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Ding, Jiandong
Faculty of Human-Environment Studies, Kyushu University

Sugiyama, Yoshio
Faculty of Human-Environment Studies, Kyushu University

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－Original－

Development of a scale to assess Chinese college students' social skills in physical education classes

Jiandong DING[1)] and Yoshio SUGIYAMA[1)*]

Abstract

In this study, based on Riggio's Social Skills Inventory (SSI) [1)2)], we developed a scale to assess college students' social skills in physical education (PE) classes. We selected and modified 12 items of the SSI by considering the specific context of PE classes. The items had to be answered using a 5-point Likert scale and were administered to 366 college students. We conducted exploratory factor analysis and confirmatory analysis, and based on the results, 1 item was deleted. The new scale consisted of two sub-scales, namely, verbal skills (five items) and nonverbal skills (six items), and the scores on the two sub-scales were founded to be adequately reliable and valid. Then, we analyzed the differences in scores based on gender and grade. The results revealed that there were no significant differences in social skills between male and female students. However, a significant difference in nonverbal skills was found between freshmen and sophomores. It is suggested that there may be a tendency for students' nonverbal skills in PE classes to improve through curriculum learning.

***Key words*:** social skills, college students, physical education classes

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1. Introduction

Social skills are one of the most important indicators of one's social competence[3)]. There are many definitions of social skills. For instance, Coleman and Lindsay[4)] defined social skills as cognitive functions and specific behaviors that an individual engages in when interacting with others. Social skills enable one to interact with others successfully and can help people to experience a high level of happiness[5)], self-esteem[6)], and quality of life[7)]. A deficit in social skills may be a risk factor in the development of disorders such as autism[8)], and psychosocial conditions such as depression[9)], social anxiety[10)], and loneliness[11)]. An area of interest related to social skills is the relationship between physical education (PE) and students' social development. PE is one of the best means by which to promote positive social behaviors in school[12)]. In PE classes, students engage in considerable social interactions with their peers and the teacher through sport activity. PE facilitates socialization[13)]; it is a powerful mechanism for increasing social skills[14)]. Therefore, PE classes have been recognized as an ideal environment in school, in which to improve students' social skills. Until now, there have been many studies investigating the effect of PE as an

1) Faculty of Human-Environment Studies, Kyushu University, Kasuga, Japan.
*Correspondence to: Faculty of Human-Environment Studies, Kyushu University, 6-1 Kasuga-koen, Kasuga City, 816-8580, Japan.
Tel & Fax: +81-92-583-7856. E-mail: sugiyama@ihs.kyushu-u.ac.jp

intervention for students' social development in school[15], and a number of social skills training programs for the PE setting have been developed, for instance, Siedentop's Sport Education[16], Hellison's Teaching Personal and Social Responsibility[17][18][19][20], and Cooperative Learning (Johnson & Johnson, 1999[21]; Stillwell & Willgoose, 2005[22]). Further, owing to the rise in students' personal and social problems in university, researchers have been paying more attention to college students' social skills development in school[23].

Self-report measures have been commonly used in the area of social skills. Inventories are one of the most frequently used instruments to assess social skills[24]. Over a number of years, assessments of social skills have been conducted for both clinical populations and non-clinical populations since social skills has increasingly become an area of interest for psychologists. For instance, two commonly used instruments, the Social Interaction Self-Statement Test[25] and The Inventory of Interpersonal Problems[26], focus primarily on the distress or anxiety of clinical populations. Several standardized instruments assessing basic social skills, such as Self-monitoring Scale[27], Social Interpretations Test[28], and The Affective Communication Test[29], have been developed to assess aspects of social skills (e.g., nonverbal skills) of non-clinical populations. For non-clinical adults, Riggio (1986, 1989)[1][2] developed a self-report measure, the Social Skills Inventory (SSI), which was designed to assess certain key dimensions of social skills. It became a representative instrument that came to be widely used by researchers in many countries (e.g., Cheng, 2005[30]; Dereli & Karakuş, 2011[31]; Perez et al., 2007[32]; Horwitz et al., 2007[33]). There have also been other standardized measures that were developed to evaluate adults' social skills, for instance, Kikuchi's Social Skills Scale (KiSS-18)[34] and the Social Skills Inventory IHS-Del-Prette[35]. However, these measures cannot be directly used to evaluate the social skills acquired by college students in the PE setting as there are differences between social skills acquired in the PE setting and those used in daily life. In training literature, 'transfer' is defined as the degree to which trainees apply the attitude, knowledge, and skills gained in a training context to other contexts such as job settings[36]. Students' social assets or competencies are those behaviors that can be learned in one domain (e.g., sport) and generalized or transferred to other domains (e.g., school, family, workplace, and community)[37]. According to Hommes and Van der Molen (2012)[38], the ultimate goal of communication skills training is the transfer of training, which involves trainees actually using the learned skills in their daily lives. The transfer of skills occurs at the moment when students apply skills to a task that is different from the task in which the skills were originally learned[39]. In school, much of the physical and social structure of the PE environment is different from the environment of other subject areas[40]. In the unique setting of PE, through interactions with other students and teachers in sport activities, students can learn certain social skills that may facilitate initiation, development, and continuation of interpersonal relationships. These skills can help students successfully introduce and express themselves to others, solve problems in the right way, and make decisions correctly. Then, when students in their daily lives face situations similar to those encountered in PE classes, they may use the social skills they learned in these classes in these daily-life social contexts. Therefore, the social skills students acquire in the PE setting may be different from the social skills they use in their daily lives[41] and this is where the phenomenon of skills transfer comes into play. Thus, it is somewhat unlikely that the instruments that were developed to assess students' social skills in daily life can accurately capture the true essence of the social skills acquired by students in the unique context of PE classes.

