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The Factors Affecting the Adaptation of Junior High School Students with Severe Disabilities to Inclusive or Segregated Educational Settings

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Abstract. The aim of this research is to explore the factors of the adaptation of junior high school students with severe disabilities (SD) to inclusive or segregated school environments. The study was based on survey data gathered from 868 students with SD who were studying in junior high schools of Taiwan. The research found that: (1) Language, cognitive, and visual abilities are key factors for succeeding in an inclusive education setting; (2) Language skills are correlated with successful adaptation for students with SD; (3) Children with certain types of disabilities are diagnosed later than children with other disabilities and therefore receive intervention later; (4) The relationships among intervention timing, language skills, and school adaptation for children with SD vary by disability types. There are implications for improving interventions for SD based on these research findings.

Keywords: early intervention, inclusive school, intervention timing, language skills, students with severe disabilities

Introduction

The National Center for Educational Statistics reported that fifty percentage of students with disabilities spent more than eighty percentage of their time in the general education system (Madden, 2012; Michael & Trezek, 2006). Educators believe social skills are crucial to effectively integrate students with disabilities into the general education system. It showed that children with disabilities who study in typical life circle have developed more positive social behaviors than the children studying in more segregated contexts (Alquraini & Gut, 2012; Koegel, Koegel, Frea, & Fredeen, 2001). Moreover, inclusive education allows students with disabilities to interact with typical students, which prevents students from being labeled. In past decades, many countries, including the United States and Taiwan, enacted some regulations to ensure that students with

disabilities are included in typical education system (Alquraini & Gut, 2012; Special Education Act of Taiwan, 2009).

The exterior placement of students with disabilities into general classrooms does not mean a meaningful inclusion (Brown, Ouellette-Kuntz, Lysaght, & Burge, 2011). Educational adaptation thus is an important clue for evaluating whether the education system is proper for the children or not. It is suggested to develop a way to assess a child's adaption in school.

Some researches argued that inclusive education should be insisted only when the children could achieve positive academic (Oliver, 2008; Rous, Hallam, McCormick, & Cox, 2010). If a child cannot adapt well to a mainstream environment, transferring to a more segregated learning setting might be a more appropriate placement for the student to have improved academic experience. The disability of a child should be considered to lead him into certain activities (World Health Organization, 2001). If an education system can afford the students an environment to take part in more school activities than another environment, then the first one is more appropriate for the student than the second. The student is perceived as having a milder disability in the first one than in the second setting. Koegel et al. (2001) and Huang (2003) studied the effect of school adaptation on student's interactions with their classmates and teachers and on participating in activities. It is claimed that these themes are important supports by the schools when the students study in inclusive schools (Kurth et al., 2015). Based on the literature review, this research evaluate students' overall school adaptation by their academic progress, activity participation, and social relationships.

Intervention Timing and School Adaptation. This study explored the factors that promoted a student's adaptation to school in an inclusive or segregated education system. It is thought that early intervention facilitates the children with disabilities adapt to inclusive school (Low & Lee, 2011). Many studies have demonstrated that intensive preschool intervention brings various benefits, including academic, social, and economic issues, and enables the children adapt to inclusive education setting (Zucker, 2010). Intervention during children's infancy and preschool stages has produced aggressive results and promote the children's educability (Rogow, 2005). Neuman (2007) concluded that interventions are more effective the earlier they are made. Several studies have indicated that identification and intervention in time can avoid development problems and promote developmental outcomes (Aron & Loprest, 2012; Puig, 2010; Renshaw et al., 2009; Shonkoff & Meisels, 2002). Other studies have tried to identify the ideal intervention timing that will maximize children adapting and learning well in an inclusive education setting (Akshoomoff, Stahmer, Corsello, & Mahrer, 2013; Stahmer, Carter, Baker, & Miwa, 2003). In accordance with previous

researches, the present research will explore the relationship between intervention timing and subsequent school adaptation.

Language Skills and School Adaptation. Akshoomoff et al. (2013) indicated that a child with a disability's school adaptation relates to communication skills. The child needs communication to interact with others or participate in activities. An example is that hallway greetings enable children to interact and initiate conversations with other persons. These greetings require oral language delivered (Rossetti, 2011). Language communication is important in mainstream setting for conveying a variety of messages; therefore, children should have ongoing opportunities to improve language skills (Low & Lee, 2011; Puig, 2010; Rogow, 2005). The 1960s' Head Start Program emphasized improving children's language ability to prevent them from learning failure in future schooling. It is believed that students adapt better when they have better language skills.

