

The Age Difference in Social Skills Constructs for School Adaptation: A Cross-Sectional Study of Japanese Students at Elementary, Junior, and Senior High Schools

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Abstract—Many interventions for social skills acquisition aim to decrease the gap between social skills deficits in the individual and normative social skills; nevertheless little is known of typical social skills according to age difference in students. In this study, we developed new quintet of Hokkaido Social Skills Inventory (HSSI) to identify age-appropriate social skills for school adaptation. First, we selected 13 categories of social skills for school adaptation from previous studies, and created questionnaire items through discussion by 25 teachers in all three levels from elementary schools to senior high schools. Second, the factor structures of five versions of the social skills scale were investigated on 2nd grade ($n = 1,864$), 4th grade ($n = 1,936$), 6th grade ($n = 2,085$), 7th grade ($n = 2,007$), and 10th grade ($n = 912$) students, respectively. The exploratory factor analysis showed that a number of constructing factors of social skills increased as one's grade in school advanced. The results in the present study can be useful to characterize the age-appropriate social skills for school adaptation.

Keywords—Social skills, age difference, children, adolescents.

I. INTRODUCTION

SOCIAL skills are learned, composed of specific behaviors, include initiations and responses, maximize social reinforcement, are interactive and situation-specific, and can be specified as targets for intervention [1]. Social skills deficits are common problems among children and adolescents with school maladaptation [2]. Specifically, failure to acquire social skills appropriate for one's developmental stage does not only cause social impairment at that point but also lead to psychosocial problems in the future [3]. In contrast, an appropriate skill performance in various social situations contributes to long-term social adaptation throughout one's life [4].

Several research in Japan also have been carried out to evaluate the relationship between social skills and school adaptation in Japanese students. For example, in lower grades of elementary school, it has been shown that poor "social initiation" makes internalizing problems (e.g., anxiety, isolation), and lack of "self-control" and "discipline" relates externalizing problems (e.g., aggressive behavior, disturbing behavior) [5]. In upper grades of elementary school,

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"interpersonal participation" and "relationship improvement" were determining the social status within their classroom [6]. On the other hand, junior high school students who had acquired general social skills showed better recognition from those around one and less susceptible to classmates' disturbance [7]. The research targeted at senior high school students revealed that "assertion skills" strongly correlated to whether they liked school [8]. These results suggest that social skills closely connected to school adaptation regardless of age or school level.

Many interventions for social skills acquisition aim to decrease the gap between social skills deficits in the individual and normative social skills [9]; nevertheless little is known of the typical components of social skills according to age difference in students. Previous study suggests that the factor structure of social skills is different across the ages [10]. In order to assess target skills of children and adolescents, it should be accommodated to social contexts which are influenced by their developmental changes [11]. It is important for social skills coaching in school education to configure target skills based on developmental perspective from an early stage of elementary school.

A taxonomy of social skills is useful for providing a nomenclature to refer to typical social skills patterns [12] and thus to clarify age difference in social skill constructs might be beneficial to characterizing target skills according to developmental stages. In this study, we aim to identify age-appropriate social skills for school adaptation and to develop new quintet of scales in order to efficiently handle the social skills components.

II. METHODS

A. Identification of General Social Skills Categories

From the 22 previous studies which developed social skills scale in Japan, we identified the general social skills categories as 13 categories (see Table I).

B. Item Creation of Social Skills Scales

We created the five versions of questionnaire items based on the social skills categories through discussion with 25 teachers in school at all three levels (fourteen elementary school teachers, six junior high school teachers, and five senior high school teachers). First, teachers listed observable specific

behaviors of students adapting to school life and of them exerting communication ability on the social situations through a brainstorming session. Second, the lists from the previous session were classified into the 13 categories by themselves. Third, the littered sentence examples were integrated and were modified as suitable written expression for the questionnaire by an educational psychologist, two teachers' consultants, and two graduate students who were specializing in clinical psychology. Then, 100 items for the lower grades of elementary school version, 98 items for the middle grades of elementary school version, 113 items for the upper grades of elementary school version, 126 items for the junior high school version, and 115 items for the senior high school version were created.

