Reliability and Validity of the Activity Participation Assessment for School-age Children in Korea

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Summary Objective: This pilot study examined the internal consistency, test—retest reliability, construct validity, and discriminant validity of the Activity Participation Assessment (APA) for school-age children in Korea.

Methods: The construct validity of the APA was first established by factor analysis on the response of 134 nondisabled children. Internal consistency was evaluated for each of the factors. A test—retest study was conducted on 22 nondisabled children. Discriminant validity was established by comparing the participation of 56 nondisabled children and 56 children with intellectual disabilities and examining sex differences of 61 boys and 61 girls.

Results: Analysis of the APA revealed five factors, which were labeled as instrumental activities of daily living (IADL), sports and outdoor activities, hobbies and school activities, social activities, and personal care. The factors showed acceptable levels of internal reliability (Cronbach’s alpha = .63—.89). The intraclass correlation coefficient (ICC) for the five factors were all in the good range (ICC = .86—.92). We found statistically significant difference between nondisabled children and children with intellectual disabilities in five factors. We also found that girls participated in significantly more IADL, hobbies and school activities, and social activities. However, boys participated in significantly more sports and outdoor activities.

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**Introduction**

Participation is defined as a person’s “involvement in life situations” and is viewed as resulting from the interaction of individuals with their social and physical environments (World Health Organization, 2001). The World Health Organization’s International Classification of Functioning, Disability and Health (ICF) defines health as comprehensive, meaning including body function and structure, activity, and participation. Participation has been associated with important aspects of daily living such as mobility, social relationships, and activities related to work or school (Law, 2002). ICF emphasises how disabilities affect an individual’s daily life and participation beyond the meaning of his/her physical and functional deficits (World Health Organization, 2001). That is, participation in life situations is an important element in determining health and disabilities.

Maintenance of performance and participation in activities is currently a paradigm of the time for occupational therapy (American Occupational Therapy Association, 2008; Pierce, 2003). The American Occupational Therapy Association includes participation as a performance area in the Occupational Therapy Practice Framework. Today, participation is a core value of client-centred occupational therapy (Berg & LaVesser, 2006). Since the announcement of the ICF, participation has become a major concern in rehabilitation, and developing an evaluation tool focused on occupation and participation has become a priority task in the occupational therapy area (Bundy, 1990; Coster, 1998; King et al., 2002; Townsend, 1998; Trombly, 1993; Whiteford, Townsend & Hocking, 2000).

Recent research on the participation of children has been concerned with the differences in participation between nondisabled children and children with disability (Brown & Gordon, 1987; DeGrace, 2004; Ehrmann, Aesclheimer, & Svanum, 1995; Engel-Yeger, Jarus, Anaby, & Law, 2009; Gray, 1997; King et al., 2006; Law et al., 2006; Mancini, Coster, Trombly, & Heeren, 2000; Van den Berg-Emons et al., 1995). Tools available to evaluate children’s participation include the Pediatric Interest Profile (Henry, 2000), Children’s Assessment of Participation and Enjoyment and Preferences for Activities of Children (CAPE & PAC) (King et al., 2004), Children’s Leisure Assessment Scale (CLASS) (Rosenblum, Sachs, & Schreurer, 2010), and Pediatric Activity Card Sort (PACS) (Bowman, 1999). These evaluation tools measure diverse aspects of participation in one’s life situations such as personal care, mobility, social relationships, home life, and education. All of the tools were developed in North America except for the CLASS, and each included typical activities thought to be influenced by one’s cultural environment and background (Connolly, Law, & MacGuire, 2005).