Intervention Timing and Language Skills. Interacting and developing relationships with others in various contexts contribute to a child's language skills; children's brain and their innate capacity to develop language skills are stimulated by the persons interacting with them (Puig, 2010). Many hospitals have established intervention programs to provide additional stimulation and organized activities for children with disabilities (Zucker, 2010). Studies have shown that intervention timing and the acquisition of language skills are related. Research in Norway, for instance, found that eight-year-old children with disabilities who were involved early intervention had better language ability than those who were not involved. Akshoomoff et al. (2013) found that the children who received early intervention obtained better scores in the communication subscale of the Vineland Adaptive Behavior Scale.

According to the reviewed literature, the relationships among early interventions, language skills, and school adaptation are significant. Therefore, this research will also explore how intervention timing, language skills and school adaptation are related with one another among the students with disabilities.

Children with Disabilities in Different Types and Levels. Many studies have claimed that intervention effectiveness, intervention timing, language skills, and school adaptation vary greatly with disability level and type. Neuman (2007) indicated that interventions for children with mild disabilities are generally more effective in intervention than for children with severer disabilities. For example, the abilities required of students with mild visual impairments (VI) to adapt to inclusive schools may be different from those required of students with severe VI. Livneh and Wilson (2003) found that life adaptation was impacted by disability level. Statistical analyses examining all disability levels simultaneously might lead to incorrect conclusions, the analyses of intervention issues should be performed for various disability level individually.

Alquraini and Gut (2012) noted that greater part of studies have focused on students with mild disabilities and advocated that more topics be conducted with the students with severe disabilities (SD). Some researches claimed to explore the critical components to include the students with severe disabilities into typical educational settings (Brock, Biggs, Carter, Cattey, & Raley, 2016; Kurth, Lyon, & Shogren, 2015). The present study focuses on students with SD. Inclusion setting afforded conditions for the students with SD to develop relationships and social abilities by contacting with their typical classmates (Alquraini & Gut, 2012). It is advocated to find the practice factors supporting the students with SD to effectively study in inclusive education setting (Brock, Biggs, Carter, Cattey, & Raley, 2016; Kurth, Lyon, & Shogren, 2015).

Children with disabilities in different types go through different difficulties to school and social adaptation. Children with severe cognitive impairment are worse at language of reception and expression (Alberta Education, 2009). Most of them also have difficulty learning words and speaking, and their language is typically with spatial terms (Gabel, Cohen, Kotel, & Pearson, 2013). Children with severe autism (AU) are not interested in communicating; consequently, they lack the abilities needed to effectively initiate, maintain, and end a reciprocal interaction. This limits their opportunities to mentally build the word for social behaviour (Low & Lee, 2011). Their language learning and intervention outcomes therefore tend to be different from those of children with other disabilities. On the children with a severe physical disability (PD), their mobility is restricted and they have restricted in participating in activities (Florian et al., 2006). Moreover, students with different disability severities in different education systems do not use the same abilities in their school adaptation. It is obvious that the abilities required in an inclusive setting may be different from those required in segregated environments because the two education systems have different conditions and resource types. Therefore, the present study will examine the relationships among intervention timing, language skills, and school adaptation individually for each disability type and education setting.

For the students with SD studying in inclusive school, it needs ensuring them access positive social relationship and learning opportunities (Carter et al., 2015). The purposes of this study are to attempt, based on the research findings, to improve current early intervention policies and allow the most students with SD to study and adapt well in an inclusive environment. It also seeks to facilitate the adaptation factors if the student with SD is placed in a segregated environment. Here are some questions this research intends to answer: (1) Do the students with SD adapt well in inclusive education settings or segregated settings? What factors made the children with SD be placed in an inclusive or a segregated education

system? (2) How the relationship among intervention timing, language skills, and school adaptation differs among the students with different disability type? (3) How the relationship among intervention timing, language skills, and school adaptation differs between the students in inclusive and segregated educational systems.

