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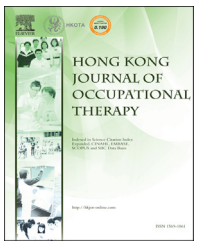

ORIGINAL ARTICLE

Reliability and Validity of School Function Assessment for Children with Cerebral Palsy in Guangzhou, China

Xiao-Lin Li [a,b], **Vicky An-Qin Dong** [a,c,*], **Kenneth N.K. Fong** [a]

[a] *Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Hong Kong*
[b] *School of Rehabilitation Sciences, Shanghai University of Traditional Chinese Medicine, Shanghai, China*
[c] *Guangdong Provincial Work Injury Rehabilitation Hospital, Guangzhou, China*

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Summary *Background/Objective:* The aim of this study was to examine the reliability and validity of the Chinese version of the School Function Assessment (SFA) for primary school students with cerebral palsy (CP) in Guangzhou, China.
Methods: Ninety-three students with CP were recruited by convenience sampling from a special school. The Chinese version of the SFA was administered and an exploratory factor analysis with direct oblique rotation was used to extract the factor structure underlying the Activity Performance scales of the SFA. An intraclass correlation one-way random single measure was performed to study external reliability. Cronbach's alpha was used to study internal consistency.
Results: The findings showed that the Chinese version of the SFA had high internal consistency with test–retest reliability [ICC (1, k) = 0.49–0.97].
Conclusion: This study has established the applicability of the SFA for both clinical and research purposes in the Chinese population, and presented evidence of satisfactory psychometric properties in use with primary school students with CP in special schools.

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* Corresponding author. Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Hong Kong.
E-mail address: dong.anqin@connect.polyu.hk (V.A.-Q. Dong).

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Introduction

In China, the education and rehabilitation of children with disability has become an increasingly serious social problem and the Chinese government has enacted legislation to ensure that such children enjoy the right to an education and to participate in the community. In 2006, there were 3.87 million children aged between 0 and 14 with disability in China. Of these, 2.46 million were aged 6—14, among whom were about 480,000 diagnosed with cerebral palsy (CP) (Office of the Second National Sample Survey on Disability, 2007). Among them, 63.2% of children with disability are enrolled either in mainstream or special schools. The rate of school enrollment has increased by 7.94% compared to the rate in 1987 (Office of the Second National Sample Survey on Disability, 2007). In 2007, nearly 905,000 school-aged children with disability in China were denied access to education due to factors such as inadequate school resources and poverty. Although some projects (i.e. "Project Hope" and "Spring Drizzle") are attempting to assist such children to go to school, a lack of accessibility and appropriate accommodation in mainstream school campuses present environmental barriers to students with physical disability (Disabled World, 2010). Appropriate special education services can provide children with disability with maximum access to the classroom and enable them to take part in regular schooling more effectively. Research on the functional performance of children with disability in a real-life school environment in China is relatively rare. Therefore, it is important to evaluate the strengths and needs of children and families so that appropriate interventions and services can be developed (Dunn & Oetter, 1991; Stewart, 2001).

CP has been defined as a group of non-progressive, developmental disorders of movement and posture limiting activity (Rosenbaum et al., 2007). Motor impairment is secondary to lesions or anomalies of the brain in the early stages of development, followed by impairment of sensation, cognition, communication, and behaviour (Mutch, Alberman, Hagberg, Kodama, & Perat, 1992). Children with CP have a range of physical and mental impairments which result in a wide range of disability, although their performance depends very much on their living environment or context. The International Classification of Functioning, Disability and Health of the World Health Organization identifies environmental factors as those that are external to the individual which make up the physical, social, and attitudinal environment within which the person lives and conducts his/her life (World Health Organization, 2007). In particular, Rosenbaum and Stewart (2004) emphasized that studies of children and youths with CP should also include the dimensions of participation in school and the interactional nature of their life experiences in the school environment. The latter is important in terms of evaluating the extent to which a child can engage in activities that meet his/her individual needs and goals and meet social expectations (Simeonsson, Carlson, Huntington, McMillen, & Brent, 2001). School participation can be influenced by either external (environmental) or internal factors, such as the child's physical, cognitive, speech and language, and behavioural abilities, as both factors are important to students' performance of activities (Schenker, Coster, & Parush, 2005).