TABLE I
GENERAL SOCIAL SKILLS CATEGORIES

| Categories | Characteristics of skills |
|----------------|---|
| Politeness | Greeting and appreciation for help |
| Expression | Asserting opinions and desire |
| Participation | Participating positively in group activities |
| Consideration | Treating someone with kind consideration |
| Refusal | Saying "no" to unreasonable requests |
| Relaxation | Coping with strain in front of people |
| Compliment | Giving compliments and delights |
| Compliance | Keeping the rules and the morals |
| Advisement | Giving advice and caution |
| Self-restraint | Controlling impulsivity and anger |
| Leadership | Leading classmates and keeping the group together |
| Schoolwork | Preparing for academic performance |
| Consultation | Taking counsel and disclosing oneself |

C. Preliminary Investigation

In order to evaluate usability of the items, the preliminary investigation was conducted in three lower grade classes, four middle grade classes, and three upper grade classes of elementary school, three classes of junior high school, and three classes of senior high school. The teachers in charge of these classes rated each item on four-point Likert scale ranging from 1 (disagree) to 4 (agree) with their students' behaviors as a target. The 189 lower graders, 107 middle graders and 175 upper grades of elementary school, 154 junior high and 126 senior high school students were subjected. Based on the results of the survey, we were shortened items. Finally, 15 items for the lower grades of elementary school version, 19 items for the middle grades of elementary school version, 20 items for the upper grades of elementary school version, 21 items for the junior high school version, and 24 items for the senior high school version were adapted. Respondents rate each item on four-point Likert scale ranging from 1 (disagree) to 4 (agree) as Hokkaido Social Skills Scale Inventory (HSSI).

D. Participants and Procedure

Stratified random sampling method was used to obtain the samples without selection bias. The first stage was involved in the random selection of 47 elementary schools, 30 junior high schools, and 10 senior high schools in Hokkaido prefecture in Japan. The participants for this study consisted of 2nd grader (n = 1,864; male = 931, female = 933), 4th grader (n = 1,936; male = 963, female = 972), and 6th grader (n = 2,085; male = 1,064, female = 1,017) from 47 elementary schools, 7th grader (n =

2,007; male = 1,009, female = 996) from 30 junior high schools, and 10th grader (n = 912; male = 492, female = 420) from 10 senior high schools. The survey was carried out in these schools to obtain the data using the self-administered questionnaire. This study was approved by the local ethical committee.

E. Data Analysis

The data were analyzed using IBM SPSS Statistics 20 and R version 2.14.0 installed ltm package. To identify the factor constructs of social skills scales, exploratory factor analysis with maximum-likelihood method by Promax rotation and categorical factor analysis by using polychoric correlation matrix were administered, and Cronbach's α was calculated. Besides, we estimated item parameters based on item response theory with graded response model (GRM).

III. RESULTS

Table II summarizes the results of the exploratory factor analysis and the internal consistency coefficient of Cronbach's α . The lower grades, middle grades, and upper grades of elementary school version of social skills scale were constructed two subscales in a similar way: "Assertion skills" and "Discipline skills"/"Cooperation skills". The junior high school version was constructed three subscales: "Relationship maintenance skills", "Peer encouragement skills", and "Self-control skills". The senior high school version was constructed four subscales: "Help-seeking skills" were added to three subscales of the junior high school version. Cronbach's α of subscales were almost acceptable (0.69 to 0.85) and of full-scales excluded a "relaxation" category because of lower item-total correlation ($r < 0.30$) in all five scales, were totally fair (0.84, 0.89, 0.89, 0.89, and 0.91, respectively).

TABLE II
SUMMARY OF RESULTS OF EXPLORATORY FACTOR ANALYSIS AND RELIABILITY OF SUBSCALES

| Factors | No. of items | Factor loading | Cumulative contribution ratio (%) | Cronbach's α |
|---------------|--------------|----------------|-----------------------------------|---------------------|
| Lower grades | | | | |
| Assertion | 7 | 0.42 – 0.73 | 34.39 | 0.76 |
| Discipline | 5 | 0.45 – 0.68 | 44.43 | 0.72 |
| Middle grades | | | | |
| Assertion | 12 | 0.39 – 0.65 | 36.35 | 0.85 |
| Discipline | 6 | 0.48 – 0.83 | 44.01 | 0.80 |
| Upper grades | | | | |
| Cooperation | 12 | 0.38 – 0.68 | 34.40 | 0.85 |
| Assertion | 7 | 0.39 – 0.82 | 42.22 | 0.77 |
| Junior high | | | | |
| Encouragement | 7 | 0.44 – 0.88 | 35.22 | 0.82 |
| Self-control | 5 | 0.43 – 0.81 | 43.21 | 0.69 |
| Relationship | 5 | 0.35 – 0.74 | 49.82 | 0.73 |
| Senior high | | | | |
| Relationship | 7 | 0.38 – 0.66 | 37.01 | 0.84 |
| Encouragement | 7 | 0.38 – 0.85 | 45.04 | 0.85 |
| Self-control | 5 | 0.45 – 0.80 | 51.50 | 0.76 |
| Help-seeking | 3 | 0.39 – 0.89 | 56.62 | 0.70 |