Method

Research Design. There are three latent variables used for analysis in this study: intervention timing, language skills, and school adaptation. These variables were derived from survey data collected from the parents of Taiwanese junior high school students with SD. These data were retrieved from the database of the Special Needs Education Longitudinal Study of Taiwan (SNELS). In accordance with previous studies, a number of observed variables in the survey data which were reviewed and revised by 12 special specialist were considered to define the three latent variables. Next, the three latent variables were quantified by Confirmatory Factor Analysis (CFA). The CFA model contains the three latent variables, and each latent variable is factored by observed variables. The following explains what each latent variable measures and the observed variables identified via CFA in them (see Table 1).

1. *Intervention timing.* It refers to the time a child starts to receive treatment to improve his/her development. This intervention must be afforded by professionals, who are be either special educators, therapists, or medical professionals. The observed variables of quantifying intervention timing were the earliest age of the child involved the intervention, the earliest age of the child's disability was identified, the earliest age of the child receiving a disability diagnose, and the earliest age of the child involved special education. The first two variables were chosen using the CFA to quantify the intervention timing latent variable. The unit of the variables was age.
2. *Language skills.* They refer to the oral communicating skills in expression and reception exhibited. The observed variables in quantifying this latent variable included parents' evaluations of their kid's language expression ability compared with peers, their kid's language comprehension ability compared with peers, their kid's verbal expression being understood by strangers compared with peers, and their kid's willingness to initiate language with others compared to peers. The first three variables were determined by CFA to quantify the latent variable. The score of the three observed variables distributed from 1 to 4, where 1 indicated that the student's language skills were as good as his/her schoolmates', 2 indicated inadequate language skills, 3 indicated poor language skills, and 4 indicated that the student cannot communicate with others at all.
3. *School adaptation.* In this study, school adaptation was represented by the children's social and academic performance in school. The observed variables for quantifying school adaptation included parental

satisfaction with their children's interactions with teachers, interactions with classmates, participation in activities, academic performance, and the parents' overall satisfaction with their kid's school experience. The CFA indicated that all five variables quantified the latent variable. The score of the observed variables distributed from 1 to 4, where 1 indicated very satisfied, 2 satisfied, 3 unsatisfied, and 4 very unsatisfied.

In CFA, the fitting observed variables are preserved in the model, and the loading factor of each observed variable was determined to quantify the latent variables (see Table 1). After the three latent variables were obtained, ANOVA and correlation analyses were conducted to identify which factors influence the choice of an inclusive or segregated school environment and how intervention timing, language skills, and school adaptation related with one another.

Table 1
Factor score weights from a CFA of intervention timing, language skills, and school adaptation

Latent Variables	Observed Variables	Factor Score Weights
Intervention Timing	Identification age	0.441
	Intervention age	0.303
Language Skills	Verbal expression	0.351
	Language comprehension	0.475
	Understood by strangers	0.307
School Adaptation	Interaction with teachers	0.156
	Interaction with peers	0.151
	Activity participation	0.084
	Academic performance	0.088
	Overall education	0.197

Subjects. The subjects in SNELS were chosen with random from the Taiwanese children with disabilities and age of 19 years or younger. The survey data included the participants' family background, demographic information, medical histories, education, after-school activities, and responses to several survey questions. The SNELS database was established in 2007 and developed 20 survey waves from 2007 through 2012.

The data used in this study were collected in 2009 survey conducted among the parents of 3180 junior high school students with disabilities. Because the present study focused on students with SD, 866 subjects with SD were included in the study. Among the 866 subjects, 519 subjects were male and 347 were female. The subjects' disability type profile is shown in Table 2.

Research Instrument. The SNELS data used in this research were obtained from surveys conducted from 2008 to 2009. The SNELS team manage the survey process, which includes questionnaire development, subjects sampling, survey administration, survey data verification, and report the primal data in their data bank. SNELS group is a survey organization supported by the

Ministry of Science and Technology of Taiwan. It comprises of 27 experts of special educators, sociologists, survey experts, statisticians, and data analysts etc.

