Asian Journal of

HUMAN SERVICES

Printed 2016.0430 ISSN2188-059X
Published by Asian Society of Human Services

April 2016
VOL. 10

Asian Society of Human Services

Human Services

Asian Journal of Human Services,VOL.10 93-102

SHORT PAPER

A Study on the Standardization of the SNEAT

:The Verification of Reliability and Validity of the SNEAT Based on the Data from Miyagi Prefecture

Changwan HAN [1)] Aiko KOHARA [1)] Masahiro KOHZUKI [2)]

1) Faculty of Education, University of the Ryukyus
2) Graduate School of Medicine, Tohoku University

ABSTRACT

The Special Needs Education Assessment Tool (SNEAT) were verified of reliability and validity. However, the reliability and validity has been verified is only Okinawa Prefecture, the national data has not been analyzed. Therefore, this study aimed to verify the reliability and construct validity of SNEAT in Miyagi Prefecture as part of the national survey. SNEAT using 55 children collected from the classes on independent activities of daily living for children with disabilities in Miyagi Prefecture between November and December 2015. Survey data were collected in a longitudinal prospective cohort study. The reliability of SNEAT was verified via the internal consistency method; the coefficient of Cronbach's α were over 0.7. The validity of SNEAT was also verified via the latent growth curve model. SNEAT is valid based on its goodness-of-fit values obtained using the latent growth curve model, where the values of comparative fit index (0.997), tucker-lewis index (0.996) and root mean square error of approximation (0.025) were within the goodness-of-fit range. These results indicate that SNEAT has high reliability and construct validity.

＜Key-words＞
Special Needs Education Assessment Tool (SNEAT), reliability, validity, latent growth curve model

Received
January 25, 2016

Revised
February 10, 2016

Accepted
February 18, 2016

Published
April 30, 2016

hancw917@gmail.com（Changwan HAN）

Asian J Human Services, 2016, 10:93-102.

Ⅰ. Introduction

The SNEAT (Special Needs Education Assessment Tool) is a tool to evaluate the performance of special needs education. The SNEAT was developed by Han, Kohara & Kohzuki (2015) and its reliability and validity were verified by Kohara, Han, Kwon, Kohzuki (2015). The SNEAT that combined HRQOL with Jiritsu-Katusdo (independent activity) that is the part of the special needs education has attracted the attention as the new tool that enables to evaluate the performance of special needs education.

However, the reliability and validity of the SNEAT have been verified with the data from Okinawa Prefecture, which have the necessity to collect and analyze the nationwide data for the standardization of the SNEAT brought up. Therefore, this study aimed to report the results of the research that was conducted for Miyagi Prefecture as the part of the standardization of SNEAT.

Ⅱ. Subjects and Methods

1. Subjects and Procedures

The researchers met school officials to explain the purpose and research methods of this study. After obtaining the school officials' consent to participate in the research in the meeting, packages containing the official document to formally request the cooperation for this study and the SNEAT manual were sent to all the participating schools. The SNEAT questionnaire sets were distributed to the 60 classes on independent activities of daily living for children with disabilities in the 2 special needs schools in Miyagi Prefecture. The class on independent activities of daily living for children with disabilities was conducted once a week (four times) for one month, between November and December 2015, using SNEAT. The questionnaires were completed after the class on the independent activity; the four surveys were named as Time 1, Time 2, Time 3 and Time 4. The class participants (i.e., the teachers and students) and the class contents were the same for all the classes. The selection of the classes on independent activities of daily living for children with disabilities was implemented via the random sampling method.

2. Data Collection

SNEAT is a tool for evaluating the educational outcome of the classes on independent activities of daily living for children with disabilities (Han et al, 2015). The SNEAT questionnaire has a total of 11 items in three domains (bodily pain, mental health, and social functioning) and enables the teachers to evaluate the educational outcome of their students (Han et al, 2015).

