

A study on the Development and Validation of Disability Empathy Scales for Pre-Service Early Childhood Teachers

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ABSTRACT

This study aimed to develop and validate a tool that can measure the degree of empathy for disabilities of pre-service early childhood teachers. Through this, it is intended to improve the professionalism of pre-primary early childhood teachers related to inclusive education with disabilities. First, the conceptual definition of disability empathy was established through the search for prior research, preliminary questions were developed and tool validation was carried out. The survey was conducted with 209 university students majoring in early childhood education in Gyeonggi-do, South Korea. As a result of the study, the disability empathy scale consisted of 14 items with 3 factors, and the sub-factors were named cognitive empathy, emotional empathy, and expressive empathy. As a result of confirmatory factor analysis to confirm the internal factor structure of the disability empathy scale, it was found that the three-factor model adequately explains the data. Based on the study results, the significance and implications of the study were discussed.

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INTRODUCTION

Inclusive education for children with disabilities is to educate CHILDREN with disabilities and non-disabled children together. Inclusive education for children with disabilities is mainly conducted in kindergarten special classes and daycare centers for the disabled. Through this integrated education, children with disabilities and ordinary children grow and develop together. In the past, physical integration was primarily emphasized, but recently, inclusive education has been emphasized in terms of social integration and educational efficiency. For inclusive education to continue to grow, social awareness must be improved and the educational rights of children with disabilities and non-disabled children must be satisfied at the same time. The main factor for success is the professionalism of teachers (Choi, 2022). However, in the field, teachers continue to report difficulties in implementing inclusive education for children with disabilities (Baek, 2005; Lim, 2009; Kim & Lee, 2017; Ahn, & Lee, 2019; Park et al., 2021). This suggests that more systematic education is needed to develop the expertise of integrated education for children with disabilities. And if such education is to be carried out systematically, it should start with the education of pre-primary early childhood teachers. Pre-primary teachers are receiving education on understanding disabilities through the completion of an introductory course on special education. However, it is difficult to acquire expertise in the characteristics of disabilities or the education of children with disabilities only by completing this course. There is a need for more specific and practical pre-service teacher education for disabilities.

The success or failure of inclusive education for children with disabilities can depend on the teacher's positive or negative attitude (Lee, 2006). For inclusive education for children with disabilities to be successful, a culture of understanding and empathy for disabilities must be formed (Bang & Choi, 2019). Empathy refers to the ability to understand and respond appropriately to the minds of others (Leiberg & Anders, 2006). Various approaches to the concept of empathy are possible, but they are broadly divided into cognitive empathy and emotional empathy. Cognitive empathy is a cognitive understanding of the other person's thoughts and perspectives. Emotional empathy is sharing and feeling the emotions of the other person. Empathy is essential for developing an attitude of understanding and accepting others. Through empathy, you can understand the other person's point of view, respect their opinions, and com-

municate effectively. Therefore, teachers need to develop empathy to communicate with students. In particular, empathy is an essential quality for teachers who educate children with disabilities.

Previous studies report that empathy has a positive effect on teacher job satisfaction, teacher efficacy, and professional development (Koo, 2012; Kim et al., 2017; Kang & Oh, 2020; Lee & Han, 2020). Kim (2020) also reported that teachers' empathy ability has a positive effect on interaction with infants and young children. As such, the empathy ability of early childhood teachers plays an important role in teacher-toddler interaction and communication (Vorkapic & Ruzic, 2013). Koo (2012) said that teachers' empathy ability showed a high correlation with teacher efficacy in the special education scene, and Ko & Kwon (2018) argued that future education should be conducted in the direction of improving empathy ability. These studies suggest the importance of teachers' empathy. For successful inclusive education for children with disabilities, it is necessary to improve teachers' ability to empathize with disabilities.