Results and Discussions

Intervention Timing, Language Skills, and School Adaptation of Students in Inclusive or Segregated Settings. Table 2 shows that 39.8% (345) of the students with SD studied in inclusive schools or classrooms, and 60.2% (521) studied in segregated schools or classrooms. Post-hoc tests revealed that children with severe sensory and physical disabilities were more likely to study in inclusive environments than in segregated ones. However, children with cognitive disabilities, including AU and mental retardation (MR), tended to study in a segregated environment. What factors made the children with SD be placed in an inclusive or a segregated environment? Table 2 indicates that, with the exception of children with VI (F=0.00, p>.05), the language skills of the children studying in an inclusive environment were better than those of the children in a segregated environment. The ANOVA data displayed in Table 3 indicate that, with the exception of students with VI, the students from each disability type in an inclusive environment had significantly better language skills than those in a segregated one. However, the differences in intervention timing and school adaptation between the students in inclusive and segregated environments were insignificant with the exception of students with VI (F=9.60, p<.001).

Considering that most of the students in segregated environments had significantly worse language skills than those in inclusive environments, it is interesting to note that the skills of the students with VI in segregated environments were not significantly worse than those in inclusive environments (see Table 2). This phenomenon can likely be explained by their school adaptation. Table 3 shows that the students with VI in segregated setting adapted themselves to school significantly better than those who were in an inclusive environment. Students with VI in an inclusive environment cannot receive visual feedback when communicating with others and they cannot receive as much visual input during instruction in inclusive classrooms as their classmates do. In contrast, the students with VI in segregated environments have easily access to alternative visual equipment or teaching materials, such as voice basketball and Braille books. These supports helped VI students adapt themselves better and learn more in segregated setting than the students with VI in inclusive school environments. Therefore, the students with VI did not benefit from their good language skill in adaptation to school.

Table 2 also shows that 66.9% (n=111) of the students with a hearing impairment (HI) studied in an inclusive environment, while only 33.1% (n=32) studied in a segregated environment. The language skills of HI students in an inclusive environment (1.97) were worse than most of the students with other disability types in an inclusive environment. However, the language skills of the HI students in an inclusive setting

were still significantly better than those of the HI students in segregated environments. This implies that the HI students do not need good language skills as much as other SD students do to adapt well to an inclusive school environment. There are two explanations for this phenomenon. First, students with HI have normal visual ability. Therefore, although their language skills may not have been as good as those of their typical peers, having some oral language skills allows them to communicate with their peers or teachers by reading their body language and facial expressions. Second, these students have good mobility, which allows them to interact with their peers and teachers well and to participate in campus activities more frequently.

Among the students with SD in an inclusive environment, the students with AU had the worst language skills scores (Table 2). Although students with AU share common deficits in socialization and communication (Low & Lee, 2011), Table 2 shows that when in an inclusive environment, they adapt to school better than any of the other groups. This implies that they utilize abilities other than language skills to effectively adapt themselves to school. However, because the number of students with severe AU in an inclusive environment was small, further research is needed to confirm this conclusion. Table 2 shows that most of the students with AU (91.5%) and MR (93.0%) study in a segregated environment. Gabel et al. (2013) indicated children with MR had significant difficulty in learning words and speaking. Children with AU had difficulties in producing functional speech (Low & Lee, 2011). These imply that cognitive ability is another key factor to be considered when choosing an inclusive environment.

In summary, the data in Tables 2 and 3 imply the following three conclusions: (1) Language skills, visual ability, and cognitive ability were the three key abilities for students with SD studying in inclusive education settings. If one of these three abilities was insufficient, the student would eventually transfer to a segregated environment for adaptation. (2) The intervention timing varies with respect to disability type. However, for each disability type (except the MR and health impairments (HeI) groups, which had few subjects to run an ANOVA), the children in inclusive and segregated environments scored similarly in intervention timing. The results showed that earlier intervention did not help the students with SD succeed in an inclusive environment. However, it does not mean that we should deny the contribution of early intervention in the student's life. Further research is needed to clarify this result. (3) The students in both the inclusive and segregated groups achieved similar scores on school adaptation. It implies that in Taiwan, the system of special education placement used to assign children with SD to inclusive or segregated environments is appropriate.