For each item, the evaluators are asked to indicate the extent of their agreement or disagreement using a 5-point scale, where;1 = strongly disagree;2 = disagree;3 = neutral;

4 = agree; and 5 = strongly agree.

In addition, the face sheet was added to record the contents of the class and the information on the students, such as their grade level (elementary, middle, or high school), gender, and type of disability (intellectual disability, physical disability, health impairment, developmental disability, multiple disabilities). Items for recording the information on the teachers who are the evaluators of the classes were also added, such as their age, gender, length of teaching at a special support school, and possession of a special teaching certificate.

3. Statistics analysis

1) Changes and Comparisons of Total Score, Scores of Domains and Scores of Items

To analyze the obtained data, one-way repeated-measures ANOVA (matched design) was used. To analyze the changes of the scores, one one-way ANOVA with repeated-measures was conducted. One-way ANOVA was also conducted for the comparison of the scores of each domain.

The items in each domain of SNEAT are listed in descending order of difficulty, and as such, the scores of the items in each domain are ranked in the descending orders of Q1 to Q4, Q5 to Q8, and Q9 to Q11. SPSS ver.23.0 was used for statistical analysis.

2) Reliability of the SNEAT

Reliability of SNEAT was estimated using the internal consistency method. The internal consistency of SNEAT was assessed with Cronbach's α. A minimum Cronbach's α co-efficient of 0.7 was considered satisfactory for group-level comparisons (Cronbach, 1951).

3) Validity of the SNEAT

For this study, the latent growth curve model, and structural equation modeling (SEM), among the methods of construct validity, were utilized, and longitudinal data were employed to verify the validity of SNEAT. The latent growth curve model can be used to analyze the repeated-measures data, which is different from general path analysis (Kano & Miura, 2002). In the latent growth curve model, unlike in general path analysis, path coefficients are not the subjects of the data analysis because all the path coefficients from the observed to the latent variables are fixed parameters (Toyoda, 2007).

The model fitness was assessed with the following fit indices: comparative fit index (CFI) and root mean square error of approximation (RMSEA). When conducting analysis via structural equation modeling (SEM), the researchers themselves are to choose the fit index that they would use, based on their judgment. A model is considered acceptable, when two or more fit indices are met including RMSEA (Steiger, 1998). For adequately fitting models, these fit indices should meet the following criteria: CFI > 0.90 (Han et al., 2005) and RMSEA < 0.1 (Koshio, 2004). In this research, maximum likelihood estimation

was used for the parameter estimation. Amos ver.4.0 was employed for statistical analysis.

Ⅲ. Results

1. Subject Characteristics

A total of 55 analyzed questionnaires were collected among the 60 that had been distributed (91.7% response rate). As the classes on independent activities of daily living for children with disabilities are usually conducted on a one-to-one basis, 55 children and 55 teachers (evaluators) participated in such classes using SNEAT. The characteristics of the participants in the said classes using SNEAT are shown in Table 1. As for the types of disabilities, the number of children with multiple disabilities was the highest. The average length of teaching of the teachers (evaluators) was 18.3 years, and the average length of teaching special support classes was 11.1 years. In addition, 81.8% of the teachers had a special teaching certificate.

<Table 1> Characteristics of the participants in the class of students with disabilities that has used the SNEAT in Miyagi