Many of the assessments commonly used by occupational therapists in schools provide information about students' specific, isolated skills, rather than look at their functional ability to interact with the physical and social environment encountered in the real-life school setting. The School Function Assessment (SFA), which measures a student's performance of a series of functional tasks that represent the expectations of the role of an elementary school pupil in both academic and social activities show promise (Coster, Deeney, Haltiwanger, & Haley, 1998). It consists of three parts—participation, task supports, and activity performance—which systematically and comprehensively identify the student's strengths as well as the limitations that may influence his/her participation in a variety of tasks in the school environment (Coster et al., 1998). The SFA is a criterion-referenced assessment that measures a student's current level of performance relative to the overall continuum of educationally relevant functional skills and participation within and outside the classroom in the school setting. Its comprehensive design provides a view of the student's functioning as well as the specific needs and supports arising from his/her educational programme. Students without disability will score very high on the SFA with very little variance. Thus, the results of the SFA can help a collaborative team of educational specialists to develop specific goals and objectives for the Individualized Education Programme (Coster et al., 1998).

At present, there is no valid form of assessment in use in China that can directly measure the school performance and participation of students with disability. The previous Taiwanese version of the SFA was standardized for occupational therapists and other school professionals in Taiwan, but may not be culturally suited for use in Mainland China (Hwang, Nochajski, Linn, & Wu, 2004). Therefore, the purpose of this study was to examine the content and construct validities, internal consistency and external reliability of the Chinese version of the SFA and to explore its usefulness in working with primary school students with CP in Guangzhou, China.

Methods

Participants

A convenience sample of 93 participants was recruited from a special school in Guangzhou, China, one of the first special schools specifically for students with CP. Included were all students with CP from Grade 1 to Grade 5, aged 6—18 years. The inclusion criteria for participation in this study were (a) a diagnosis of any type of CP, including hemiplegia, diplegia, triplegia, and quadriplegia, (b) having physical and/or cognitive problems, (c) age 6—18 years, and (d) consent from students aged over 16, from parents, and from the school director. Demographic characteristics, diagnosis, classification of CP, and level of motor impairment were obtained from each student's educational records, which were reviewed by experienced occupational therapists and special education teachers working in the school. This study also involved 12 teachers who had

worked with the students for more than half an academic year and were familiar with their performance of activities in most school settings. Four were live-in teachers who had responsibility for taking care of the students' everyday needs. The remaining eight were academic teachers responsible for tutorial work. The study was performed in accordance with the principles of the Declaration of Helsinki. Ethics approval was sought from the Hong Kong Polytechnic University (ID: HSEARS20090609001) and the principal of the special school. Written and informed consent was obtained from a parent of each student. Letters introducing the study were sent out to all relevant teachers and parents prior to enrollment. A research translation license for the SFA was obtained from the publisher before the study began.

Procedures

Translation process

We developed the Chinese prototype of the SFA by using the translation approach suggested by Sartorius and Kuyken (1994). Permission for use and translation of the scale was obtained from the copyright owner. A five-stage process was used: translation, synthesis, back translation, expert panel review and pilot testing. The SFA, including the assessment form, rating scale guide, and test manual, was first translated into Chinese by a professional bilingual translator in Mainland China. The back translation in this study was conducted by another experienced translator whose mother tongue is English, who was blinded to the original version of the SFA. The two translators then compared the back translation with the original, and reached a consensus for the final Chinese version.