Although there are available foreign assessment tools, the tools measuring participation reflect each nation’s unique culture, environment, language, and regional characteristics (Custers, Hooijtink, van der Net, & Helders, 2002; World Health Organization, 2001). Therefore, there are many limitations in using the assessment tools developed in other countries to measure the participation of children in a given culture. For example, cursive writing included in school/productivity domain of the PACS is not applicable to Korean children, whose native alphabet is Hangeul. Moreover, activities such as playing golf, yachting and canoeing, and horse riding are not ordinary sports for Korean children. Korean children participate in the unique Korean bath culture (e.g., public bath or Korean sauna) with their parents and attend classes at different academic institutions to supplement their mainstream education. The children also commonly use cellular phones, computers, and the Internet. Accordingly, applying foreign assessment tools for Korean children may not provide accurate results. However, no assessment tool exists to date that measures participation in a comprehensive set of activities of Korean school-age children.

Most prior Korean research on children’s participation measured participation of leisure activities using questionnaires generated by the researchers in accordance with their specific study purposes. Such questionnaires cannot be considered representative of the activity of Korean children because activity was not assessed in a large population, and each questionnaire’s reliability and validity has not been verified. Therefore, the aforementioned questionnaires cannot be used as assessment tools.

The ICF has stressed that successful rehabilitation needs to be measured via activity and participation level (World Health Organization, 2001). Occupational therapists need a tool to measure participation so that they can promote social participation and achieve successful rehabilitation of children with disabilities; therefore, development of such a tool is urgently needed in Korea. The Activity Participation Assessment (APA) developed in the current study was used to measure participation of school-age children in Korea. The APA will be useful for occupational therapists to establish intervention plans to promote participation of children and assist them in setting individual treatment goals for children. Therefore, the purpose of this study was to provide preliminary information about construct validities, internal consistency, and test–retest reliability for clinical use of the APA and to explore its usefulness in school-age children in Korea.
Methods

This study examined the reliability and validity of APA, which was developed to measure the participation of school-age children via 83 activity items. This study includes two phases: development of the APA and analysis of its reliability and validity (Figure 1).

Phase 1: development of the APA

The APA was developed to measure the activity participation of school-age children in Korea. The APA was developed across four steps. First, activity list has been collected on the basis of the child and parental questionnaires, review papers, and time use survey data of Statistics Korea. Data on activities were collected by listing children doing activities during a day in every 30 minutes by 22 school-age children and their parents. Activity lists were also collected by reviewing overseas and domestic papers related to child participation assessment searched from Medline, CINAHL, ERIC databases, Google, Research Information Sharing Service, Korean Studies Information Service System, and the DBpia databases. Finally, we used the time use survey data for school-age children of Statistics Korea (2010a). This presents the type of participation activities that occur in each time slot of elementary school students. A total of 270 activities were cumulatively gathered from these processes.

Phase 1 Development of APA

(Construction of the questionnaire)

Activity collection: 270 activities
- Questionnaire from 22 school-age children and their parents
- Fifty-five overseas literature & 22 domestic literature
- Data of Statistics Korea

Expert review: 111 activities
- Five OT professors, 3 elementary school teachers, 3 parents of school-age children
- Edit inappropriate item
- Integration overlapped item

Survey: 414 school-age children
- To identify the degree of children’s participation in the 111 selected activities

Final item selection: 83 activities
- Expert review: 5 OT professors
- Cutoff score: Mean=2.63(2SD)
- Final selection: 83 items

APA test

Construct validity testing
- Construct validity: exploratory factor analysis on the response of 134 non-disabled children
- Comprised 38 items, 5 factors

Reliability and discriminant validity testing
- Internal reliability: 134 non-disabled children
- Test-retest reliability: 22 non-disabled children
- Discriminant validity
  - 56 non-disabled children & 56 children with intellectual disability
  - 61 boys and 61 girls

Figure 1 Flow diagram of reliability and validity of Activity Participation Assessment (APA). Note: OT = occupational therapy; SD = standard deviation.
In the second step, 111 activities were selected from 270 activities through a panel meeting, which involved professors of departments of occupational therapy, elementary schoolteachers, and parents of elementary school students. In the third step, a survey was conducted on 414 nondisabled children aged 7–12 years to measure the children’s participation in the 111 listed activities. The proportion of 7–12-year-old children sampled from urban versus rural areas and by province was set according to the population and housing census survey data of Statistics Korea (2010b). The children who participated in this study marked their degree of participation in the 111 activities using a 6-category rating scale (1 = not doing the activity at all, 6 = almost every day). In the fourth step, the cutoff score that denoted a high level of participation was set at ~2 standard deviation (SD) ($M = 2.63$) because 2 SD accommodates 95% of the population (Witte & Witte, 2010). That is, activities reported by fewer than 2.5% of individuals were deleted to provide a final list of 83 activities.