Table 2

Numbers and means of intervention timing, language skills, and school adaptation by disability types and educational setting

Disability type			VI	HI	PD	HeI	MR	AU	MD	OD[a]	Total	$\chi 2$
	Inc[b]	(N)	31	111	65	66	3	6	44	19	345	334.02***
		(%)	55.4	66.9	66.3	97.1	7.0	8.5	13.1	65.5	39.8	
	Seg	(N)	25	55	33	2	40	65	291	10	521	
		(%)	44.6	33.1	33.7	2.9	93.0	91.5	86.9	34.5	60.2	
Inter-vention	Inc	(M)	1.36	1.53	1.39	0.72	0.82	2.36	1.01	0.72	1.22	
	Seg	(M)	0.95	1.50	1.04	NA	1.24	2.06	1.19	1.03	1.29	
Lang-uage	Inc	(M)	1.08	1.97	0.99	0.93	2.43	2.51	1.68	1.12	1.44	
	Seg	(M)	1.08	2.87	2.38	3.27	3.10	4.00	3.57	3.29	3.31	
Adapt-ation	Inc	(M)	2.08	1.86	1.90	1.93	2.25	1.60	2.00	1.91	1.92	
	Seg	(M)	1.61	1.95	2.08	2.58	1.98	2.10	2.01	1.70	1.99	

***p<.001

[a]OD indicates other disabilities

[b] Inc: inclusive educational setting; Seg: segregate educational setting

Table 3

ANOVA of intervention timing, language skills, and school adaptation by educational setting and disability type

		VI	HI	PD	HeI	MD	MR	AU	OD	Total
Interv-ention	F	1.50	0.04	2.40	/	1.86	/	/	1.69	
	Post							/		
Lang-uage	F	0.00	26.51***	38.31***	/	62.83***	/	/	39.45***	
	Post		Seg>Inc[a]	Seg>Inc		Seg>Inc		/	Seg>Inc	Seg>Inc
Adap-tation	F	9.60**	0.98	1.64	/	0	/	/	1.45	
	Post	Inc>Seg								

**p<.01. ***p<.001

/ indicates that one of the compared group's sample size is less than 10 and inappropriate for ANOVA

[a] Seg: the children were placed in segregate educational setting; Inc: in inclusive educational setting

Correlations Among the Three Latent Variables. How do the students with each disability type utilize their language skills to adapt to school? Are intervention timing, language skills, and school adaptation related with one another? Table 4 shows the correlations among the three latent variables by disability type and educational setting.

Language Skills and School Adaptation. As shown in Table 4, a high correlation (r=0.44; p<.05) between language skills and school adaptation was found for VI children in a segregated environment but not for those in an inclusive environment. This finding implies that although VI students in an inclusive environment may have good language skills, they do not rely on their language skills for school adaptation as much as VI students in a segregated environment do. This phenomenon is understandable because in general, language skills are an important element in communicating with others in a mainstream environment. However, for a student with severe VI in a mainstream environment, good language skills may not provide an advantage in school adaptation because good communication requires not only good language skills but also an ability to receive visual clues. However, good language skills may help students with severe VI adapt well in a segregated environment. In a segregated environment, all peers of a student with VI have the same disability and are taught by teachers who are specialized in handling VI students' needs; therefore, visual clues are not a critical factor for communication in segregated environments, and language skills become the only common tool that VI students use to communicate. Therefore, better language skills can result in better communication and better school adaptation.

Table 4 also displays that the language skills and school adaptation of students with PD in both inclusive and segregated environments are highly correlated. It is inferred that this phenomenon is caused in part by these students' insufficient mobility, which limits their opportunities to take part in school activities and increases the physical distance with their classmates (Florian et al., 2006). Therefore, when students with PD interact with others or participate in school activities, they rely heavily on their verbal abilities to compensate for their poor mobility.

This study also found that, in an inclusive environment, the language skills of the students with severe HI correlated with their level of school adaptation. The hearing impairment of students with HI directly influenced their language skills. Due to the nature of the disability, a child with severe HI typically engages in limited interactions with others (Brehm, 2010). Table 2 shows that the average language skills score of HI students in inclusive settings was 1.97, but the average score of HI students in segregated schools was 2.87. Students with HI who are in a segregated environment rely on skills other than conventional verbal skills, such as sign language, when communicating with their peers and teachers. Thus, the students with HI in segregated schools do not enhance their adaptation using oral language skills as their counterparts in inclusive schools do.

Table 2 also shows that, for students with multiple disabilities (MD) in a segregated environment, language skills correlated with school adaptation.

Because each student in the MD group had a unique combination of disabilities, this study did not explore the correlation between their language skills and school adaptation.