To address content validity, an expert panel comprised of four health care experts was established: there was one teacher and one medical consultant from Mainland China with an average of 5 years' working experience, and two experienced bilingual occupational therapists specializing in paediatrics from Hong Kong, who are familiar with the Chinese culture and educational context. We designed an *expert opinion questionnaire* to evaluate their interpretations in terms of the degree of agreement on content and linguistic appropriateness of the translation of each item in the SFA, as represented by cultural relevance, fluency, clarity, the semantic meaning of words, and the semantic meaning of whole sentences. The experts were asked to rate each of the above items using a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). In the translation process, we also considered the cultural relevance of the items to Mainland China, with the panel offering a satisfactory level of agreement that the wordings used by the translators were simple and easily understood. For instance, the item "Brings food from plate/container to mouth using fork or spoon" was amended to "Brings food from plate/container to mouth using chopsticks or spoon", and "Buttons small buttons (less than one inch)" was replaced by "Buttons small buttons (less than two centimeters)". A final draft of the Chinese version was then completed by amending the content and wording according to these ratings, taking into account the qualitative responses also given by the experts.

Field test implementation

The SFA was completed by the 12 primary school teachers (that is, they acted as raters) for 93 consenting students. Teachers received prior written instructions on how to complete the questionnaires before the study commenced. The Rating Scale Guide was also translated into Chinese in this study so that it could be given to teachers to rate the students' performance in the school setting. Moreover, they were given an hour of group training on the background of the SFA and on how to use each of the scale ratings. The SFA was then scored for the 21 individual Activity Performance Scales on a 0–100 continuum following the standard scoring procedures described in the translated Chinese manual.

Test–retest procedure

Fourteen participants, aged 8–15 years (mean, 11 ± 2.4 years), mainly male ($n = 11$) and diagnosed with hemiplegia ($n = 10$), were recruited for the test–retest reliability study. The sample size for the test–retest study was based on the convenience sampling that at least 2 students were randomly selected from each of the 5 participating grades. The same teacher (that is, the rater who had done the SFA previously for the selected students) was asked to complete the questionnaire again 10 days after the first time, in the same environment.

Data analysis

The demographic characteristics and scores of the SFA were summarized and the average percentages of agreement computed in order to evaluate the experts' opinion on the content and linguistic validities for each item of the questionnaire. Intraclass correlation [ICC (1, k)] one-way random single measures were used to investigate test–retest reliability of all SFA items (Shrout & Fleiss, 1979). Cronbach's alpha was used to test the internal consistency of all parts of the new Chinese version by assessing the extent to which the items correlated with one another within a scale (Cronbach, 1951). Construct validity of the Chinese version of the SFA was evaluated through an exploratory factor analysis. Although a sample size of about 100 is considered to be marginal according to the rule of thumb in the factor analytic literature, exploratory analyses about the number of factors should also be considered for instrument development during the exploratory stage (Henson & Roberts, 2006). Principal component analysis with direct oblique rotation was used to extract the factor structure underlying the summary scores for the Activity Performance scales of the SFA (Hwang et al., 2004; Hwang & Davies, 2009). The factor analysis procedure was selected with the purpose of extracting factors that would demonstrate the inter-correlations among the observed variables for comparing with the factor structure of the original version of the SFA, and the oblique rotation option was used under the assumption that the factors extracted would also correlate with one another (Stevens, 2001). This form of rotation approach, which tries to minimize the complexity of the loadings within each factor, is commonly used as it makes the distinct factors visible and independent of each other (Portney & Watkins, 1993). All statistical tests were

carried out using SPSS version 14.0 (SPSS Inc., Chicago, IL, USA) for Windows, with the significance level set at $p = .05$.

Results

The baseline characteristics of the participants are shown in Table 1. Ninety-three students with CP aged 6–18 years (mean, 11.3 ± 2.7 years) were recruited from Grade 1 to Grade 5. All children had spastic type CP: spastic hemiplegia (75.3%), diplegia (10.7%), triplegia (1.1%) and quadriplegia (12.9%). The children who were diagnosed with hemiplegia were classified as having unilateral motor impairment, while those with diplegia, triplegia and quadriplegia were classified as having bilateral movement impairment. Overall, 75.3% of participants had unilateral movement impairment and 24.7% had bilateral movement impairment. Participants included students who had intellectual impairment (44%), special learning disability (11.1%), impairment of visual abilities (9.1%), and impairment of speech or language (16%).