Significant features were found from the development process of the APA. First, the final list of 83 activities was not entirely equivalent to those of foreign countries: 59.04% of APA activities were consistent with activities in foreign participation assessment tools. Second, the APA has 14 activities that were not included in foreign assessment tools such as the PACS and the Singapore version of PACS. Activities such as “going to a public bath or Korean sauna with family,” “doing workbook exercises,” “going to extracurricular academy,” “playing with marbles/five stones,” and “playing Korean chess/game of go” reveal unique Korean cultural characteristics and environment. This confirmed the need to develop the APA for Korean children. Third, the APA for Korean children has a smaller number of sports activities (playing dodge ball, playing baseball, playing soccer, playing badminton, sledding, and running), and a larger number of activities related to learning (attending after-school class, doing workbook exercises, going to art/sports academy, going to an extracurricular academy, writing a diary, doing homework, writing a book report) than participation tools of foreign countries. These unique items show Korean’s notable concern with academic education, even for young children.

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The development of the APA represented the first study that developed a tool for measuring participation by collecting representative activities performed by elementary school students from all over the country.

**Phase 2: analysis of reliability and validity**

Once the final version of the questionnaire was established, which consisted of 83 items rated via a 6-category scale, the next phase involved the preliminary determination of the reliability and validity of the APA. First, exploratory factor analysis was conducted to determine the factor structure of the APA, and then we assessed the internal consistency, test–retest reliability, and discriminant validity of each domain.

**Participants**

Nondisabled children and children with intellectual disability were recruited for the reliability and validity test. The age of the participants ranged from 7 to 12 years. Nondisabled children were students who had never been diagnosed with a disability and had no difficulties with academic performance due to physical and psychological problems. They were recruited randomly from eight elementary schools in Seoul, Gyeonggi, and Jeonla provinces in Korea, which represented the proportion of 7- to 12-year-old children in urban versus rural areas (80% vs. 20%) of Statistics Korea (2010b).

The children with intellectual disability were recruited from three special schools in the same provinces as the nondisabled children. Prior to data collection, all participants and their parents were informed about the purpose of the study and gave written, informed consent to participate.

**Instruments**

The 83 APA items were used for reliability and validity testing. Prior to conducting the survey, the first author operationally defined the 83 activities based on lexical and activity definitions in the time use survey report (Statistics Korea, 2010a) and obtained agreement from the panel members. The interviewers asked each participant “How often do you perform this activity?” for each of the 83 activities. When a participant did not fully understand any activity, an additional explanation was provided by giving its operational definition. For example, if a child were to ask what playing with assembly toys meant, the interviewer would explain that it meant to play with Lego or a creative model. Participants were required to select among “never” (not doing the activity at all), “rarely” (once or twice every 6 months), “sometimes” (once or twice every 3 months), “frequently” (once or twice every month), “often” (once or twice per week), and “very often” (almost every day). However, when a child gave an answer that deviated from the response scale, the interviewer was advised to select the most equivalent scale choice.

The researcher recorded responses for the 83 activities by coding “never” as 1, “rarely” as 2, “sometimes” as 3, “frequently” as 4, “often” as 5, and “very often” as 6. The level of activity participation (%) was calculated as the arithmetic mean of the 83 activities using the statistical program IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA).

**Procedure**

All of the participants’ data were included in the investigation of internal consistency, test–retest reliability, construct validity, and discriminant validity. The data were gathered by four trained research assistants. The first author trained each assistant on how to complete the questionnaire. The first author and the four trained research assistants administered APA testing first to the 134 nondisabled children, and then to the 22 nondisabled children 2 weeks later. On average, it took about 20 minutes for nondisabled children to complete the APA testing. To minimise variations during the test–retest study, the testing environment was kept constant. A 2-week interval was considered a reasonable period to minimise potential learning and practice effects for the tool.