The analyses failed to find a correlation between the language skills and school adaptation for AU and MR in segregated setting. Table 2 shows that these students' language skills were poor (3.10 and 4.00 respectively). This result suggests that although language skills are related to school adaptation, if the language skills did not reach a certain cutoff, language skills alone could not facilitate school adaptation. Lastly, the language skills of the HeI did not correlate with school adaptation in an inclusive environment. Students with severe HeI are usually too weak to participate in school activities, and their school adaptation score is generally low. However, their language skills score (0.93) was the best among all the students with SD in inclusive setting. Because their language skills are good, their poor school adaptation may be attributed to their limited mobility. Overall, their language skills did not seem to correlate with their school adaptation based on the Pearson correlation analysis.

Intervention Timing and Language Skills. For the students with non-language-related disabilities, intervention timing should not correlate with language skills because their interventions did not include language programs. For a student with language-related disabilities, the student's language skills depend on the severity of the student's disability and on how much and how early the student received intervention. However, students who received an intervention earlier usually had severer disabilities. Therefore, there was a negative correlation (r=-.36, p<.05, see Table 4) between intervention timing and language skills in the AU group in the segregated environment. These results suggest that intervention timing alone does not explain school adaptation.

Table 4 shows that the VI group in the inclusive environment was the only group whose language skills correlated positively and highly with their intervention timing (r=.67, p<.01). The high correlation between intervention timing and language skills in this group can be understood by observing how toddlers acquire language. When a toddler acquires a language, he/she relies on visual feedback in addition to auditory input. Toddlers with VI may have to learn to rely on other senses to compensate for their lack of visual feedback during language acquisition. When a child with VI receives an intervention, the therapist gives most of his/her instructions to the child verbally, which requires the child to engage in language production oftener and earlier. In addition, through intervention, the child can learn how to use his/her other senses and other strategies to compensate for the visual impairment. This may explain why language skills were highly correlated with intervention timing in this group.

Table 4
Correlation among the three latent variables versus disability type in inclusive setting and in segregate setting.

	Inclusive			Segregate		
type	L-A	I-L	I-A	L-A	I-L	I-A
VD	.12	.67**	.16	.44*	.16	.13
HI	.26**	-.07	-.18	-.01	-.24	-.29
PD	.41**	-.18	-.04	.43**	-.05	-.18
HD	.13	-.09	-.29*	/	/	/
MR	/	/	/	.14	.13	-.1
AU	/	/	/	.07	-.36*	-.14
MD	-.13	.13	-.04	.31**	.03	-.01
OD	.30	-.06	.11	-.14	.48	.15
Total	.09*	.16**	-.13*	.26**	.06	-.02

*p<.05 **p<.01 ***p<.001
/ indicates the sample count is less than 10, and not appropriate to perform Pearson correlation anal**ysis.**

However, no such correlation was found among the students with VI in a segregated environment. Both VI groups had good language skills (1.08). The average intervention time for the inclusive group and segregated groups was 1.36 and 0.95 years of ages respectively. These results imply that the level of visual impairment among the segregated students was severer than among the students in the inclusive schools, and their disabilities were therefore identified and received intervention earlier. Figure 1 plots the average language skills by average intervention timing for all the students with VI. As this figure illustrates, if the children received intervention before they were 2 years old, the correlation between intervention timing and language skills was weak. However, if they received intervention later, between the ages of 2 and 4, the intervention timing was highly correlated with language skills. This may explain the absence of such a correlation in the segregated VI group, most of whom (24 out of 25) received their intervention before 1.5 years of age.