The gross motor functions of participants were assessed by the Gross Motor Function Classification System (GMFCS) (Morris, 2008). More than half of the children (57 children, 61.3%) were identified as being at Level II, 25 (26.9%) at Level III, and 11 (11.8%) at Level IV. Correlations among motor impairment (classification of CP), medical history and GMFCS were analyzed by Spearman's test, but no significant relationships among them were noted.

Table 2 describes the mean ± standard deviation score of each item of the SFA scale for all the participants. The mean scores for a majority of items were more than 50 out of 100 points, except for the three items of Physical Adaption, Recreational Movement and Up/Down Stairs, which were rated at less than half of the total score. All the participants presented better performance in Participation, Setup and Cleanup, and Eating and Drinking in the school situation, with a mean score of more than 70 points.

Table 1 Characteristics of Study Participants ($n = 93$).

Sex, *n* (%)	
Male	67 (72.0)
Female	26 (28.0)
Age (year), mean (SD)	11.3 (2.7)
Age groups, *n* (%)	
6–7	2 (2.2)
8–9	29 (31.2)
10–11	21 (22.6)
12–13	13 (14.0)
14–15	17 (18.3)
16–17	7 (7.5)
18–19	2 (2.2)
Classifications of CP, *n* (%)	
Spastic diplegia	10 (10.7)
Spastic hemiplegia	70 (75.3)
Spastic triplegia	1 (1.1)
Spastic quadriplegia	12 (12.9)
Medical history, *n* (%)	
Intellectual disability	41 (44.1)
Special learning disability	11 (11.8)
Visual impairment	9 (9.7)
Speech or language impairment	15 (16.1)
Dialect spoken, *n* (%)	
Cantonese	64 (68.8)
Mandarin	89 (95.7)
Means of communication, Verbal, *n* (%)	
Expressive	84 (90.3)
Receptive	68 (73.1)
Means of communication, Written/pictorial, *n* (%)	
Expressive	26 (28.0)
Receptive	18 (19.4)
Means of communication, Gesture, *n* (%)	
Expressive	23 (24.7)
Receptive	21 (22.6)
GMFCS, *n* (%)	
Level II — walks on own	57 (61.3)
Level III — walks with crutches	25 (26.9)
Level IV — mobility by manual wheelchair	11 (11.8)

CP = cerebral palsy; GMFCS = Gross Motor Function Classification System; SD = standard deviation.

Content and construct validities

In the *expert opinion questionnaire*, the average percentage score of agreement on cultural relevance was 72.5%.

Table 2 Descriptive Statistics of SFA Scales in Students with Cerebral Palsy ($n = 93$).

Scale	Mean	SD
Participation	71.52	20.46
Physical assistance	50.88	23.57
Physical adaptation	48.41	23.46
Cognitive assistance	55.11	23.81
Cognitive adaptation	52.92	22.47
Travel	57.87	31.14
Maintaining and changing position	64.42	23.62
Recreational movement	45.69	25.39
Manipulation with movement	61.09	20.16
Using materials	58.52	22.96
Setup and cleanup	70.44	23.69
Eating and drinking	73.37	26.49
Hygiene	64.46	23.17
Clothing management	63.52	22.45
Up/Down stairs	44.82	36.31
Written work	58.12	31.00
Computer and equipment use	63.00	27.54
Functional communication	66.11	25.57
Memory and understanding	66.37	26.08
Following social conventions	61.25	24.34
Compliance with adult directive & school rules	65.77	26.00
Task behaviour/completion	59.51	24.67
Positive interaction	63.08	24.63
Behaviour regulation	55.24	24.43
Personal care awareness	64.05	24.64
Safety	59.91	26.16

SFA = School Function Assessment (scale: 0–100); SD = standard deviation.

The highest percentage (85.3%) was for the item dealing with the semantic meaning of words, while all other items ranged around the seventies (Table 3). Agreement on the semantic meaning of the Chinese words used was 85.3%, indicating that the content validity of the prototype is supported by the expert ratings.