To compare the participation of nondisabled children and children with intellectual disability who are not capable of...
completing the APA test, researchers administered the APA to the parents of 56 children with intellectual disabilities and 56 age-matched, nondisabled children in Korea.

**Statistical analysis**

Cronbach’s alpha was calculated to examine the internal consistency of the APA. Test–retest reliability was estimated using the intraclass correlation coefficient (ICC), a reliability coefficient that accounts for both degree of correspondence and agreement among ratings (Portney & Watkins, 2000). The results of the tests were compared for each factor of the APA.

Factor analysis is a statistical method used to describe variability among observed, correlated variables, and to determine whether multivariate data are affected by some factors (Altman, 1991; Green & Salkind, 2003). We conducted exploratory factor analysis on the frequency of data and extracted principal factors using varimax factor rotation to determine the domains of the questionnaire. Independent t-tests were used to compare the activity participation scores of nondisabled children and those with intellectual disability. We postulated that the scores of nondisabled children would be significantly higher than those of the intellectual disability group. Independent t-tests were also used to compare the level of activity participation between boys and girls. All analyses were conducted using the SPSS Statistics 20.0, with the significance level set at \( p < .05 \).

**Results**

A total of 134 nondisabled children were recruited to test the APA’s construct validity and internal consistency. Their mean age was 9.19 ± 1.37 years. More than 79% of these nondisabled children were living in urban areas (Table 1).

**Construct validity and internal reliability**

The factor analysis of nondisabled children’s data revealed five factors with an eigenvalue > 1, which comprised 38 items (Table 2). The first factor accounted for 13.54% of the variance, the second factor 10.32%, the third factor 9.90%, the fourth factor 6.85%, and the fifth factor 6.47%. Overall, the five principal factors explained 47.08% of the total variance.

The first factor was composed of instrumental activities of daily living (IADL; 9 items), the second was sports and outdoor activities (8 items), the third was hobbies and school activities (11 items), the fourth was social activities (6 items), and the fifth was personal care activities (4 items). Cronbach’s alpha was calculated to quantify each factor’s internal reliability. Internal reliability was .89 for factor 1, .82 for factor 2, .77 for factor 3, .65 for factor 4, and .63 for factor 5 (Table 2). The other 45 activities, which had low loading values (<.40), were eliminated from the questionnaire and hence do not appear in the table.

**Test–retest reliability**

The data of 22 nondisabled children were used to assess test–retest reliability. The average age of the 22 children in the study was 9.3 years (SD = 1.24). Table 3 shows the descriptive data for the pretest and posttest scores and ICs. The ICs for the five factors were all acceptable (ICCs = .86-.92). When interpreting the coefficient, coefficients of .75 and above are considered good to excellent (Portney & Watkins, 2000). Therefore, the result suggested excellent test–retest reliability of the APA. There were no significant differences between the test and retest scores.

**Discriminant validity**

Fifty-six nondisabled children (31 male, 25 female; \( M_{age} = 9.82 \) years, SD = 1.23) and 56 children with intellectual disability (32 male, 24 female; \( M_{age} = 9.84 \) years, SD = 1.17) took part in the discriminant validity test (Table 4). No significant differences were found between nondisabled children and children with intellectual disability in terms of age or sex.

To compare the participation of nondisabled children (n = 56) and children with intellectual disability (n = 56), we calculated a mean score and performed t-tests over all 38 items. The mean score of nondisabled children was higher than that of children with intellectual disability for all factors. There were significant differences between the two groups for IADL (t = 16.30, \( p < .001 \)), sports and outdoor activities (t = 9.22, \( p < .001 \)), hobbies and school activities (t = 13.35, \( p < .001 \)), social activities (t = 9.88, \( p < .001 \)), and personal care (t = 3.22, \( p = .002 \)) factors (Table 5).