Disability empathy is a combination of disability and empathy. Disability empathy is the ability to think and understand from the standpoint of a student with a disability and to respond appropriately. It means cognitive understanding, emotional sharing, and practical response to disability (Jung, 2019). In other words, empathy with disabilities means understanding the emotions felt by children with disabilities, communicating based on them, and responding in the way they need (Peck, 2012).

Looking at the empathy studies conducted so far in inclusive education, empathy fatigue and exhaustion in special education for early childhood (Hwang et al., 2021), a study on the empathy ability of mothers of children with disabilities (Jo, 2020), and emotional empathy of pre-school teachers It can be seen that there are ability studies (Lee & Eo, 2020) and early childhood teachers' empathy research (Baek & Kang, 2018). Sharma and co-authors (2021) used the empathy scale and attitude scale toward disability while studying empathy and attitude toward students with disabilities. Perenc and Peczkowski (2018) also used the cognitive empathy scale and the emotional empathy scale in a study to measure attitudes toward children with disabilities. Parchomuk (2019) studied teachers' empathy for children with disabilities, using the empathy scale and the disability scale. In many studies like this, it can be seen that the general empathy scale is used to measure empathy for children with disabilities. Representative examples of empathy scale studies include a study on the development

of an empathy scale for early childhood teachers (Oh & Hwang, 2020), a study on the development of a basic empathy scale for preservice teachers (Lee, 2021), and a study on the development of a cognitive empathy scale for college students (Ryu, 2019). A study on the development of an empathy scale for general adults (Kim & Kim, 2017; Heo et al., 2019), a study on the shortened Korean version of the empathy scale for nursing students (Yeo, 2012), and others. These scales measure empathy in general situations, and there is a limit to measuring the level of empathy for a disability.

Empathy is difficult to see as a single dimension and is a multidimensional component of a complex concept (Bohart & Greenberg, 1997). Therefore, the empathy measurement method and results may vary depending on which factors are centered on the operational definition. To measure empathy with disabilities, it is necessary to explore the components of empathy with disabilities and to develop a measurement tool based on this. When using a scale that does not reflect the characteristics of students with disabilities or disabilities, there is a limit to accurately measuring the construct. Therefore, this study aims to develop and validate a scale that can accurately and objectively measure the degree of empathy for pre-primary early childhood teachers.

This study aims to develop and validate a disability empathy scale for pre-primary teachers. The research questions for this are as follows:

1. Does a disability empathy scale demonstrate adequate reliability and validity?
2. What factors empirically comprise the construct of the disability empathy scale?

METHOD

Participants

The subjects of this study were 209 students majoring in early childhood education attending universities in Gyeonggi-province, South Korea. Since this study is aimed at students who are studying special education for early childhood at universities, convenience sampling was used to select the study subjects. The criteria for the selection of study subjects were pre-service teachers who had completed at least one special education course. The purpose of the study was explained to the study participants, and an online survey was conducted using Naver Form based on the subjects who agreed to participate in the study. The contents of the survey consisted of questions asking about basic personal information, empathy with disabilities, and general empathy to check criterion va-

lidity. The total number of people who responded to the questionnaire was 209, and the response rate was 100%. Looking at the distribution of respondents, 13 males and 196 females by gender, with an average age of 22.1 years. By grade, there were 41 first graders, 69-second graders, 56 third graders, and 43 fourth graders.

Developing tools

The process of developing a tool for measuring empathy for disability was carried out in the order of 4 steps (concept definition, preliminary question development, preliminary survey, and main survey) suggested in previous studies (Netemeyer et al., 2003; Choi, 2020). In this study, scale development research was conducted focusing on the educational aspect of empathy with disabilities. For this purpose, preliminary questions were constructed based on the empathy scale (Oh & Hwang, 2020; Lee, 2021) and the scale of attitude toward disability (Dachez et al., 2015). In this study, disability empathy was defined as 'the ability to empathize and express the emotions and behaviors of children with disabilities based on their understanding of the disability. Such empathy for a disability includes not only emotional empathy but also the behaviour of expressing and practicing empathy.

