will immediately tell the teacher about it".

Participation and effort. There are 9 items in this subscale. Sample items include "When learning new technical movements, I will practice more than usual", "I am actively seeking to make breakthrough in order to improve my technical level" and "Even faced with failure, I won't feel upset and will keep practicing".

Self-direction. There are 9 items in self-direction subscale. Sample items include "I practice very hard the action skills taught by the teacher", "I know how to practice in stages" and "In terms of action skills, I maintain healthy competition with other students".

Caring. There are 10 items in this subscale. Sample items include "I don't make fun of the poor athletic performance of others", "When other students are injured, I always come forward to give them help and comfort" and "I help other students play out their potential in activities or contests".

Leadership. There are 11 items in this subscale. Sample items include "I ask my classmates to follow the rules of activities and contests", "I explain the overall

plans and strategies to the team" and "I make good use of all kinds of opportunities to communicate and discuss with teachers and team members".

Value. There are 14 items in this subscale. Sample items include "In daily life, I respect the elder and myself", "When I am confronted with difficulties, I will try my best to resolve them" and "I take into account the feelings of people around me, e.g., classmates, friends, family members, colleagues".

4.2 Construct Validation

The PSRSPE consisted of a total of 77 items across eight subscales, including goal (9 items), responsibility (8 items), respecting the rights and feelings of others (7 items), participation and effort (9 items), self-direction (9 items), caring (10 items), leadership (11 items) and value (14 items). Table 1, below, reports the overall convergent validity and discriminant validity of eight domains in PSRSPE.

Table 1. Test for convergent validity and discriminant validity for Caring, Effort, Goal, Leadership, Responsibility, Self-Orientation and Value

Dimension	Convergent Validity		Discriminant Validity							
	Cronbach	AVE	Caring	Effort	Goal	Leadership	respective	Responsibility	Self	Value
Caring	.939	.671	**.819**	.600**	-.321**	.728**	.508**	-.324**	.670**	.667**
Effort	.955	.739	.600**	**.860**	-.456**	.640**	.565**	-.377**	.800**	.608**
Goal	.925	.630	-.321**	-.456**	**.794**	-.320**	-.207**	.747**	-.345**	-.348**
Leadership	.966	.746	.728**	.640**	-.320**	**.864**	.422**	-.244**	.695**	.640**
Respective	.908	.651	.508**	.565**	-.207**	.422**	**.807**	-.243**	.502**	.542**
Responsibility	.916	.632	-.324**	-.377**	.747**	-.244**	-.243**	**.795**	-.290**	-.362**
Self-direction	.929	.640	.670**	.800**	-.345**	.695**	.502**	-.290**	**.800**	.599**
Value	.963	.679	.667**	.608**	-.348**	.640**	.542**	-.362**	.599**	**.824**
**. Correlation is significant at the 0.01 level (2-tailed). Bold is the square root of the average variance extracted										

Convergent validity measures how well different sub-constructs converge to the main construct. In this study, we would like to know how the eight domains, convergent to PSRSPE. Convergent validity is measure by Average Variance Extracted (AVE). A value of AVE that is above 0.5 indicates convergent validity. As Table 1 shows, all eight scales have AVEs that are above 0.5, the instrument, therefore, has very good convergent validity.

Discriminant validity is assessed to measure the extent to which constructs differ. It involves comparing the square root of the average variance extracted for a given construct with the correlations between that construct and all other constructs. Table 1 shows all have very good discriminate validity from .794 to .860. All subscales are clearly distinctive from others. When examining the correlation of the eight subscales, we have found Caring is positive with Effort, Leadership, Respective, Self-direction, and Value, but negative with Goal and Responsibility. Moreover, the Goal is negative with most of subscales, including Caring, Effort, Leadership, Respective, self-direction, and Value.

4.3 Results of Testing for Non-Normal Distribution

When all items were included into the subscale, the analysis of all data of eight subscales did not all fit the specified factor model. This warrantied a testing for multivariate normality through calculating Mardia's coefficient, and the sample showed the assumption of multivariate normality to be violated (See Appendices:1-8). Therefore, the Bollen-Stine bootstrapping (B-S bootstrapping) procedure was applied (Bollen & Stine, 1992).[2] See Table 2 for the results.

After the B-S bootstrapping adjustment, the results for the eight subscales are shown as follows. "Goal" (x^2 =52. 491, df=27, x^2 / df=1. 944, RMSEA =. 055, GFI =. 992, AGFI=. 976, CFI= 0. 996.), "Responsibility" (x^2 = 38. 348, df=20, x^2/df=1. 917, RMSEA=. 029, GFI =. 992, AGFI =. 962 and CFI=. 996)., "Respecting the rights and feelings of others" (x^2=25. 693, df=14, x^2/df=1. 835, RM-SEA =. 029, GFI=. 995 and CFI =. 998)., "Participation and Effort" (x^2=58. 792, df=27, x^2/df=2. 177, RMSEA =. 033, GFI=. 994, AGFI=. 982 and CFI = 0. 997), "Self-Ori-

entation" (x^2 = 44. 302, df=27, x^2/ df=l. 641, RMSEA =. 024, GFI =. 994, AGFI =. 982 CFI= 0. 998)., "Caring" (x^2= 62. 741, df=35, x^2/df=1. 793, RMSEA =. 027, GFI= .994, AGFI=. 985 and CFI= 0. 996), "Leadership" (x^2 = 45.