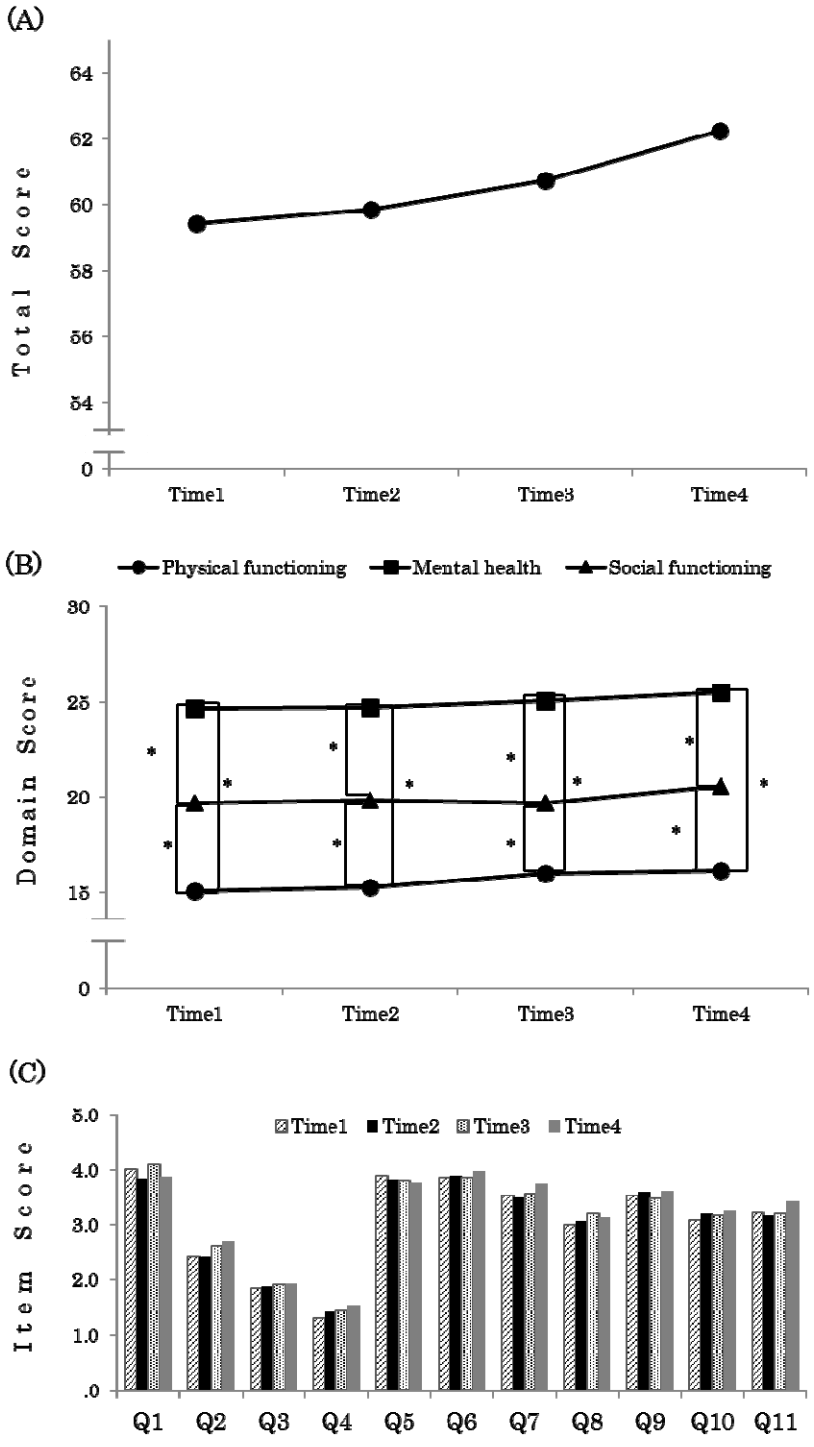
Characteristic			Mean±SD or n (%)
Children	Grade	Elementary school	27 (49.1)
n = 55		Middle school	17 (30.9)
		High school	11 (20.0)
	Sex	Male	37 (67.3)
		Female	18 (32.7)
	Types of disabilities	Intellectual disability	26 (47.3)
		Physical disability	0 (0.0)
		Health impairment	0 (0.0)
		Development disability	1 (1.8)
		Multiple disabilities	28 (50.9)
Teachers	Age		41.6±11.0
n = 55	Average length of teaching		18.3±10.6
	Average length of teaching for special needs education		11.1±9.1
	Sex	Male	22 (40.0)
		Female	33 (60.0)
	Special teaching certificate	With the certificate	45 (81.8)
		Without the certificate	10 (18.2)

2. The Changes and Comparisons of Total Score, Scores of Domains and Scores of Items

The total scores changed from 59.42 in the Time1 to 59.85 in the Time2, 60.73 in the Time3, and 62.24 in the Time4. In the results of the analysis through one-way repeated-measures ANOVA, there were not significant differences among the first, second, third, and fourth classes (Figure 1-A).