TABLE III
ITEM PARAMETERS OF THE LOWER GRADES OF ELEMENTARY SCHOOL VERSION OF HOKKAIDO SOCIAL SKILLS INVENTORY

| Items | Difficulty | | | Discrm. |
|--|------------|-------|-------|---------|
| | b1 | b2 | b3 | |
| I greet my friends in the morning or afternoon meetings. | -4.05 | -2.67 | -1.05 | 1.42 |
| When someone does something for me, I say "Thank you". | -4.15 | -2.50 | -0.76 | 1.56 |
| I can say what I think. | -3.74 | -2.58 | -1.16 | 0.99 |
| I can ask my friend to play with him/her by myself. | -2.67 | -1.10 | 0.63 | 1.26 |
| I can help a friend in trouble. | -2.64 | -1.59 | -0.15 | 1.92 |
| I can listen and talk face to face with my friend. | -3.47 | -2.06 | -0.21 | 1.44 |
| I can tell my friend that I don't want to do something. | -3.35 | -2.12 | -0.68 | 1.16 |
| I can cheer for friends who are trying their best. | -2.69 | -1.66 | -0.33 | 1.72 |
| I can follow the rules for school and playing. | -3.75 | -2.33 | -0.29 | 1.24 |
| I can stop my friend from fighting. | -1.80 | -0.77 | 0.56 | 1.46 |
| I can work well with everyone. | -2.98 | -2.00 | -0.72 | 1.76 |
| I do my classroom duty even if nobody tells me to do it. | -3.22 | -2.18 | -0.52 | 1.52 |
| I can put away my study tools neatly in my desk. | -3.55 | -2.41 | -1.23 | 1.14 |
| I can tell a parent or teacher when I am in trouble. | -2.73 | -1.56 | -0.29 | 1.19 |

TABLE IV
ITEM PARAMETERS OF THE MIDDLE GRADES OF ELEMENTARY SCHOOL VERSION OF HOKKAIDO SOCIAL SKILLS INVENTORY

| Items | Difficulty | | | Discrm. |
|--|------------|-------|-------|---------|
| | b1 | b2 | b3 | |
| I can greet a teacher or a friend. | -3.82 | -2.24 | -0.15 | 1.42 |
| When someone does something for me, I say "Thank you". | -4.13 | -2.63 | -0.68 | 1.51 |
| I can explain my ideas to my friends or teachers clearly. | -2.15 | -0.24 | 2.18 | 1.37 |
| I can invite a friend to play by myself. | -4.45 | -2.51 | -0.83 | 0.86 |
| I can cooperate with a friend to do a duty or some work. | -2.74 | -1.45 | 0.11 | 2.02 |
| I can be kind to a friend who doesn't do so well. | -2.17 | -0.85 | 0.79 | 2.07 |
| I can help a friend with some trouble. | -2.41 | -1.28 | 0.17 | 2.33 |
| I can tell a friend "No", if I don't want to do something. | -4.38 | -2.32 | -0.28 | 0.78 |
| I can cheer for friends who are trying their best. | -2.74 | -1.36 | 0.21 | 1.62 |
| I can follow the rules for school and playing. | -3.33 | -1.73 | 0.31 | 1.29 |
| I can correct a friend who is behaving badly. | -2.40 | -1.00 | 0.65 | 1.53 |
| I can be patient when I can't have everything my way. | -3.15 | -1.66 | 0.41 | 1.08 |
| I don't behave selfishly. | -2.77 | -1.35 | 0.51 | 1.22 |
| I think and take an action for my class. | -2.24 | -0.86 | 0.80 | 2.26 |
| I can cooperate and study with my friends. | -2.62 | -1.38 | -0.01 | 2.03 |
| I can put away my study tools carefully. | -3.16 | -1.63 | -0.17 | 1.34 |
| I can ask a teacher or friend when I don't know something. | -3.87 | -2.01 | -0.39 | 1.03 |
| I can talk to my family about what I learned or tried at school. | -2.93 | -1.86 | -0.54 | 1.00 |