Preliminary questions were composed according to the definition and scope of the concept of empathy with disabilities. The items of empathy with disabilities were based on the content of empathizing with the emotions and behaviors of children with disabilities, and sub-factors were based on the areas commonly emphasized in previous studies (Oh & Hwang, 2020; Lee, 2021; Kim & Kim, 2017; Dachez et al., 2015; Findler et al., 2007). Sub-factors of the empathy scale include cognitive empathy, emotional empathy, and expressive behavioral empathy. And the sub-factors of the attitude scale toward disability are composed of cognition, emotion, and behavior. In this study, items were developed with an emphasis on the empathy that teachers feel when guiding children with disabilities in the scene of inclusive education. Thus, the sub-components of empathy with disabilities include cognitive empathy, emotional empathy, and expressive empathy. Cognitive empathy is the ability of children with disabilities to understand what they are feeling and to communicate based on that understanding. Emotional empathy is the ability to pay attention to and feel the emotions of children with disabilities. Expressive empathy refers to the ability to understand the thoughts and feelings of children with disabilities and to respond in the way they need help. These obstacle em-

pathy factors are organically connected. Empathy with emotional disability plays a role in motivating empathy, and cognitive empathy plays a role in transforming emotional experience. Through empathy for these cognitive and emotional, an expressive response is made.

In order to secure the validity of all items and the contents of each factor, content validity verification was conducted with one pedagogical expert and one special education specialist for early childhood. These are experts who have experience teaching special education courses at universities. Six items that were agreed to have low content validity based on the way of expression of the items, the degree of comprehension of the contents, and appropriateness were deleted. Through this review process, the contents of the items were corrected and supplemented, and 35 items were finally selected.

In order to confirm the reliability and validity of the selected items, a preliminary survey was conducted targeting pre-preschool teachers. The subjects of the survey were 77 university students majoring in early childhood education in Y city. As a result of the preliminary investigation, 7 components of empathy for disability were extracted. To increase the simplicity and usability of the scales, the items for each factor were examined. We checked whether each item and the factors are properly matched, but 10 items were deleted because there was a

case where a single item was overloaded with multiple factors. And 4 items were deleted because the items were loaded on factors other than the corresponding factors. Finally, 7 items that caused a decrease in reliability were deleted. Through this reliability and validity check process, the final 14 items of this study were confirmed. Previous studies suggested that the optimal number of items for each factor should be considered in consideration of the parsimony principle that a good theory should have (Gould et al., 2011; Ko & Kim, 2016). In this study, the final items were confirmed by selecting the optimal number of items that best represent each factor.

The main survey was conducted with 209 pre-preschool teachers, and the questions of the final disability empathy scale were completed after confirming reliability and validity. The reliability of the scale was .873. As a result of the factor analysis, the disability empathy scale appeared to have a three-factor structure, and the correlation analysis results also showed that each factor was closely related by showing a correlation value above the middle of the overall scale. The items on the scale consist of a total of 14 items and are measured in a 5-point Likert format. The scale ranges from 'not at all (1 point)' to 'very much (5 points)'. Previous studies related to the empathy scale and examples of items are presented in Table 1 and Table 2.

Table 1. Previous studies related to disability empathy scale

Author	Scale	Factor
Hee-Jeong Oh, Hae-Ik Hwang (2020)	Empathy Scale for Pre-Education Teachers	cognitive empathy emotional empathy expressive empathy
Yunok Lee (2021)	Basic Empathy Scale	cognitive empathy emotional separation emotional transfer
Yunhee Kim, Jinsook Kim (2017)	Empathy Scale	sincerity proxy appraisal understanding emotions
Findler et al., 2007	French Validation of the Multidimensional Attitude Scale Toward Persons with Disabilities (MAS)	Behaviours Cognitions Affects
Dachez et al., 2015	Multidimensional Attitudes Scale Toward Persons With Disabilities (MAS)	Negative affects Calm Cognitions Behaviours