The average scores of the domain of physical functioning were 15.09 in the Time1, 15.29 in the Time2, 16.02 in the Time3, and 16.16 in the Time4. The average scores of the domain of mental health were 24.65 in the Time1, 24.73 in the Time2, 25.04 in the Time3, and 25.49 in the Time4, and those of the domain of social functioning were 19.67 in the Time1, 19.84 in the Time2, 19.67 in the Time3, and 20.58 in the Time4. In the results of the analysis through one-way repeated-measures ANOVA, there were not significant differences among the Time1, Time2, Time3, and Time4. But in the results of the analysis of one-way ANOVA, there were significant differences ($p< 0.05$) among the domain of physical functioning, mental health and social functioning (Figure 1-B).

The scores of the items decreased, with the scores of the items within each domain decreasing from Q1 to Q4, from Q5 to Q8, and from Q9 to Q11. The items of each domain of SNEAT are listed in descending order of difficulty. As such, the hypothesis was verified because the scores of each domain were ranked in the descending orders of Q1 to Q4, Q5 to Q8, and Q9 to Q11 (Figure 1-C).



<Figure 1> Changes of the total scores, item scores and score of each domain in Miyagi.

(A) Changes of the total score, n = 55.

(B) Changes of the scores of each domain, one-way ANOVA was used, *p < 0.05, n = 55.

(C) Changes of the scores of each items, n = 55

3. Reliability of the SNEAT

The internal consistency reliability (Cronbach's α coefficient) ranged from 0.72 to 0.77 for all the domains, and the internal consistency reliability of all the items was 0.81 (Table 2).

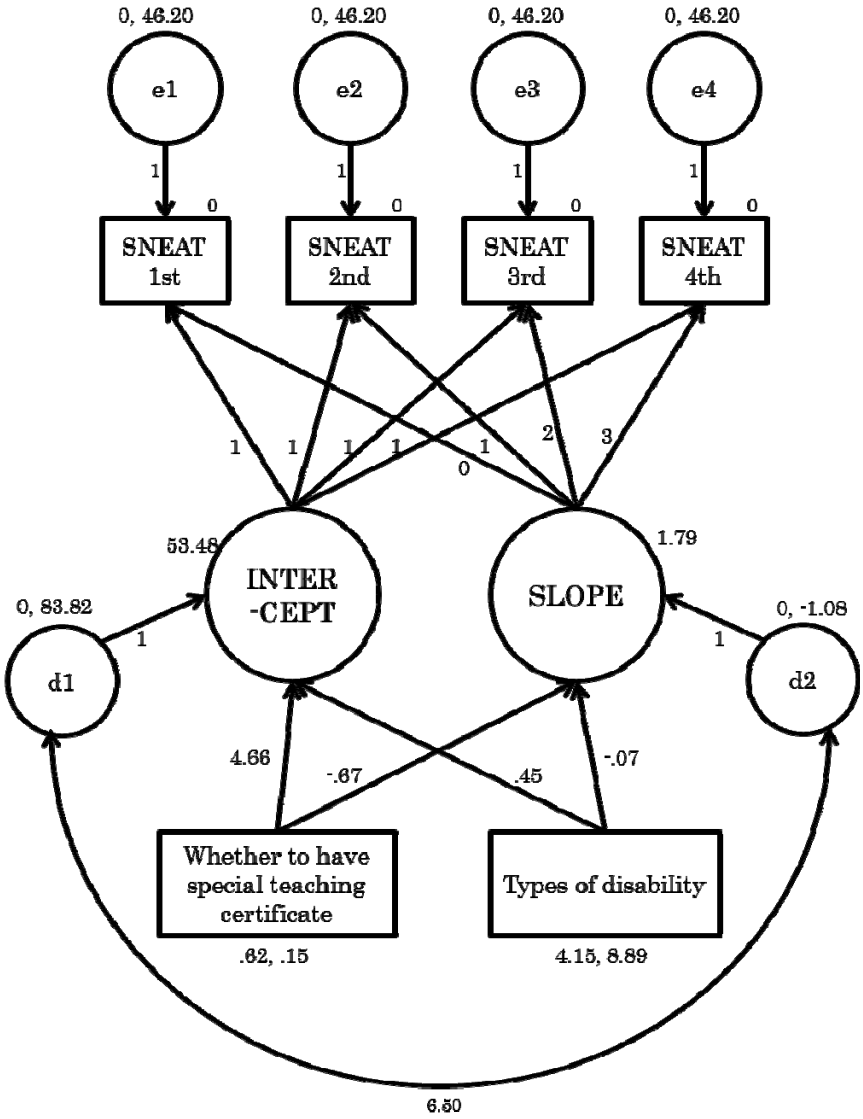
<Table 2> SNEAT scale scores and Reliability Score.