TABLE V
ITEM PARAMETERS OF THE UPPER GRADES OF ELEMENTARY SCHOOL VERSION OF HOKKAIDO SOCIAL SKILLS INVENTORY

| Items | Difficulty | | | Discrm. |
|---|------------|-------|-------|---------|
| | b1 | b2 | b3 | |
| I can greet everyone for myself. | -3.57 | -1.41 | 0.87 | 1.29 |
| When something is done for me, I say "Thank you". | -3.94 | -2.18 | 0.08 | 1.41 |
| I can speak clearly for everyone to hear. | -3.45 | -0.94 | 1.09 | 1.07 |
| I can tell my ideas to my friends clearly. | -1.90 | 0.10 | 2.18 | 1.60 |
| I can join a group of my friends easily. | -2.94 | -1.37 | 0.40 | 1.27 |
| I can take care of younger children. | -2.53 | -1.18 | 0.26 | 1.36 |
| I can refuse if my friend invites me to do something bad. | -4.11 | -2.35 | -0.37 | 0.93 |
| I can praise a friend who is trying very hard. | -3.00 | -1.56 | 0.36 | 1.51 |
| I can attend to everyone with a smile. | -2.25 | -0.81 | 0.90 | 1.60 |
| I can behave according to the time and place. | -3.27 | -1.07 | 1.23 | 1.13 |
| I can humbly apologize for my mistake. | -2.93 | -1.15 | 0.90 | 1.46 |
| I can correct a friend who is behaving badly. | -2.47 | -0.56 | 1.36 | 1.46 |
| I can be patient when I can't have everything my way. | -3.53 | -1.64 | 0.85 | 0.99 |
| I can consider a better idea even if it doesn't match my opinion. | -1.73 | 0.11 | 1.79 | 1.52 |
| I can cooperate and study with my friends. | -2.13 | -0.75 | 0.76 | 1.75 |
| I can show my friends how to study. | -1.87 | -0.41 | 1.13 | 1.30 |
| I know how to take notes. | -2.10 | -0.54 | 0.98 | 1.19 |
| I can discuss my troubles or worries with others. | -2.23 | -0.79 | 0.68 | 1.20 |
| I can talk to others about my hobbies or interests. | -3.31 | -1.95 | -0.40 | 1.18 |

The categorical factor analysis confirmed that the five scales also have one-dimensional property with each other. And then, item response theory analysis was performed to the five scales and their parameters of difficulty and discrimination were calculated (see Tables III-VII). The meaning of difficulty "b1"

in Tables III-VII is a location that a response probability to minimum category (1: disagree) is 50%. "b2" means a location that response probabilities to second and third category are equal each other. "b3" means a location that a response probability to maximum category (4: agree) is 50%.

TABLE VI
ITEM PARAMETERS OF THE JUNIOR HIGH SCHOOL VERSION OF HOKKAIDO SOCIAL SKILLS INVENTORY

| Items | Difficulty | | | Discrm. |
|--|------------|-------|-------|---------|
| | b1 | b2 | b3 | |
| I can greet everyone for myself. | -4.03 | -1.85 | 0.61 | 1.23 |
| I can express words of appreciation. | -4.08 | -1.89 | 0.46 | 1.39 |
| I can confidently share my idea even if it is of the minority opinion. | -2.54 | -0.09 | 1.53 | 1.25 |
| I can communicate my ideas to my friends clearly. | -2.64 | -0.45 | 1.70 | 1.63 |
| I can proactively join group activities. | -2.64 | -0.88 | 0.74 | 1.67 |
| I can cooperate with everyone toward a common goal. | -2.94 | -1.37 | 0.44 | 2.09 |
| I can help a friend with some trouble. | -3.03 | -1.14 | 0.84 | 1.74 |
| I can refuse even if I am invited by a friend to do something bad. | -4.69 | -2.69 | -0.55 | 0.90 |
| I can encourage and praise a friend who is trying very hard. | -3.26 | -1.60 | 0.35 | 1.60 |
| I can follow the school rules. | -4.36 | -2.27 | 0.42 | 1.07 |
| I can make a speech to get everyone motivated. | -1.90 | 0.23 | 2.17 | 1.62 |
| I can correct a friend who is behaving badly. | -2.19 | -0.16 | 1.68 | 1.52 |
| I react with a bad attitude when I am corrected. | -3.27 | -0.82 | 1.87 | 0.86 |
| I can form an opinion or give directions as a chairperson or group leader. | -1.63 | 0.03 | 1.60 | 1.53 |
| I think and take an action for my class. | -2.28 | -0.72 | 1.17 | 2.27 |
| I can prepare for the next lesson during the break times. | -4.26 | -2.03 | 0.11 | 0.72 |
| I can cooperate and study with my friends. | -2.66 | -1.28 | 0.33 | 1.92 |
| I can discuss my troubles or worries with teachers or friends. | -2.23 | -0.61 | 1.12 | 0.98 |
| I can talk to friends about my personality or hobbies. | -3.94 | -2.34 | -0.48 | 0.97 |