To establish additional validity, two age-matched groups of 61 boys and 61 girls were formed from the sample described previously. No significant differences were present between the two groups with respect to age (boys: \( M = 9.42, SD = 1.02 \) years; girls: \( M = 9.39, SD = 1.21 \) years; \( t = 0.75, p = .37 \)). To compare the participation of girls and boys, we calculated a mean score for each factor separately (i.e., IADL, sports and outdoor activities, hobbies and school activities, social activities, and personal care). We then
performed t tests to compare the scores of the two groups (boys and girls) on the five factors. There were significant differences between the two groups for IADL (t = -2.27, p = .015), sports and outdoor activities (t = 2.99, p = .003), hobbies and school activities (t = -2.42, p = .017), and social activities (t = -2.27, p = .011). We found no significant difference for the personal care (t = -1.46, p = .147) factor (Table 6).

Table 2  Factor Loading for Each of the 38 Items Regarding the Participation Frequency in Nondisabled Children.

| Factor | 1<sup>a</sup> | 2<sup>b</sup> | 3<sup>c</sup> | 4<sup>d</sup> | 5<sup>e</sup> |
|--------|-------------|-------------|-------------|-------------|-------------|
| 11. Cleaning own room | .827 | .053 | .012 | .174 | .052 |
| 13. Cleaning the house | .780 | .247 | -.073 | .128 | -.101 |
| 12. Cleaning desk | .765 | .053 | .116 | .095 | .139 |
| 17. Organising closet | .760 | .225 | -.047 | -.046 | -.016 |
| 10. Making one’s bed | .691 | .213 | .006 | .079 | .056 |
| 16. Setting/cleaning the table | .675 | .127 | .153 | .051 | .013 |
| 18. Helping recycle | .673 | .316 | .089 | .138 | -.080 |
| 14. Watering the plants | .623 | .364 | .079 | -.097 | -.059 |
| 15. Putting laundry in basket or washing machine | .550 | -.154 | .271 | .112 | .027 |
| 80. Playing soccer | .009 | .667 | -.238 | .144 | .098 |
| 77. Snowball fight/making snowman | .130 | .664 | .295 | -.007 | .150 |
| 79. Playing baseball | .191 | .651 | -.134 | .163 | -.006 |
| 76. Going sledding | .148 | .643 | .120 | .064 | -.300 |
| 81. Playing dodgeball | .184 | .624 | .176 | .046 | .090 |
| 78. Playing badminton | .242 | .622 | .204 | .053 | .146 |
| 60. Jumping on the trampoline | .224 | .508 | -.037 | .211 | -.274 |
| 49. Doing origami | -.011 | .015 | .771 | -.136 | -.080 |
| 50. Drawing/coloring | -.028 | -.010 | .754 | -.084 | .093 |
| 47. Clay craft | -.077 | .027 | .724 | -.095 | -.210 |
| 64. Jumping rope | .198 | .251 | .539 | .164 | .049 |
| 46. Puzzles | -.023 | .359 | .517 | -.073 | -.181 |
| 33. Writing in diary | .038 | .094 | .463 | .195 | .219 |
| 62. Reading | .256 | .057 | .454 | -.067 | .121 |
| 70. Dancing | -.078 | -.049 | .438 | .398 | -.037 |
| 31. Doing homework | .182 | -.038 | .375 | .038 | .211 |
| 68. Using the library | .158 | .115 | .355 | .233 | -.104 |
| 32. Writing book report | .221 | .145 | .339 | .315 | .216 |
| 36. Talking with friend on the telephone | .186 | .001 | -.075 | .689 | -.051 |
| 34. Buying and eating food in a snack restaurant | -.019 | -.012 | .053 | .610 | .000 |
| 37. Text messaging | .223 | -.065 | .009 | .600 | .006 |
| 29. Buying items from a stationery store | .000 | .115 | .051 | .510 | -.034 |
| 39. Going to friend’s place | .181 | .147 | .001 | .504 | -.039 |
| 40. Playing with friend | -.086 | .173 | -.080 | .473 | .070 |
| 5. Eating | .003 | .119 | -.090 | -.054 | .870 |
| 6. Using the bathroom | .067 | .072 | -.017 | -.067 | .807 |
| 3. Washing face/brushing teeth | .042 | .019 | .078 | .116 | .541 |
| 4. Putting on/taking off clothes or shoes | -.049 | -.093 | .040 | -.062 | .462 |
| Eigenvalue | 7.35 | 3.40 | 2.52 | 2.38 | 2.23 |
| % of variance | 13.54 | 1.32 | 9.90 | 6.85 | 6.47 |
| Internal consistency | .888 | .819 | .771 | .650 | .630 |