Until now, only a few studies have evaluated students' social skills from the point of view of the differences between social skills acquired in PE class and those used or required outside PE class. Vernadakis et al. (2010)[42] developed the student's

behaviors' self-evaluation scale in order to evaluate the moral and social development of elementary students in the context of PE classes. One study was conducted by Sugiyama et al. (2010)[41], who, by considering the different environmental contexts, developed scales for assessing students' psychosocial skills in PE and daily life. Maureen et al. (2014)[43] developed a quantitative survey that can be used to evaluate the effects of youth development programs in teaching youth social, emotional, and behavioral competencies that can be generalized to other domains of daily life. The purpose of this study was to develop a context-specific instrument that can be used to accurately evaluate college students' social skills that are acquired in the context of PE classes.

2. Method

Instrument: Items selected from the SSI

The SSI is a self-report measure that was developed by Riggio in 1986 and was revised in 1989[1][2]. The inventory has 90 items, including those concerning basic social/communication skills, and these items are distributed across six subscales (15 items per subscale) that representing three basic communication skill dimensions (expressivity [sending ability], sensitivity [receiving and decoding ability], and control [ability to regulate communication]) in two separate domains, namely, the nonverbal (or emotional) domain and verbal (or social) domain[2][44]. The skills measured by the subscales are emotional expressivity (EE), emotional sensitivity (ES), emotional control (EC), social expressivity (SE), social sensitivity (SS), and social control (SC). Each item has to be answered on a 5-point Likert scale ranging from "not at all like me" to "exactly like me," and the scores on the subscales range from 15 to 75. Cheng (2005)[45] translated the SSI into Chinese to study the characteristics of the development of social skills of Chinese college students. Qian (2012)[46] examined the reliability and validity of the SSI on a sample of Chinese in-service staff through precise translation and repetitive investigation. In our study, the context of the items was based on the original version of the SSI and two Chinese versions that were translated by Cheng (2005)[45] and Qian (2012)[46]. Although the 90-item SSI has good validity, it is not concise and takes time to administer. The number of items of a psychosocial scale should ideally be limited[47]. Therefore, we tried to develop a simplified version of the SSI. Further, when selecting items, to ensure the core purpose of our study was met, we fully considered the specificity of the college PE context. The SSI was originally developed to evaluate people's social skills in daily life. Some items (e.g., "At parties I enjoy speaking…" and "I usually take the initiative and introduce myself to strangers") are not suitable for the PE setting; as a result, we could not use these items. In case of some items that have been used in our study, we changed the wordings, in accordance with the unique contexts of PE and native Chinese culture. For example, we changed the original item "I can fit in with all types of people, young and old, rich and poor" to "I can fit in with all types of people in the PE class." Finally, we selected 12 items (Table 1 and Table 2).

Procedure

We carried out a survey in June 2014 and the participants were college students from two Chinese cities (i.e., Dalian and Sanya). They (n=366)

Table 1. Selected SSI items

Item in this study	Item in the SSI	Subscale domain
5	19	ES
11	55	
3	14	ES
9	32	
1	1	EC
7	57	
6	30	SE
12	79	
4	5	SS
10	67	
2	6	SC
8	64	

Table 2. SSI items selected for this study

1. When I feel sad or depress, others can hardly detect my feeling.
2. I can fit in with all types of people in the PE class.
3. When someone pays close attention to me I can instantly detect it.
4. I feel very uncomfortable when being criticized.
5. I am good at express myself by eyes.
6. It is difficult for me to speak when facing all class members.
7. I express as calm even if I'm very nervous.
8. I am not gregarious.
9. I can always detect others' feeling no matter how they pretend it.
10. I don't like to be the focus of others' attention.
11. I always have body touch with friends.
12. I rarely talk in the class.

consisted of 189 freshmen (male: 101, female: 88) and 177 sophomores (male: 93, female: 84). A retest was conducted for 40 freshmen (male: 23, female: 17). We administered the selected items of the SSI to the students, and the students in the test-retest group retook the questionnaires two weeks after the initial administration.