Constructs	Mean	SD	Cronbach's alpha if item deleted	Cronbach's alpha
Physical function				0.72
Q1	3.87	1.14	0.73	
Q2	2.69	1.25	0.63	
Q3	1.93	1.07	0.59	
Q4	1.53	0.88	0.65	
Mental health				0.77
Q5	3.76	1.00	0.76	
Q6	3.96	0.88	0.68	
Q7	3.75	1.11	0.63	
Q8	3.13	1.20	0.77	
Social functioning				0.75
Q9	3.62	1.03	0.75	
Q10	3.25	1.00	0.43	
Q11	3.42	1.17	0.78	
All item				0.81

Q1 - Q11, (1 = minimum, 5 = maximum) α > 0.70, n = 55.

4. Validity of the SNEAT

As for the analysis via the latent growth curve model, SNEAT showed a high level of fitness: $\chi 2 = 13.422$; DF = 13; P = 0.416; CFI = 0.997; TLI = 0.996; and RMSEA = 0.025. The validity was verified because the values of CFI, TLI and RMSEA were within the goodness-of-fit range. As for the factors affecting the SNEAT scores, two factors were clearly identified: the teacher's possession of a special teaching certificate and the type of disability of the student. This means that these two variables affect the evaluation of the outcome of special needs education (Figure 2). Kohara, Han, Kwon, Kohzuki (2015) reported that the goodness-of-fit of model decreased when the four explanatory variables such as the period of teaching in special support schools, whether to have the special teaching certificate, school grades and the types of disabilities were included($\chi 2 = 30.405$; DF = 22; P = 0.109; CFI = 0.940; TLI = 0.924; and RMSEA = 0.084).



<Figure 2> Latent curve analysis of SNEAT in Miyagi

χ2, DF, P, CFI; comparative fit index; RMSEA; root mean square error of approximation.

n = 55, χ2 = 13.422, DF = 13, P = 0.416, CFI = 0.997, TLI = 0.996, RMSEA = 0.025.

Ⅳ. Discussion

In this study, the data from the research on Miyagi Prefecture were analyzed as the part of the nationwide research for the standardization of the SNEAT. This study was the first attempt to conduct the SNEAT in the Miyagi Prefecture and its reliability and validity were also verified.