The factor structure of the Chinese version of the SFA was studied using exploratory factor analysis based on the sample of 93 students (Table 4). The Kaiser-Meyer-Olkin measure of sampling adequacy was .92 and Bartlett's test of sphericity was significant ($\chi^2 = 2107.88$; $df = 201$; $p < .001$). These results indicated that the correlations among the items were statistically different from zero and the data are suitable for factor analysis. Principal component analysis and scree plot examination extracted three factors (eigenvalue > 1) underlying each of the summary scores of the 21 Activity Performance items, which accounted for 77.5% of the total variance ($\lambda 1 = 12.34$; $\lambda 2 = 2.85$; $\lambda 3 = 1.11$). The linear combination formed by Factor 1 had an eigenvalue of 12.34, and accounted for 58.8% of the variance; Factor 2 had an eigenvalue of 2.85, accounting for 13.5%; and Factor 3 had an eigenvalue of 1.11, accounting for 5.2%. After Varimax rotation using the Kaiser Normalization method, the scales of functional communication, memory and understanding, following social conventions, compliance with adult directives, task behaviour/completion, positive interaction, behaviour regulation, computer and equipment use, written work, and safety were loaded on to Factor 1 and were defined as the "Cognitive/Behavioural Function" factor. The scales of manipulation with movement, using materials, setup and cleanup, eating and drinking, hygiene, clothing management, and personal care awareness were grouped as Factor 2 and defined as the "Physical Tasks" factor. The scales of travel, maintaining and changing position, recreational movement, and up/down stairs were grouped as Factor 3 and defined as "Mobility".

Table 4 Factor Analysis by Rotated Component Matrix.

Activity Performance scale	Factor 1	Factor 2	Factor 3
Travel	.05	.10	.91
Maintaining and changing position	.24	.38	.77
Recreational movement	.25	.37	.69
Manipulation with movement	.31	.75	.38
Using materials	.37	.78	.02
Setup and cleanup	.25	.74	.41
Eating and drinking	.45	.68	.31
Hygiene	.47	.67	.27
Clothing management	.31	.74	.33
Up/Down stairs	-.03	.13	.91
Written work	.56	.52	-.02
Computer and equipment use	.59	.43	.27
Functional communication	.75	.38	.04
Memory and understanding	.84	.29	.05
Following social conventions	.89	.25	.09
Compliance with adult directive & school rules	.85	.30	.20
Task behaviour/completion	.84	.33	.12
Positive interaction	.86	.31	.18
Behaviour regulation	.90	.14	.10
Personal care awareness	.57	.61	.34
Safety	.76	.46	.15

Notes: Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization with rotation converged in 5 iterations.

Reliabilities

The internal consistency of each scale of the Chinese version of the SFA was examined using the alpha coefficient, as shown in Table 5. As a rule of thumb, Cronbach's alpha with values equal to or above .90 can be considered excellent in internal consistency (Portney & Watkins, 1993). The coefficient ranged from .91 to .96, demonstrating high internal consistency. The test–retest reliability reported ICC (1, k) ranges from .49 to .97 among the individual summary scores for each of the 21 scales in the Activity Performance domain, as shown in Table 6. ICC values above .75 are indicative of good reliability, and those below .75 are of poor-to-moderate reliability (Portney & Watkins, 1993). The ICC (1, k) of 71.4% of the Activity Performance items ranged from .75 to .97, indicating good-to-excellent reliability.

Discussion

This study aimed to support the content validity and reliability of the Chinese version of the SFA using a group of primary school students with CP in Mainland China. All questionnaire items in the prototype, including the SFA scales and rating sheet, demonstrated a satisfactory degree of agreement with the proportion of "total agreement" up to 85.3% in the study context. Unlike many traditional developmental tests that primarily use children without disability, the standardization of the SFA carried out with students with learning disability or CP was proven to have high validity by Hwang, Davies, Taylor,

Table 3 Average Results of Agreement on the Translation of Each Item in the School Function Assessment.