Table 2. Example items

Factor	N	Item
cognitive empathy	5	When I talk to children with disabilities, I will think from their point of view.
emotional empathy	5	When a child with a disability is happy, I will rejoice as well.
expressive empathy	4	I will comfort children with disabilities with warm words

Data Analysis

For the development and validation of the Disability Empathy Scale, concept definitions and preliminary questions were formed based on previous studies, and reliability and validity analyses were performed. For reliability analysis, the internal consistency index (Cronbach's α coefficient) was used. For factor analysis to confirm component validity, exploratory factor analysis, and confirmatory factor analysis were performed. Before the factor analysis, Kaiser-Meyer-Olkin's measure of sampling adequacy and Bartlett's test of sphericity were checked. For the exploratory factor analysis, the main axis factor analysis and the Varimax rotation method were used. For confirmatory factor analysis, the parameters were estimated using the maximum likelihood method, and the absolute fit indices χ^2 and TLI, CFI, and RMSEA were used as fit indices. Criteria validity was confirmed by performing correlation analysis with the Basic Empathy Scale. The statistical tools used in this analysis process are SPSS 22.0 and Amos 20.0.

RESULTS

Validation

First, the descriptive statistics and reliability of each item of the disability empathy scale were analyzed. Table 3 presents the average, standard deviation, and reliability of each item of the disability empathy scale. Each item is measured in a 5-point Likert format and has a score range from 1 to 5. The average of the disability empathy scale items was 4.16 to 4.43 for cognitive empathy, 3.89 to 4.00 for emotional empathy, and 4.03 to 4.50

for expressive empathy. The reliability of the overall scale was .873. Looking at the reliability of each sub-factor, cognitive empathy was .835, emotional empathy was .859, and expressive empathy was .776. Their values are presented in Table 3.

Exploratory factor analysis was conducted to confirm the internal factor structure of the disability empathy scale. Before conducting exploratory factor analysis, KMO values and Bartlett's sphericity test were performed to check the suitability of the data. As a result of the analysis, the KMO value was found to be .802, and Bartlett's sphericity test also showed a significant level of $p < .001$, indicating that the data were suitable for factor analysis. As a result of the exploratory factor analysis, 7 factors with an eigenvalue of 1 or higher were extracted, and the cumulative explanatory variance was 69.9%. For the economic feasibility of the scale, all items that were not loaded with the relevant factor and those that were double-loaded on several factors were deleted. Afterward, the items were sorted in the order of highest correlation between the items and the total score, and the factors and the contents of the items were reviewed. After going through this process, exploratory factor analysis was performed again. As a result, a total of three factors were extracted according to the criteria of eigenvalue 1 or higher, and the cumulative explanatory variance of these factors was 64.0%. The number of items finally confirmed as the disability empathy scale was 14, a three-factor structure. Factor 1 represents emotional empathy, factor 2 represents cognitive empathy, and factor 3 represents expressive empathy. Emotional empathy consists of items that feel and empathize with the feelings that children

Table 3. Descriptive statistics and internal consistency

Factor	Item	Range	M	SD	Cronbach's α
cognitive empathy	1	1-5	4.17	.71	.835
	2	1-5	4.43	.62	
	3	1-5	4.19	.70	
	4	1-5	4.16	.73	
	5	1-5	4.23	.71	
emotional empathy	6	1-5	4.00	.65	.859
	7		3.89	.70	
	8		3.93	.66	
	9		3.93	.75	
	10		3.91	.85	
expressive empathy	11	1-5	4.30	.59	.776
	12	1-5	4.03	.68	
	13	1-5	4.20	.61	
	14	1-5	4.50	.65	
Total	14				.873