Data analysis

We performed exploratory factor analysis to examine factor components of the scale. We verified the reliability of the scales by calculating Cronbach's α coefficient and the test/retest correlation r. We used confirmatory factor analysis to determine the validity of the scale. A two-factor analysis of variance (ANOVA) was conducted to examine the age- and gender-based differences in social skills. We performed data analysis by using SPSS 22.0 and Amos 22.0 for Windows.

3. Results

Exploratory factor analysis

In order to determine whether the items assessed distinct aspects of social skills, we performed an exploratory factor analysis by using the principal components method with varimax rotation, on the sample (n=366) of the survey. Bartlett's test of sphericity (733.646) and the Kaiser-Mayer-Olkin (KMO) statistic (0.733) suggested that it was necessary and feasible to perform factor analysis. First, we derived three factors by setting the eigenvalues higher than 1.0. With regards to the eigenvalues, the eigenvalue of factor 1 was 2.214, that of factor 2 was 2.158, and that of factor 3 was 1.598. The curve on the scree plot (not shown here) became smooth after the second factor. As the items of the SSI reflected social skills in two domains, namely, verbal and nonverbal skills, we performed the factor analysis again by extracting the number of factors with 2, and suppressing the absolute values of factor loadings less than 0.30. The results revealed that except for item 2, all the items located on the factors were consistent with the domains from which the items were selected in the SSI. Then, similarly, we conducted an analysis for the third time, wherein we deleted item 2. The result revealed that the factor loadings were all greater than 0.4 except for item 11, for which the factor loading was 0.381. Finally, we employed 11 items. The 11 item-SSI (11-SSI) included two subscales, which we called "nonverbal skills" (factor 1) and "verbal skills" (factor 2). The results are presented in Table 3.

Reliability of the 11-SSI

We calculated Cronbach's α coefficient, which is a reliability index of internal consistency, to assess the reliability of the 11-SSI. The reliability coefficient of the total scale was 0.515 and the reliability coefficients of the subscales were 0.679 (for the verbal skills subscale) and 0.665 (for the nonverbal skills subscale). In addition, we conducted a correlation analysis for the two-week test-retest. The correlation coefficient r for the total scale was 0.926 and those for the subscales were 0.917 (for the verbal skills subscale) and 0.934 (for the nonverbal skills subscale). Thus, the results verified that the reliability of the 11-SSI was acceptable. The results are presented in Table 4.

Table 3. Results of the exploratory factor analysis of the 11-SSI (*n*=366)

Item	Mean	SD	Factor loading	
			Factor 1 (Nonverbal skills)	Factor 2 (Verbal skills)
5	2.68	1.059	0.721	
9	2.90	1.072	0.711	
3	2.77	1.043	0.704	
1	2.54	1.089	0.561	
7	3.18	1.073	0.546	
11	3.23	1.177	0.381	
12	3.95	1.197		0.748
6	3.83	1.164		0.745
8	4.27	1.044		0.708
10	3.27	1.074		0.634
4	3.02	1.135		0.410
Eigenvalue			2.411	2.258
Variance explained (%)			21.916	20.531

Table 4. Results of reliability analysis for the 11-SSI (*n*=366)

	Cronbach's α	Test-retest *r*
Verbal skills	.679	.917**
Nonverbal skills	.665	.934**
Total skills	.515	.926**

** $p < .01$

Validity of 11-SSI

To assess the validity of the factor component of the 11-SSI in evaluating social skills in PE classes, we performed a confirmatory factor analysis. Figure 1 shows the results of the analysis. The goodness of fit index (GFI) was 0.946. The adjusted goodness of fit index (AGFI) was 0.917. The comparative fit index (CFI) was 0.881. The root mean square error of approximation (RMSEA) was 0.068. The results suggested that the hypothesized two-factor model that was developed based on the results of exploratory factor analysis fit the data reasonably well.