Note. Data in boldface indicates items belonging to the factor.

<sup>a</sup> Instrumental activities of daily living.
<sup>b</sup> Sports and outdoor activities.
<sup>c</sup> Hobbies and school activities.
<sup>d</sup> Social activities.
<sup>e</sup> Personal care.

**Discussion**

The development of the APA addressed the lack of a reliable and valid tool for measuring activity participation in Korean culture, especially among school-age children. The validity and reliability findings of this study support the APA as an assessment tool to measure activity participation for school-age children in Korea.
The five principal factors of the APA explained 47.08% of the response total variance, and their internal reliability values were acceptable (Cronbach’s alpha = .63–.89). The test–retest reliability findings also showed that the tool was stable over a reasonable time frame (Portney & Watkins, 2000). Participant-dependent factors, such as motivation and learning, were carefully controlled in this study.

Our findings are consistent with the five types of activities identified by Bowman (1999): IADL, sports and outdoor activities, hobbies and school activities, social activities, and personal care. Whereas Bowman combined IADL and school activities into one construct called school/productivity, we separated them into two different constructs, which are quite distinct in nondisabled children. Our distinction between two types of activities is based on the activity and participation categories of the ICF, which separates domestic life and education as major life areas (World Health Organization, 2001).

Unlike Bowman (1999), we combined hobbies and school activities into one construct. The hobbies and school activities factor consisted of hobbies such as art and crafts, puzzles, dancing, reading, using the library, and jumping rope, and school activities such as writing a diary, doing homework, and writing a book report. Hobbies and school activities were combined as one factor because hobbies such as jumping rope and reading were associated with items that evaluate school performance; in addition, after-school hobbies such as origami, drawing, and dancing, were also run by schools. Using the library was related to school activities because the library was used for reading, writing book reports and doing homework. The factor may correspond to the concept of self-enrichment activities addressed in other studies (King et al., 2006; Rosenblum et al., 2010). We considered naming the factor “self-enrichment activities” but chose “hobbies and school activities” based on the ICF framework language.

The second factor, sports and outdoor activities, consisted of four sports and four outdoor activities. Bowman classified outdoor activities such as snowball fights/making a snowman, sledding, and trampolining as hobby activities, whereas we combined sports and outdoor activities into one construct, which conveys that sports are generally carried out with others and involve rules and activities. Sports and outdoor activities can be differentiated from hobby activities that are performed individually. School-age children’s play is based on rules, and peer groups are a major medium for socialisation. Sports and outdoor activities reflect children’s attempts to build their self-confidence and to prove their talents (Hughes, 2010).

The APA was composed of 38 items after 45 items were removed because of low loading values. The activities reflecting cultural relevance such as playing Korean chess and playing with marbles/fivestones were deleted from the final items. These activities were removed because of the differences among children in participation frequency, which confounded each item’s reliability; however, removing items because of low loadings in the exploratory factor analysis might not be good in developing a culture-specific APA. Therefore, one should not rely solely on the current results.