943, df=27,x^2/df=1. 702, RMSEA=.025, GFI=. 992, AGFI =. 975 and CFI =. 997) and "Value"(x^2 = 157. 223, df=78, x^2/df= 2.016, RMSEA=.031,GFI=.989,AGFI=. 983 and CFI =. 994).

Table 2 The results of the Bollen-Stine Bootstrapping procedure

Sub Scale	Chi-Square	Df	Chi/Df	RMSEA	GFI	AGFI	CFI	SRMR
Goal	669.899	27	24.811	0.148	0.854	0.757	0.902	0.0509
*Goal	52.491	27	1.944	0.055	0.992	0.976	0.996	0.0509
Responsibility	213.707	20	10.685	0.095	0.951	0.911	0.962	0.0318
*Responsibility	38.348	20	1.917	0.029	0.992	0.962	0.996	0.0318
Effort	830.432	27	30.757	0.165	0.826	0.709	0.916	0.0414
*Effort	58.792	27	2.177	0.033	0.994	0.982	0.997	0.0414
Respect	928.015	14	66.287	0.245	0.776	0.552	0.827	0.0855
*Respect	25.693	14	1.835	0.028	0.995	n/a	0.998	0.0855
Self-direction	364.319	27	13.493	0.107	0.92	0.866	0.953	0.031
*Self-direction	44.302	27	1.641	0.024	0.994	0.982	0.998	0.031
Caring	1252.818	35	35.795	0.179	0.773	0.643	0.877	0.0696
*Caring	62.741	35	1.793	0.027	0.994	0.985	0.996	0.0696
Leadership	1219.712	27	45.175	0.201	0.84	0.733	0.784	0.109
*Leadership	45.943	27	1.702	0.025	0.992	0.975	0.997	0.109
Value	2521.059	78	32.321	0.17	0.755	0.671	0.829	0.23
*Value	157.223	78	2.016	0.031	0.989	0.983	0.994	0.023
* The result of the Bollen-Stine Bootstrapping								

The results, as shown above, provide statistically significant evidence that all subscales have unique predictive capabilities providing support for PSRSPE.

4.4 Summary

The findings of this study suggest that the Personal and Social Responsibility Scale for Physical Education (PSRSPE) is a valid measure of the responsibility behaviors of students in physical education setting in Macau, China. The results of the data analysis show the eight subscales' convergent and discriminant validity are good. At the same time, results of structural equation modeling (SEM) suggest that subscales have strong relationships with the total scale. PSRSPE shows higher than acceptable validity and reliability.

5. Conclusion

The results of this study provide support for PSRSPE as a valid instrument to assess the personal, social responsibility behaviors in physical education class, and it is developmentally appropriate for Macau adolescents with adequate internal consistency. To our knowledge, this is the first compressive scale targeting high school students in China. It could be used to measure responsibility behaviors in physical education, thus provide teachers a useful tool to assess students' behaviors in physical education setting. Future studies are needed to further test the validity and reliability of the instrument by using it with high school students in other areas of China. Survey of both teachers' and students' perceptions of the instrument will also further improve its face validity

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Appendices: Assessment of Normality

Appendix1: Assessment of normality (Goal)

Variable	min	max	skew	c.r.	kurtosis	c.r.
b9	0	10	1.463	19.725	1.974	13.309
b8	0	10	1.234	16.638	1.077	7.261
b7	0	10	1.28	17.266	1.532	10.328
b6	0	10	0.903	12.175	0.47	3.17
b5	0	10	0.866	11.679	0.328	2.208
b4	0	10	0.885	11.928	0	0.003
b3	0	10	1.229	16.567	1.078	7.265
b2	0	10	1.136	15.313	0.901	6.075
b1	0	10	1.218	16.419	0.975	6.577
Multivariate					91.283	107.138

Appendix2: Assessment of normality (Responsibility)

Variable	min	max	skew	c.r.	kurtosis	c.r.
c8	0	10	1.674	22.57	2.456	16.56
c7	0	10	1.015	13.692	0.613	4.132
c6	0	10	1.438	19.39	1.8	12.133
c5	0	10	1.579	21.298	2.428	16.372
c4	0	10	0.997	13.451	0.804	5.423
c3	0	10	1.268	17.103	1.35	9.102
c2	0	10	1.118	15.079	1.004	6.769
c1	0	10	1.356	18.288	1.351	9.109
Multivariate					81.183	105.996