	Totally agree (%)	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Totally disagree (%)
Cultural relevance	72.5	23.6	48.9	25.3	2.2	0	2.2
Fluency	73.3	21.9	51.4	29.9	3.2	0	3.2
Clearness	72.0	24.3	47.7	28.0	0	0	0
Semantic meaning of words	85.3	26.7	58.6	14.3	0.2	0.2	0.4
Semantic meaning of whole sentence	77.6	21.3	56.3	17.9	2.5	2.0	4.5

Table 5 Internal Consistency Reliability Coefficients (Cronbach's alpha) of the Chinese version of the School Function Assessment (n = 93).

Scale	Alpha
Part I: Participation	.92
Part II: Task Support	
Physical Tasks—Assistance	.94
Physical Tasks—Adaptation	.94
Cognitive/Behavioural Tasks—Assistance	.93
Cognitive/Behavioural Tasks—Adaptation	.94
Part III: Activity Performance	
Physical Tasks	
Travel	.92
Maintaining and changing position	.91
Recreational movement	.91
Manipulation with movement	.91
Using materials	.91
Setup and cleanup	.91
Eating and drinking	.91
Hygiene	.91
Clothing management	.91
Up/Down stairs	.91
Written work	.92
Computer and equipment use	.91
Cognitive/Behavioural Tasks	
Functional communication	.96
Memory and understanding	.96
Following social conventions	.96
Compliance with adult directive and school rules	.96
Task behaviour/completion	.96
Positive interaction	.96
Behaviour regulation	.96
Personal care awareness	.96
Safety	.96
Physical tasks part	.92
Cognitive/Behavioural tasks part	.97

Table 6 Test—Retest Reliability of the Chinese Version of the School Function Assessment (n = 14).

Scale	ICC	95% CI
Part I: Participation	.83	.47—.94
Part II: Task Support		
Physical Tasks—Assistance	.84	.53—.95
Physical Tasks—Adaptation	.78	.35—.93
Cognitive/Behavioural Tasks—Assistance	.82	.46—.94
Cognitive/Behavioural Tasks—Adaptation	.69	.06—.90
Part III: Activity Performance		
Physical Tasks		
Travel	.97	.92—.99
Maintaining and changing position	.78	.35—.93
Recreational movement	.77	.30—.93
Manipulation with movement	.71	.11—.91
Using materials	.49	−.55—.83
Setup and cleanup	.81	.42—.94
Eating and drinking	.72	.21—.92
Hygiene	.74	.22—.92
Clothing management	.86	.59—.96
Up/Down stairs	.80	.38—.93
Written work	.51	−.48—.84
Computer and equipment use	.59	−.23—.87
Cognitive/Behavioural Tasks		
Functional communication	.84	.53—.95
Memory and understanding	.92	.76—.97
Following social conventions	.88	.64—.96
Compliance with adult directive & school rules	.86	.57—.95
Task behaviour/completion	.94	.93—.98
Positive interaction	.96	.89—.99
Behaviour regulation	.78	.34—.93
Personal care awareness	.79	.37—.93
Safety	.82	.48—.94

CI = confidence interval; ICC = intraclass correlation coefficient (1, k).

and Gavin (2002). The good content validity and reliability of the Chinese version of the SFA implies that the original scoring criterion is acceptable to be applied for measuring school activity performance of children aged up to 18 years in special schools in China. Although good validity and reliability were found in this study, the SFA in particular is a context-related assessment tool and must therefore be carefully validated in different languages and cultures before being used outside its country of origin.

The results of the factor analysis also supported the theoretical hypothesis described by the authors of the original SFA, although four mobility items do not belong to the physical function in this version. The construct of school function, when measured with heterogeneous groups of students with disability, involved two major domains: cognitive/behavioural and physical function (Coster, Mancini, & Ludlow, 1999; Mancini & Coster, 2004). However, the results of this study showed little difference from the original, except that the physical function task gave rise to an additional separate construct—Mobility—from that in the original test. This result is different from that found in the original scale. All of our participants were students with CP, of whom 85% had movement impairment involving both the upper and lower extremities. It is therefore not difficult to understand that mobility was a very important aspect of their physical performance as they needed to move around, up, and down to perform functions around school, such as going to the toilet and accessing classrooms and bedrooms. It may therefore be expected that Mobility in the Physical Tasks factor mainly involves lower-limb movements. These scales are closed to the mobility dimension, while the scales of the Physical Tasks factor are mainly related to upper-limb movements. We also found that the rotated values of the scales of written work and computer and equipment use were involved in both the Cognitive/Behavioural Function factor and the Physical Tasks factor. Considering that use of computer and other equipment involves cognitive function, we located this scale in the Cognitive/Behavioural Function factor. On the other hand, as written work mainly involves upper-limb movement, it can be included either in the Physical Tasks or Cognitive/Behavioural Function factors.