Age- and gender- based differences in social skills

To analyze the differences in social skills on the basis of age and gender, we performed a two-factor (age × gender) ANOVA. According to the results, there were no significant differences between the verbal skills, nonverbal skills, and total social skills of males and females; further, there were no significant differences between the verbal and total skills of freshmen and sophomores. However, there was a significant difference between the nonverbal skills of freshmen and sophomores (F=4.14). The results are presented in Table 5.

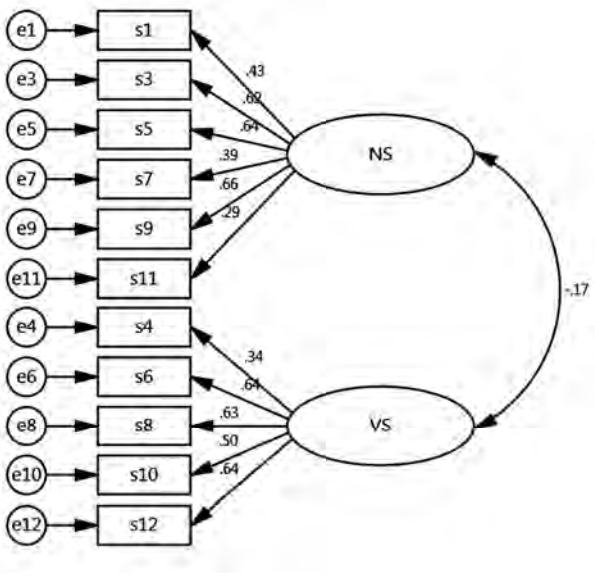

Figure 1. Results of the confirmatory factor analysis of the 11-SSI (NS = Nonverbal Skills, VS = Verbal Skills, s1-12 = skills 1-12)

Table 5. Age- and gender- based differences in social skills

		Freshman (M*n*=101, F*n*=88)		Sophomore (M*n*=93, F*n*=84)		F (*df*=1,364)		
		Mean	SD	Mean	SD	Age	Gender	Interaction
Verbal	Male	18.28	3.83	17.95	4.15	2.28	0.097	0.8
	Female	18.37	3.65	18.07	3.95			
Nonverbal	Male	17.49	4.08	17.61	3.59	4.14*	3.43	0.12
	Female	17.20	4.21	17.32	4.13			
Total	Male	35.76	4.56	36.54	4.71	3.17	3.21	0.07
	Female	35.57	5.68	36.12	5.73			

* p< .05 M: male F: female

4. Discussion

Upon graduation, college students are expected to apply their learnings to the real-world setting. However, this is the long-term expectation of their learnings. During the four years that they study and live on the campus, they are also expected to apply their learnings to their everyday social life. This is the expectation of the transfer of their learnings, in other words, the expectation to grow into socially mature individuals. Recently, in China, an emergent area of research on social skills is the study of social skill in the context of college PE. Several researchers have begun studying the function and use of PE in the social skills development of college students (e.g., Wang & Sugiyama, 2014[23]; Lv & Takami, 2015[48]). However, based on the literature on transfer of learning in social psychology, we felt that it was necessary to exert caution when choosing instrument to evaluate the improvement of social skills. This is because the use of a measurement in a context different from that for which it was originally developed may not provide an accurate evaluation.

Therefore, the general purpose of this study was to develop a scale that can be used to evaluate the social skills that Chinese college students acquired in PE classes. In this study, by considering the process of skills transfer, we distinguished the social skills that were acquired during PE from those that were used in daily life. The items included in the measure were selected from Riggio's SSI[1)2)], and were revised based on the unique contexts of PE and native Chinese culture. Through exploratory and confirmatory research, we developed an 11 item-SSI. The 11-SSI consists of two sub-scales, namely, verbal skills and nonverbal skills. We found the reliability and validity of the 11-SSI to be acceptable, and the instrument can be used to evaluate college students' social skills in PE classes.

Adolescents' perceptions of their social skills in PE vary according to age and gender[49)]. In this study, we used the new scale to examine age- and gender-based differences in social skills. The results only indicated that there was a significant difference in nonverbal skills between freshmen and sophomores. This implied that as male and female college students mature into adults, their levels of social skills may remain more or less the same and even their verbal skills may not improve much; however, as they grow older, there is a considerable scope for their nonverbal skills to develop.

Therefore the 11-SSI can be used to assess the developmental outcomes of social skills in the specific context of PE classes. However, to our knowledge, evaluation studies have not assessed whether students perceive that they are able to successfully transfer social skills learned through PE to other domains and contexts. Thus, in order to examine the attribution of PE for students' social competence in life, a measure of social skills transfer is needed to be developed to enable the evaluation of PE in successfully teaching skills that students report using in other domains.

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