As for the demographic information on the subjects of the research, the research was conducted for the similar number of students with that of the research on Okinawa Prefecture. As for the types of disabilities of the respondents, the proportion of students with multiple disabilities in the Miyagi Prefecture accounted for the biggest part of all

the respondents, which was the same state with the precedent study in Okinawa Prefecture. However, in the Miyagi Prefecture there was no student with physical disabilities or health impairments, but there were many students with intellectual disabilities. The average period of teaching of the evaluators of Miyagi Prefecture was longer than that of Okinawa Prefecture, but the average period of teaching in the field of special needs education was similar with that of Okinawa Prefecture. The proportion of evaluators with teaching license in Miyagi Prefecture was higher than that in Okinawa Prefecture. The total score and the scores of domains tended to be higher as the number of classes increased, the differences between classes were not significant. It was confirmed that the scores of items of each domains also tended to rank in the same order with the level of difficulty of items of each domain, which is the same results of precedent studies.

In the results of the validity via Latent growth curve modeling, it was confirmed that the two explanatory variables such as whether to have special teaching certificate and the types of disabilities affected the SNEAT scores. In the precedent study in Okinawa Prefecture, it was found that the four explanatory variables such as the period of teaching in special support schools, whether to have special teaching certificate, school grades and the types of disabilities affected the SNEAT scores and the goodness of fit of the model was excellent. However, in the study in Miyagi Prefecture, the goodness of fit of the model was not so good, when the four explanatory variables are included. In the Miyagi Prefecture, the period of teaching in special support schools or the grades that evaluators were in charge of didn't affect the scores. Since the results of this study were derived without considering the differences from the regions, the differences from the regions need to be studied more.

The results of the research in Miyagi Prefecture were reported through this article. For the standardization of the SNEAT, the collection and analysis of data need to be conducted via the nationwide research.

Acknowledgment

The authors wish to thank the educational officials for special needs education in Miyagi Prefecture for their assistance in this study. This work was supported by JSPS KAKENHI Grant No. 15K04567.

References

1) Aiko Kohara, Changwan Han, Haejin Kwon, Masahiro Kohzuki (2015) Validity of the Special Needs Education Assessment Tool (SNEAT), a Newly Developed Scale for Children with Disabilities. *Tohoku J. Exp. Med.*, 237, 241-248.
2) Changwan Han, Yuki Yajima, Eunjoo Lee, Kazuo Nakajima, Makiko Meguro &

Masahiro Kohzuki (2005) Validity and Utility of the Craig Hospital Inventory of Environmental Factors for Korean Community-Dwelling Elderly with or without Stroke. *Tohoku J. Exp. Med.*, 206, 41-49.

3) Changwan Han, Aiko Kohara & Masahiro Kohzuki (2015) Development of Scale to Special Needs Education Assessment Tool (SNEAT). *Asian Journal of Human Services*, 7, 125-134.
4) Hideki Toyoda (2007) Covariance Structure Analysis: Amos. Tokyo-Tosyo.
5) James H. Steiger (1998) A note on multiple sample extensions of the RMSEA fit index. *Structural Equation Modeling*, 5(4), 411-419.
6) Lee J. Chronbach (1951) Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.
7) Shinji Koshio (2004) The Analysis of Psychology and Survey via SPSS and Amos. Tokyo-Tosyo.

Asian Journal of HUMAN SERVICES
Asian Society of HUMAN SERVICES

Asian Journal of Human Services
VOL.10 April 2016

Editor-in- Chief Masahiro KOHZUKI

Presidents Masahiro KOHZUKI・Sunwoo LEE

Publisher Asian Society of Human Services
Faculty of Education, University of the Ryukyus, 1 Senbaru, Nishihara-cho, Nakagami-gun, Okinawa, Japan
FAX: +81-098-895-8420 E-mail: ashs201091@gmail.com

Production Asian Society of Human Services Press
Faculty of Education, University of the Ryukyus, 1 Senbaru, Nishihara-cho, Nakagami-gun, Okinawa, Japan
FAX: +81-098-895-8420 E-mail: ashs201091@gmail.com

Asian Journal of Human Services
VOL.10 April 2016

CONTENTS

ORIGINAL ARTICLES

SHORT PAPER

Published by
Asian Society of Human Services
Okinawa, Japan