Internal consistency as measured by Cronbach's alpha was excellent. The alpha coefficient was over the required .90 among the two major domains of the SFA, in terms of the Cognitive/Behavioural Function (.97) and Physical Tasks factors (.92), demonstrating the high internal reliability of the Chinese version of the SFA for use with children with CP in Mainland China. Moreover, the teachers reported that the Chinese version of the SFA was relevant to students with CP in the special school involved in this study.

Re-administration of the SFA allows the examiner to document the progress of the student's educationally relevant functional performance as well as to measure the effects of the services provided (Fisher, 1992). The results of the test–retest reliability were satisfactory overall, though some scales showed lower values, especially written work, using materials, and computer and equipment use. One possible reason for the low coefficient for the scale of computer and equipment use is that students who use a computer may not do so very often, or they may have no opportunity to use one at the school due to limited availability. Accordingly, this scale may not be suitable for these students' situation, leading to the rater being unable to decide how to rate these items. This is consistent with the observations of Silverman and Smith (2006) that the scale has a number of limitations relating to its use in assistive technology in the school setting, and previous studies have also found that school participation differs depending on occasion, type of activity, and contextual features (Egilson & Traustadottir, 2009; Eriksson, Welander, & Granlund, 2007). From the findings of this study, we note that school participation is limited by the school environment and that the school environment is contextual and to some extent culture-bound. Therefore, we suggest that a careful examination of the construct of this instrument, particularly the common contextual features of the school environment in a particular country, is very important before the tool is used for data collection. Silverman and Smith (2006) adapted the SFA to make it more able to assess the effects of using assistive technology and so that it is in line with expert interpretations regarding assistive technology. Regarding the written work and using materials scales, the raters may not have been familiar with students' performance of writing or hand manipulation, and these low values suggest that this assessment should be used by trained raters who are able to respond to items about type of activity and contextual features. Thus, untrained raters or raters with limited experience of the students' school performance may have influenced the test–retest reliability of some items of the Chinese version.

Study limitations

In this study, convenience sampling was used—only one special school was involved in the study the sample was primarily male students, and the participants' age levels were unevenly distributed, which limits the generalizability of these findings to children who are younger than 7 years in other educational settings. The current results were derived from the CP population and it is not clear whether they can be generalized to the larger population of students with other diagnoses, such as learning disability, in China. Further studies could also stratify students according to severity of motor impairment, manual ability, and communication function systems. Furthermore, we only included special classrooms in this study, so did not examine situations where students with disability participated in regular schools, alongside their peers without disability in mainstream classrooms, in China. Although the SFA standardization sample included children aged 5–12 years, the present study included students up to the age of 18 as subject recruitment was based on convenience sampling for all students with CP in the special school. Similar to the original SFA, it would also be preferable to use Rasch analysis to provide additional evidence for the construct validity of the Chinese version of the SFA in future (Hwang & Davies, 2009).

Conclusion

Our findings support the utility of the Chinese version of the SFA for both clinical and research purposes, which could also be generalized to primary school students with CP in special schools in Mainland China. This new version of the assessment may serve as a useful standardized instrument for rehabilitation professionals, occupational therapists, or other school teachers, enabling them to develop objectives for individualized educational programmes and to measure the effects of environmental accessibility for the rehabilitation services provided to children with disability in China. The findings in this study are also relevant to therapists and researchers of other populations or contexts for cross-country comparison.

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