Appendix3: Assessment of normality (Respecting the rights and feelings of others)

Variable	min	max	skew	c.r.	kurtosis	c.r.
d7	0	10	-0.487	-6.569	-0.304	-2.052
d6	0	10	-0.218	-2.942	-0.788	-5.316
d5	0	10	-0.478	-6.442	-0.334	-2.252
d4	0	10	-0.822	-11.087	0.166	1.122
d3	0	10	-0.9	-12.133	0.247	1.668
d2	0	10	-1.013	-13.659	0.656	4.426
d1	0	10	-1.367	-18.438	0.888	5.988
Multivariate					43.195	63.552

Appendix4: Assessment of normality (Participation and Effort)

Variable	min	max	skew	c.r.	kurtosis	c.r.
ee9	0	10	-0.404	-5.452	-0.449	-3.027
ee8	0	10	-0.393	-5.3	-0.363	-2.448
ee7	0	10	-0.316	-4.255	-0.503	-3.39
ee6	0	10	-0.301	-4.054	-0.555	-3.739
ee5	0	10	-0.378	-5.092	-0.693	-4.673
ee4	0	10	-0.458	-6.179	-0.629	-4.242
ee3	0	10	-0.372	-5.01	-0.56	-3.778
ee2	0	10	-0.49	-6.611	-0.581	-3.919
ee1	0	10	-0.579	-7.812	-0.213	-1.438
Multivariate					92.745	108.853

Appendix5: Assessment of normality (Self-Orientation)

Variable	min	max	skew	c.r.	kurtosis	c.r.
f9	0	10	-0.353	-4.759	-0.477	-3.217
f8	0	10	-0.33	-4.443	-0.461	-3.112
f7	0	10	-0.243	-3.279	-0.427	-2.879
f6	0	10	10.163	137.049	107.554	725.156
f5	0	10	-0.278	-3.751	-0.585	-3.947
f4	0	10	-0.183	-2.466	-0.568	-3.831
f3	0	10	-0.199	-2.685	-0.552	-3.724
f2	0	10	-0.35	-4.724	-0.304	-2.047
f1	0	10	0.019	0.255	-0.614	-4.138
Multivariate					165.853	194.659

Appendix6: Assessment of normality (Caring)

Variable	min	max	skew	c.r.	kurtosis	c.r.
g10	0	10	-0.364	-4.904	-0.473	-3.189
g9	0	10	-0.453	-6.105	-0.305	-2.057
g8	0	10	-0.344	-4.643	-0.559	-3.771
g7	0	10	-0.54	-7.285	-0.214	-1.446
g6	0	10	-0.547	-7.377	-0.117	-0.791
g5	0	10	-0.627	-8.461	-0.007	-0.049
g4	0	10	-0.532	-7.173	-0.336	-2.266
g3	0	10	-0.552	-7.446	-0.307	-2.072
g2	0	10	-0.572	-7.709	-0.222	-1.498
g1	0	10	-0.567	-7.649	-0.674	-4.547
Multivariate					98.113	104.593

Appendix7: Assessment of normality (Leadership)

Variable	min	max	skew	c.r.	kurtosis	c.r.
b9	0	10	1.463	19.725	1.974	13.309
b8	0	10	1.234	16.638	1.077	7.261
b7	0	10	1.28	17.266	1.532	10.328
b6	0	10	0.903	12.175	0.47	3.17
b5	0	10	0.866	11.679	0.328	2.208
b4	0	10	0.885	11.928	0	0.003

b3	0	10	1.229	16.567	1.078	7.265
h2	0	10	-0.172	-2.323	-0.679	-4.578
h1	0	10	-0.319	-4.303	-0.539	-3.632
Multivariate					72.366	84.935

Appendix8: Assessment of normality (Value)

Variable	min	max	skew	c.r.	kurtosis	c.r.
i14	0	10	-0.954	-12.859	0.639	4.311
i13	0	10	-0.673	-9.075	0.1	0.671
i12	0	10	-0.689	-9.292	0.078	0.525
i11	0	10	-0.636	-8.572	0.116	0.78
i10	0	10	-0.666	-8.984	0.198	1.336
i9	0	10	-0.663	-8.946	0.164	1.103
i8	0	10	-0.667	-8.996	0.111	0.749
i7	0	10	-0.758	-10.228	0.375	2.528
i6	0	10	-0.54	-7.28	-0.248	-1.67
i5	0	10	-0.862	-11.618	0.405	2.733
i4	0	10	-0.865	-11.658	0.487	3.281
i3	0	10	-0.698	-9.41	0.364	2.453
i2	0	10	-0.833	-11.234	0.451	3.04
i1	0	10	-1.047	-14.123	1.007	6.789
Multivariate					215.932	168.484