Table 4. **Factor loadings (N=209)**

N	Item	Factor1	Factor2	Factor3
1	I will try to feel the feelings of children with disabilities.	.823		
2	I will share my feelings when a child with a disability is having a hard time.	.800		
3	I will respect the feelings of children with disabilities.	.792		
4	When a child with a disability is happy, I will rejoice as well	.758		
5	When a child with a disability is sad, I will grieve together.	.626		
6	When I talk to children with disabilities, I will think from their point of view.		.826	
7	I will try to recognize the sad feelings of children with disabilities.		.755	
8	I will try to recognize the joyous feelings of children with disabilities.		.748	
9	I will try to understand emotions through facial expressions of children with disabilities.		.739	
10	I will try to understand emotions through the behaviour of children with disabilities.		.709	
11	I will comfort children with disabilities with warm words			.862
12	I will express words of encouragement to children with disabilities			.741
13	I will listen to children with disabilities with an attitude of interest			.701
14	I will faithfully answer the words of children with disabilities.			.618
	Cumulative %	64.0		
	Eigen value	5.4	2.1	1.2

with disabilities feel. Cognitive empathy consists of items related to empathy in the cognitive dimension to understanding the situation, thoughts, and emotions of children with disabilities. Expressive empathy consists of items that understand the emotions and thoughts of children with disabilities and expressing them through verbal and non-verbal actions. The final factor structure and factor matrix of the disability empathy scale are presented in the following (Table 4).

Factor Structure

Comparing models

To confirm the internal factor structure of the disability empathy scale, confirmatory factor analysis was performed. As a result of the exploratory factor analysis, the disability empathy scale appeared as a three-factor structure, and in the confirmatory factor analysis, the

three-factor model was found to explain the data best. The three-factor model refers to a model in which the items constituting the disability empathy scale are loaded on each factor of cognitive empathy, emotional empathy, and expressive empathy. After the three-factor model was constructed, the fit was analyzed, and the results are presented in Table 5. As a result of the analysis, each fit index satisfies the fit index criteria with TLI .905, CFI .922, and RMSEA .08 (Hu & Bentler, 1995).

Correlations

As a result of correlation analysis for each sub-factor of the Disability Empathy Scale, it was found that the sub-factors of the Disability Empathy Scale were closely related to each other. The correlation coefficient between sub-factors was .322 to .540. To confirm the criterion validity of the empathy scale with disabilities, the correla-

Table 5. **Model Fit (N=209)**

model	χ^2	df	χ^2_{df}	TLI	CFI	RMSEA
model	180.324***	74	2.43	.905	.922	.08

*** $p < .001$

Note. TLI=Turker-Lewis index; CFI=Comparative Fit Index; GFI=Goodness of Fit Index; RMSEA=Root Mean Square Error of Approximation, AIC=Akaike information criterion.

Table 6. **Correlations**

Factor	cognitive empathy	emotional empathy	expressive empathy	Disability Empathy Scale
cognitive empathy	1			
emotional empathy	.390**	1		
expressive empathy	.322**	.540**	1	
Basic Empathy Scale				.745**

*** $p < .001$, ** $p < .01$

tion with the basic empathy scale (Lee, 2021) was investigated. As a result of correlation analysis, the disability empathy scale developed in this study and the basic empathy scale showed a correlation of .745. Based on these results, it can be seen that the disability empathy scale developed in this study is a reliable and valid tool. The analysis results are presented in Table 6.

CONCLUSION

This study aims to develop and validate a scale measuring disability empathy for pre-preschool teachers. The tools were justified through exploratory factor analysis, confirmatory factor analysis, and reliability analysis. This is to be used as basic data for pre-primary early childhood teachers' professionalism in inclusive education with disabilities and to improve the quality of inclusive education. The discussion according to the results of this study is as follows.

Firstly, 41 items that can measure disability empathy were constructed through the item development process, and exploratory factor analysis and confirmatory factor analysis were conducted. As a result, 14 items of the 3 factors of cognitive, emotional, and expressive empathy were extracted. The reliability value, which is the index of internal consistency of all items, was .873, which was good. The criterion validity through correlation with the existing empathy scale was also found to be at a good level, confirming convergence and discriminatory validity.