To verify the discriminant validity of APA, we compared the APA scores of nondisabled children and children with intellectual disability. The nondisabled children’s participation levels were significantly higher than those of children with intellectual disability. This result shows the appropriate discriminant validity of the APA, that is, the APA was able to differentiate between children with different levels of intelligence. This is similar to the result of King et al. (2013), who compared participation in out-of-

| Table 3 | Test–retest Reliability of the Activity Participation Assessment. |
|---------|---------------------------------------------------------------|
| Factor                          | Pretest            | Posttest           | ICC  | 95% CI          |
|                                  | M (SD)             | M (SD)             |      |                 |
| Instrumental activities of daily living (range, 9–54) | 39.45 (6.27)       | 39.27 (5.55)       | 0.90 | 0.52–0.98       |
| Sports and outdoor activities (range, 8–48)      | 30.75 (8.11)       | 30.82 (8.77)       | 0.87 | 0.56–0.97       |
| Hobbies and school activities (range, 11–66)      | 44.41 (8.40)       | 45.14 (9.35)       | 0.86 | 0.51–0.95       |
| Social activities (range, 6–36)                   | 25.95 (5.11)       | 25.86 (5.58)       | 0.86 | 0.81–0.93       |
| Personal care (range, 4–24)                       | 23.30 (0.80)       | 23.59 (0.67)       | 0.92 | 0.64–0.96       |

Note: CI = confidence interval; ICC = intraclass correlation coefficient; M = mean; SD = standard deviation.

| Table 4 | Demographic Characteristics of Participants for Discriminant Validity Test. |
|---------|---------------------------------------------------------------|
| Category | Characteristic | Nondisabled children (N = 56) | Children with intellectual disability (N = 56) |
|          |                 | No. (%) | (N = 56) | No. (%) |
| Sex      | Male            | 31 (55.36) | 32 (57.15) |
|          | Female          | 25 (44.65) | 24 (42.86) |
| Age (y)  | 7               | 4 (7.15) | 4 (7.15) |
|          | 8               | 11 (19.65) | 11 (19.65) |
|          | 9               | 4 (7.15) | 4 (7.15) |
|          | 10              | 18 (32.15) | 18 (32.15) |
|          | 11              | 10 (17.86) | 10 (17.86) |
|          | 12              | 9 (16.08) | 9 (16.08) |
| Province | Seoul·Gyeonggi   | 36 (64.29) | 23 (41.08) |
|          | Jeonla          | 20 (35.72) | 33 (58.93) |
| Location | City            | 44 (78.58) | 51 (91.08) |
|          | Rural           | 12 (21.43) | 5 (8.93) |
| Mother’s education | High school graduate | 7 (12.50) |                  |
|          | College         | 49 (87.50) |                  |
|          | graduate        |                  |                  |
school activities of typically developing children and children with intellectual disability, using CAPE & PAC (King, Shields, Imms, Black & Ardern, 2013). The researchers found that children with intellectual disability participated in fewer active-physical and skill-based activities than typically developing children. Shields et al. (2014) also found that children with intellectual disability participated in fewer community-based social activities, recreational, family enrichment, and formal activities than typically developing children.

Further discriminant validity of the APA was evident from the sex distinction found across the factors of the APA. A comparison of two age-matched groups of 61 boys and 61 girls showed that girls participated more frequently in IADL, hobbies, and school and social activities than boys, whereas boys participated in more sports and outdoor activities than girls. These findings are supported by the literature, in which girls are generally reported to participate more in skill-based, social, and self-improvement activities, and boys participate more in sports than girls (Rosenblum et al., 2010; Gill & Persson, 2008; King et al., 2006; Posner & Vandell, 1999).

APA is a tool that evaluates participation. Some items—for example, putting laundry in a basket, trampolining, and text messaging—however, appeared to be an engagement in activity rather than participating in a life situation. For example, putting laundry in a basket is operationally defined as activities involving laundry; trampolining and text messaging are play activities carried out for fun and to communicate with friends. These items appeared as simple actions because they are included in the list of participation activities; therefore, it would be necessary to modify the names of the above items in future studies.