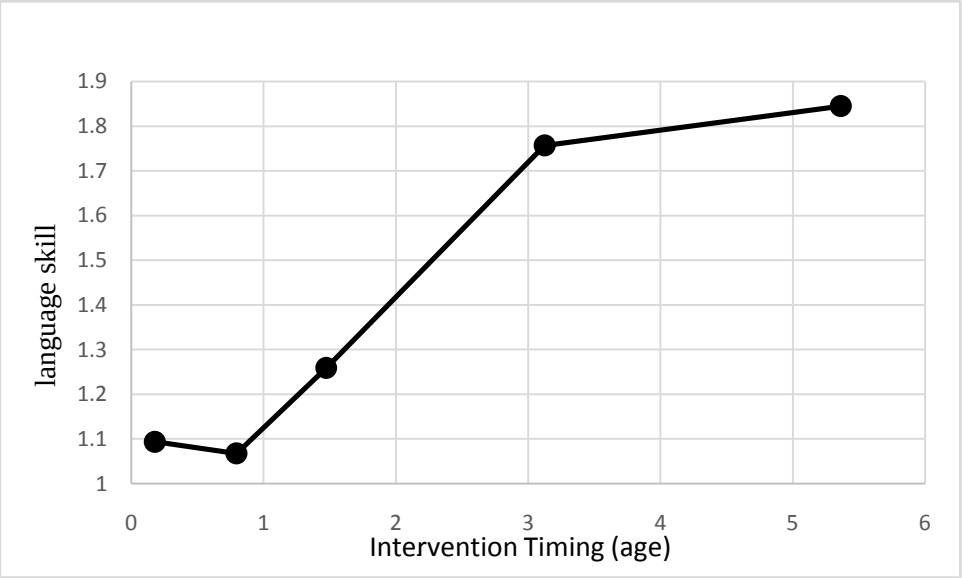

Figure 1: The correlation between intervention timing and language skills for students with VI

Conclusion

Typically, the severer disabilities receive earlier intervention, and for some disabilities, the severity of the impairment negatively impacts students' language skills and school adaptation. However, it appears that intervention timing affects language development if the intervention begins before 2 years of age. Overall, this study identified three factors that influence the choice of education system (inclusive or segregated) for junior high school students with SD: Early intervention did not make a student more likely to be in an inclusive education system or adapt well to it if the early intervention could not improve the children's language skills, visual ability, or cognitive ability. The study found that, except for the students with VI, the current education placement system in Taiwan is appropriate. Because school adaptation is determined by multiple factors, including language skills, visual ability, and cognitive ability, unless the intervention targets these factors directly, intervention timing does not correlate with school adaptation.

Suggestions

The findings suggest that language skills are critical for the school adaptation of children with SD, especially for those with certain types of disabilities. Even for non-language-related disabilities, early interventions should also include a language development program to help the children develop sufficient language skills. In these programs, children's language skills should be regularly examined and tracked to facilitate timely and appropriate training.

Our findings also suggest that it may be more advantageous to begin language development intervention before children are 2 years old. Therefore, a more aggressive identification system is needed to identify children with

disabilities, especially those with HI and AU, whose intervention timing is typically later than other types. As the students with VI, although studying in an inclusive environment generally benefits students with SD, children with severe VI did not appear to significantly benefit from studying in an inclusive environment. It is suggested that more support should be afforded for the students with severe VI in inclusive education setting or they should be considered for placing in a more segregated educational setting. For the students with mild or moderate VI, further research is needed to explain for their situation.

The language skills of the students with VI did not facilitate their inclusive school adaptation. However, it is worthwhile to distinguish school adaptation from societal and workplace adaptation. In certain environments outside of school, communication does not require visual feedback as in education setting, and language skills would thus be a more important factor in this group's successful adaptation. Language are the important skills that VI children use to communicate. Advocates must stress the need for promoting in these students' abilities.

Due to the nature of disabilities and education systems, the majority students with MR and AU study in segregated education settings, and most of the students with HeI studied in inclusive environments. Because in our dataset, the numbers of students with severe AU and MR in inclusive environments and HeI in segregated environments were small, future research should target these disability types more specifically to better explore the factors of these students' school adaptation. In addition, future researches are suggested to record the intensity and duration of participants' interventions (SNELS database does not have these data). Further data could then be analyzed to get the knowledge of how interventions can affect a child's language skills and cognitive abilities. Additional efforts are suggested to refine strategies to increase the replicability and sustainability of this intervention.

Finally, this study explored the relationship between intervention timing, language skills, and school adaptation among children with SD. Future research could replicate the present study among students with mild or moderate disabilities or among typically developing students to further examine the relationship between school adaptation and language skills. By comparing the relationships, it can be learned more about the underlying mechanisms of school adaptation. Another suggestion is to conduct researches of societal and workplace adaptation among individuals who have graduated from school and entered into society. A follow-up study to our research could trace the same subjects after they graduate and enter society and the workforce to find the differences in the quality of their academic, societal, and workplace adaptations.

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