According to previous studies (Lee, 2021; Lee et al., 2018; Oh & Hwang, 2020), the empathy scale consists of a multi-factor structure. In a study by Kim & Kim (2017), empathy was composed of core factors of cognition, emotion, and attitude. In particular, a previous study (Oh & Hwang, 2020) argued that early childhood teachers' empathy should be measured in a complex way, including cognitive, emotional, and expressive empathy. In this study, the sub-factors of disability empathy were revealed as three factors: cognition, emotion, and expression, indicating that a complex measurement

was possible. However, in the study of Lee (2021) and Lee et al. (2018), the sub-elements of empathy consisted of factors of cognition and emotion, which is a different result from the factor composition of this study. Yeo (2012) said that cognition and emotion appear as stable factors in the constituent factors of the empathy scale, but it is necessary to consider whether to separate empathy revealed in behavior as another factor. In this study, expressive empathy, a behavioral factor, emerged as a new factor. This seems to be because empathy has multidimensional properties, but these dimensions tend to coexist and coexist rather than clearly distinguish each other. In other words, it is because cognition, emotion, and attitude, which are sub-elements of empathy, are closely connected. These results reflect that the disability empathy scale developed in this study is a valid tool.

Secondly, in this study, expressive empathy, which is a behavioral empathy factor, was extracted as the third factor of empathy with disabilities. Empathy tends to be better communicated when expressed in action. Through the expression of empathy, we can maintain social relationships and develop prosocial behaviors (Roberts et al., 2014). Therefore, while recognizing and sharing other people's feelings is important, the act of expressing them outwardly is also important. Barrett-Lennard's recurrent empathy model (1981) also reported that empathy expands by giving and receiving each other. In particular, in the case of children with disabilities, social interaction skills can be developed through the empathic behavior of each other. Ryu (2017) also reported that the role of teachers in empathic interaction and the acquisition of social skills is most important.

Thirdly, in the meantime, empathy for children with disabilities was measured by adapting foreign scales or using general empathy scales. However, to measure psychometric properties more accurately and objectively, it is necessary to develop a scale that considers the specificity of the construct. In recent years, as education to understand disability has rapidly increased, programs for empathizing with disabilities are also expanding. However,

no scale can measure the specific construct of disability empathy. In that respect, this study is meaningful in that it developed and validated a scale for pre-primary early childhood teachers by reflecting the specificity of empathy with disabilities. By using this scale, it is possible to measure the degree of empathy for pre-primary teachers more accurately, and based on the measurement results, it is possible to operate a learner-tailored disability empathy program. These efforts will contribute to improving the quality of inclusive education for children with disabilities and enhancing the professionalism of teachers.

The significance of this study is summarized as follows. First, the importance of inclusive education for children with disabilities was recognized in the absence of a measure to measure the disability empathy of pre-pre-school teachers. Second, as a result of the factor analysis conducted in this study, empathy for disability showed a three-factor structure: cognitive, emotional, and expressive. This shows the same factor structure as the existing empathy scale, suggesting that empathy with disabilities has a multidimensional structure like empathy. Third, this study was justified for use in the scene of inclusive education for children with disabilities targeting pre-primary teachers. In the future, early childhood teachers can

also use this tool to develop their expertise in teaching children with disabilities. In addition, it can be applied to various research on empathy with disabilities and the development of educational programs to improve empathy for people with disabilities.

The limitations related to the results of this study and suggestions for follow-up studies are as follows. First, in the process of validation and reliability verification, 14 items out of 41 original scale items were finally confirmed. A follow-up study is needed to determine whether such a result is a result of the application process of empathy for disability. Second, this study was aimed at pre-primary early childhood teachers. In follow-up studies, it is necessary to make efforts to expand and generalize inclusive education targeting elementary, middle, and high school teachers, and to cultivate teacher professionalism.

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