By providing the APA and its psychometric properties, we have facilitated the measurement of the participation of school-age children, and the APA may expand the range of occupational therapy intervention possibilities in Korea. The current study suggests that occupational therapists could use the APA during an initial interview when communicating with a child and parent(s) about occupation focused on daily activities. If a child does not participate in typical activities, the occupational therapist would explore the reason for this from the perspective of the child, family, or environment, and use the results in subsequent occupational therapy. The various activities of the APA may also be used to guide and assist a child and parents to identify treatment goals beyond activities of daily living or fine motor skills.

**Limitation and future research**

The current study has several limitations. First, the results of factor analysis are confounded by the small sample size of this preliminary study, which limited the generalization of the study results. Future studies should use larger sample sizes, with demographic representation of different geographical areas. Second, the APA questionnaire consists of 38 items selected via factor analysis. Some items of cultural relevance were deleted from the final items because of their low loading values. Therefore, further research is needed to determine the structure of the tool by conducting the questionnaire for children to separate

### Table 5  Comparison of the Means and Standard Deviations of the Activity Participation Assessment of the Two Groups.

| Factors                                      | Nondisabled children (N = 56) | Children with intellectual disability (N = 56) | t    | p    |
|----------------------------------------------|--------------------------------|-----------------------------------------------|------|------|
| Instrumental activities of daily living      | 39.79 (5.39)                   | 20.89 (6.83)                                  | 16.30| <.001**|
| Sports and outdoor activities                | 29.66 (7.07)                   | 18.09 (6.25)                                  | 9.22 | <.001**|
| Hobbies and school activities                | 43.54 (8.01)                   | 25.47 (6.23)                                  | 13.35| <.001**|
| Social activities                            | 25.32 (5.32)                   | 15.63 (5.26)                                  | 9.88 | <.001**|
| Personal care                                | 23.23 (1.01)                   | 20.72 (5.76)                                  | 3.22 | .002**|

*Note: M = mean; SD = standard deviation.
*p < .01. **p < .001.

### Table 6  Means and Standard Deviations of the Activity Participation Assessment Between Boys and Girls.

| Factors                                      | Boys (n = 61)                  | Girls (n = 61)                  | t    | p    |
|----------------------------------------------|--------------------------------|--------------------------------|------|------|
| Instrumental activities of daily living      | 39.67 (4.97)                   | 43.13 (5.32)                   | −2.27| .015*|
| Sports and outdoor activities                | 31.24 (6.23)                   | 28.05 (6.11)                   | 2.99 | .003**|
| Hobbies and school activities                | 41.74 (6.46)                   | 44.64 (7.41)                   | −2.42| .017*|
| Social activities                            | 25.07 (4.64)                   | 27.60 (5.16)                   | −2.27| .011*|
| Personal care                                | 23.20 (1.12)                   | 23.45 (0.85)                   | −1.46| .147|

*Note: M = mean; SD = standard deviation.
*p < .05. ** p <0.01.
the domain of APA items. In addition, activities with low loadings were removed because differences among children in participation frequency of such activities would have reduced the reliability of the APA. Accordingly, further studies are needed to configure the assessment by adding preference and enjoyment rather than frequency (Rosenblum et al., 2010; King et al., 2006). Third, continued study of the psychometric properties of the APA is required to further define its clinical utility. It is necessary to examine its relationship with other tests that assess participation irrespective of cultural background. Inter-rater reliability and concurrent validity should also be required in future studies.

Conclusion

The APA was developed because of the lack of a reliable and valid tool for measuring activity participation that reflects Korean culture. The APA measures participation across major life domains of school-age children, including IADL, sports and outdoor activities, hobbies and school activities, social activities, and personal care. The purpose of current study was to examine the reliability and validity of the APA for school-age children in Korea. We used the APA to characterise nondisabled children and children with intellectual disability to investigate its reliability and validity. We found good internal consistency and test–retest reliability. Moreover, validity was demonstrated by its five domains and its distinction between nondisabled children and children with intellectual disability and sex patterns of participation. The results support use of the APA to measure the level of activity participation of school-age children in Korea.

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