TABLE VII
ITEM PARAMETERS OF THE SENIOR HIGH SCHOOL VERSION OF HOKKAIDO SOCIAL SKILLS INVENTORY

| Items | Difficulty | | | Discrm. |
|---|------------|-------|------|---------|
| | b1 | b2 | b3 | |
| I greet friends on encounter and at farewell voluntarily. | -3.25 | -1.60 | 0.36 | 1.54 |
| I can express words of appreciation. | -3.23 | -1.73 | 0.09 | 1.91 |
| I can confidently share my idea even if it is of the minority opinion. | -2.27 | -0.33 | 1.22 | 1.62 |
| I can communicate my ideas to my friends clearly. | -2.32 | -0.62 | 0.96 | 2.09 |
| I can join your friends comfortably. | -2.30 | -0.88 | 0.85 | 1.74 |
| I can cooperate with everyone toward a common goal. | -2.64 | -1.17 | 0.47 | 2.41 |
| I can behave warmly toward people with troubles. | -2.73 | -1.06 | 0.77 | 2.27 |
| I can show interest in my friends' hobbies. | -2.81 | -1.15 | 0.62 | 1.63 |
| I can say no even if I am invited by a friend to do something bad. | -2.80 | -1.00 | 0.92 | 1.39 |
| I can greet everyone with a smile. | -2.73 | -1.02 | 0.72 | 1.38 |
| I can encourage and praise a friend who is trying very hard. | -2.73 | -1.49 | 0.45 | 2.09 |
| I can behave according to the time and place. | -3.81 | -1.36 | 1.18 | 0.92 |
| I can follow the rules for school life and public moral. | -3.72 | -1.53 | 1.02 | 1.10 |
| I can remind a friend to do a given assignment. | -2.23 | -0.49 | 1.33 | 1.83 |
| I can make a speech to get everyone motivated. | -1.57 | 0.35 | 1.94 | 1.76 |
| I can make a continuous effort to reach a goal. | -2.59 | -0.61 | 1.32 | 1.43 |
| I can react calmly even if my feelings have been hurt. | -3.32 | -0.69 | 2.13 | 0.83 |
| I can behave according to the setting or situation. | -2.61 | -1.01 | 1.18 | 1.90 |
| I can form a conclusion from all my friends' opinions. | -1.47 | 0.46 | 2.22 | 1.52 |
| I can ask my teachers or friends about anything that I do not understand. | -2.91 | -1.21 | 0.73 | 1.29 |
| I can open up about my troubles or worries to my friends. | -2.23 | -0.78 | 0.87 | 1.35 |
| I can talk to friends about my personality or hobbies. | -3.17 | -1.50 | 0.16 | 1.43 |

IV. DISCUSSION AND CONCLUSION

In elementary school students, the factors influencing self-evaluation of social skills were identified as "Assertion skills" and "Discipline skills"/"Cooperation skills". "Assertion skills" consists of expression, participation, and refusal; "Discipline skills" consists of consideration, compliance, and self-restraint; "Cooperation skills" consists of compliment and consultation added to "Discipline skills".

In junior high school students, the factors were identified as "Relationship maintenance skills", "Peer encouragement skills", and "Self-control skills", and "Help-seeking skills" in addition to these subscales in senior high school students. "Relationship maintenance skills" consists of participation, consideration, and compliment; "Peer encouragement skills" consists of expression and advertisement; "Self-control skills" consists of compliance and self-restraint; "Help-seeking skills" consists of consultation and schoolwork.

The older the ages of students were, the more difficult it was for them to agree the items. It would suggest that their social environment expects increasingly the high levels of skills with developmental progress of children and adolescents. Focusing on comparatively difficult and discriminant items from the lower grades of elementary school version to the senior high school version in order, it must be selected as normative target skills; participation, consideration, expression, leadership, and advertisement, respectively.

These results showed that a number of constructing factors of social skills increased as one's grade in school advanced. In previous research, it was suggested that children's social goals at school were more diversified [13] and more specialized [14] with the grade. Furthermore, the other research suggested social skills develop non-linearly during childhood [15]. The results in the present study can be useful to characterize the age-appropriate social skills for school adaptation.

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